**3GPP TSG-SA5 Meeting #154 *S5-241973***

Changsha, China, 15 - 19 April 2024

|  |
| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.541** | **CR** |  | **rev** |  | **Current version:** | **18.7.0** |  |
|  |
| *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 | **X** | Core Network | **X** |

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| --- |
|  |
| ***Title:***  |  |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | TEI18 |  | ***Date:*** | 2024-04-16 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | YANG SS is not matching the approved stage 2. |
|  |  |
| ***Summary of change:*** | Update YANG code to match existing stage 2. |
|  |  |
| ***Consequences if not approved:*** | Stage 2 and Stage 3 mismatch; interoperability problems. |
|  |  |
| ***Clauses affected:*** | Only Forge |
|  |  |
|  | **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:*** | YANG Forge MR link: <https://forge.3gpp.org/rep/sa5/MnS/-/merge_requests/1101> at commit efc2c4eb8f12d7fdc23ac3855eeb22502d986cbe |
|  |  |
| ***This CR's revision history:*** |  |

Forge MR link: <https://forge.3gpp.org/rep/sa5/MnS/-/merge_requests/1101> at commit efc2c4eb8f12d7fdc23ac3855eeb22502d986cbe

\*\*\* START OF CHANGE 1 \*\*\*

\*\*\* yang-models/\_3gpp-5gc-nrm-neffunction.yang \*\*\*

<CODE BEGINS>

module \_3gpp-5gc-nrm-neffunction {

 yang-version 1.1;

 namespace urn:3gpp:sa5:\_3gpp-5gc-nrm-neffunction;

 prefix nef3gpp;

 import \_3gpp-common-managed-function { prefix mf3gpp; }

 import \_3gpp-common-managed-element { prefix me3gpp; }

 import ietf-inet-types { prefix inet; }

 import \_3gpp-common-yang-types { prefix types3gpp; }

 import \_3gpp-common-yang-extensions { prefix yext3gpp; }

 import \_3gpp-common-top { prefix top3gpp; }

 import \_3gpp-5g-common-yang-types { prefix types5g3gpp; }

 import \_3gpp-5gc-nrm-nfprofile { prefix nfp3gpp; }

 organization "3gpp SA5";

 contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

 description "This IOC represents the NEF function in 5GC. For more

 information about the NEF, see 3GPP TS 23.501.

 Copyright 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI,

 TTA, TTC). All rights reserved.";

 reference "3GPP TS 28.541";

 revision 2024-04-12 { reference CR-1218 ; }

 revision 2023-09-18 { reference CR-1103 ; }

 revision 2023-09-18 { reference CR-1043 ; }

 revision 2023-04-26 { reference CR-0916; }

 revision 2022-01-07 { reference CR-0643; }

 revision 2020-11-06 { reference CR-0412 ; }

 revision 2019-10-20 { reference "initial revision"; }

 grouping DnnInfoItemGrp {

 description "This data type represents set of parameters supported by NF

 for a given S-NSSAI. (See clause 6.1.6.2.97 of TS 29.510)";

 leaf dnn {

 type string;

 mandatory true;

 description "It represents supported DNN or Wildcard DNN if the NF

 supports all DNNs for the related S-NSSAI. The DNN shall contain the

 Network Identifier and it may additionally contain an Operator

 Identifier. If the Operator Identifier is not included, the DNN is

 supported for all the PLMNs in the plmnList of the NF Profile.";

 }

 }

 grouping SnssaiInfoItemGrp {

 description "This data type represents set of parameters supported by NF

 for a given S-NSSAI. (See clause 6.1.6.2.97 of TS 29.510)";

 list sNssai {

 description "It represents the S-NSSAI the NetworkSlice managed object

 is supporting. The S-NSSAI is defined in TS 23.003.";

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses types5g3gpp:SNssai;

 }

 list dnnInfoList{

 description "It represents list of parameters supported by the

 NF per DNN.";

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses DnnInfoItemGrp;

 }

 }

 grouping AfEventExposureDataGrp {

 description "This data type represents the AF Event Exposure data managed

 by a given NEF Instance. (See clause 6.1.6.2.50 TS 29.510";

 leaf-list afEvents { // stage 2 double defined

 type string;

 min-elements 1;

 description "It represents AF Event(s) exposed by the NEF after

 registration of the AF(s) at the NEF.";

 }

 leaf-list afIds {

 type string;

 min-elements 1;

 description "It represents list of application function identifiers of

 the managed PFDs.";

 }

 leaf-list appIds { // stage 2 shaky

 type string;

 min-elements 1;

 description "It represents list of internal application identifiers.";

 }

 }

 grouping PfdDataGrp {

 description "This data type represents the list of Application IDs

 and/or AF IDs managed by a given NEF Instance.

 (See clause 6.1.6.2.49 TS 29.510)";

 leaf-list appIds { // stage 2 shaky

 type string;

 min-elements 1;

 description "It represents list of internal application identifiers.";

 }

 leaf-list afIds {

 type string;

 min-elements 1;

 description "It represents list of application function identifiers of

 the managed PFDs.";

 }

 }

 grouping UnTrustAfInfoGrp {

 description "This data type represents information of an untrusted AF

 Instance. (See clause 6.1.6.2.95 TS 29.510)";

 leaf afId {

 type string;

 mandatory true;

 description "It represents associated AF id.";

 }

 list sNssaiInfoList {

 description "It represents S-NSSAIs and DNNs supported by the AF.";

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses SnssaiInfoItemGrp;

 }

 leaf mappingInd {

 type boolean;

 yext3gpp:initial-value false;

 description "When present, this attribute indicates whether the

 AF supports mapping between UE IP address (IPv4 address or IPv6 prefix)

 and UE ID (i.e. GPSI).

 True: the AF supports mapping between UE IP address and UE ID;

 False: the AF does not support mapping between UE IP address

 and UE ID.";

 }

 }

 grouping NefInfoGrp {

 description "This data type represents information of an NEF Instance.

 (See clause 6.1.6.2.48 TS 29.510).";

 list taiList {

 config false;

 description "List of TAIs";

 yext3gpp:inVariant;

 yext3gpp:notNotifyable;

 key idx;

 leaf idx { type uint32 ; }

 uses types3gpp:TaiGrp;

 }

 list taiRangelist {

 config false;

 description "Range of TAIs";

 yext3gpp:inVariant;

 yext3gpp:notNotifyable;

 key idx;

 leaf idx { type uint32 ; }

 uses nfp3gpp:TaiRangeGrp;

 }

 leaf nefId {

 type string;

 mandatory true;

 description "It represents the NEF ID.

 (see clause 6.1.6.3.2 of TS 29.510)";

 }

 list pfdData {

 config false;

 description "It represents PFD data, containing the list of internal

 application identifiers and/or the list of application function

 identifiers for which the PFDs can be provided.

 Absence of this attribute indicates that the PFDs for any internal

 application identifier and for any application function identifier

 can be provided.";

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses PfdDataGrp;

 }

 list afEeData {

 config false;

 description "It represents the AF provided event exposure data. The NEF

 registers such information in the NRF on behalf of the AF.";

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses AfEventExposureDataGrp;

 }

 list gpsiRanges {

 description "It represents list of ranges of GPSIs whose profile data

 is available.";

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses nfp3gpp:IdentityRange;

 }

 list externalGroupIdentifiersRanges {

 description "It represents list of ranges of external groups whose

 profile data is available."; // stage 2 definition is shaky

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses nfp3gpp:IdentityRange;

 }

 leaf-list servedFqdnList {

 type string;

 min-elements 1;

 description "It represents pattern (regular expression according to

 the ECMA-262 dialect [75]) representing the Domain names served by

 the NEF.";

 }

 leaf-list dnaiList {

 type string;

 min-elements 1;

 description "It represents list of Data network access identifiers

 supported by the NEF. The absence of this attribute indicates that

 the NEF can be selected for any DNAI.";

 }

 list unTrustAfInfoList {

 description "It represents list of information corresponding to the AFs.";

 min-elements 1;

 key idx;

 leaf idx { type uint32 ; }

 uses UnTrustAfInfoGrp;

 }

 leaf uasNfFunctionalityInd {

 type boolean;

 yext3gpp:initial-value false;

 description "When present, this attribute shall indicate whether the ,

 NEF supports UAS NF functionality:

 - True: UAS NF functionality is supported by the NEF.

 - False (default): UAS NF functionality is not supported by the NEF";

 }

 }

 grouping NEFFunctionGrp {

 description "Represents the NEFFunction IOC";

 uses mf3gpp:ManagedFunctionGrp;

 leaf sBIFQDN {

 description "The FQDN of the registered NF instance in the

 service-based interface.";

 type inet:domain-name;

 }

 list sNSSAIList {

 description "List of S-NSSAIs the managed object is capable of supporting.

 (Single Network Slice Selection Assistance Information)

 An S-NSSAI has an SST (Slice/Service type) and an optional SD

 (Slice Differentiator) field.";

 key "sd sst";

 uses types5g3gpp:SNssai;

 }

 list managedNFProfile {

 description "This parameter defines profile for managed NF(See TS 23.501)";

 min-elements 1;

 max-elements 1;

 key idx;

 uses types3gpp:ManagedNFProfile;

 }

 leaf-list capabilityList {

 description "List of supported capabilities of the NEF.";

 reference "3GPP TS 23.003";

 type string;

 }

 leaf isCAPIFSup {

 type boolean;

 yext3gpp:inVariant;

 }

 list nefInfo {

 description "This attribute represents information of an NEF NF Instance.";

 key idx;

 leaf idx { type uint32 ; }

 uses NefInfoGrp;

 }

 }

 augment "/me3gpp:ManagedElement" {

 list NEFFunction {

 description "5G Core NEF Function";

 reference "3GPP TS 28.541";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses NEFFunctionGrp;

 }

 uses mf3gpp:ManagedFunctionContainedClasses;

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 1 \*\*\*

\*\*\* START OF CHANGE 2 \*\*\*

\*\*\* yang-models/\_3gpp-5gc-nrm-nfprofile.yang \*\*\*

<CODE BEGINS>

module \_3gpp-5gc-nrm-nfprofile {

 yang-version 1.1;

 namespace urn:3gpp:sa5:\_3gpp-5gc-nrm-nfprofile;

 prefix nfp3gpp;

 import \_3gpp-common-yang-types { prefix types3gpp; }

 import ietf-inet-types { prefix inet; }

 import ietf-yang-types { prefix yang; }

 import \_3gpp-5gc-nrm-nfservice { prefix nfs3gpp; }

 organization "3gpp SA5";

 contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

 description "NF profile class.

 Copyright 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI,

 TTA, TTC). All rights reserved.";

 reference "3GPP TS 29.510";

 revision 2024-04-12 { reference CR-1218 ; }

 revision 2023-11-18 { reference CR-1103 ; }

 revision 2023-09-18 { reference CR-1043 ; }

 revision 2023-02-14 { reference CR-0891; }

 revision 2019-06-17 { reference "initial revision"; }

 grouping NFProfileGrp {

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 mandatory true;

 type string;

 }

 leaf nfType {

 description "Type of Network Function.";

 mandatory true;

 type types3gpp:NfType;

 }

 leaf nfStatus {

 description "Status of the NF Instance.";

 mandatory true;

 type NFStatus;

 }

 leaf heartBeatTimer {

 description "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.";

 type uint16;

 }

 list plmnList {

 description "PLMN(s) of the Network Function.

 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.";

 min-elements 1;

 key "mcc mnc";

 uses types3gpp:PLMNId;

 }

 list sNssais {

 description "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.";

 min-elements 1;

 key "sst sd";

 uses Snssai;

 }

 list perPlmnSnssaiList {

 description "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.";

 min-elements 1;

 key idx;

 leaf idx { type uint32; }

 uses PlmnSnssai;

 }

 leaf-list nsiList {

 description "NSI identities of the Network Function.

 If not provided, the NF can serve any NSI.";

 min-elements 1;

 type string;

 }

 leaf fqdn {

 description "FQDN of the Network Function. For AMF, the

 FQDN registered with the NRF shall be that of the AMF Name.";

 type inet:domain-name;

 }

 leaf interPlmnFqdn {

 description "If the NF needs to be discoverable by other

 NFs in a different PLMN, then an FQDN that is used

 for inter-PLMN routing is specified.";

 type inet:domain-name;

 }

 leaf-list ipv4Addresses {

 description "IPv4 address(es) of the Network Function.";

 min-elements 1;

 type inet:ipv4-address;

 }

 leaf-list ipv6Addresses {

 description "IPv6 address(es) of the Network Function.";

 min-elements 1;

 type inet:ipv6-address;

 }

 list allowedPlmns {

 description "PLMNs allowed to access the NF instance.

 If not provided, any PLMN is allowed to access the NF.";

 min-elements 1;

 key "mcc mnc";

 uses types3gpp:PLMNId;

 }

 leaf-list allowedNfTypes {

 description "Type of the NFs allowed to access the NF instance.

 If not provided, any NF type is allowed to access the NF.";

 min-elements 1;

 type types3gpp:NfType;

 }

 leaf-list allowedNfDomains {

 description "Pattern representing the NF domain names allowed

 to access the NF instance. If not provided,

 any NF domain is allowed to access the NF.";

 min-elements 1;

 type string;

 }

 list allowedNssais {

 description "S-NSSAI of the allowed slices to access the NF instance.

 If not provided, any slice is allowed to access the NF.";

 min-elements 1;

 key "sst sd";

 uses Snssai;

 }

 leaf priority {

 description "Priority (relative to other NFs of the same type)

 in the range of 0-65535, to be used for NF selection;

 lower values indicate a higher priority.

 If priority is also present in the nfServiceList

 parameters,

 those will have precedence over this value.

 The NRF may overwrite the received priority value

 when exposing

 an NFProfile with the Nnrf\_NFDiscovery service.";

 type uint16;

 }

 leaf capacity {

 description "Static capacity information in the range of 0-65535,

 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.";

 type uint16;

 }

 leaf load {

 description "Dynamic load information, ranged from 0 to 100,

 indicates the current load percentage of the NF.";

 type types3gpp:Load;

 }

 leaf locality {

 description "Operator defined information about the location

 of the NF instance (e.g. geographic location, data center).";

 type string;

 }

 grouping udrInfo {

 leaf groupId {

 description "Identity of the UDR group that is served

 by the UDR instance.

 If not provided, the UDR instance does not pertain

 to any UDR group.";

 type string;

 }

 list supiRanges {

 description "List of ranges of SUPI's whose profile data

 is available in the UDR instance.";

 key "start end pattern";

 min-elements 1;

 uses SupiRange;

 }

 list gpsiRanges {

 description "List of ranges of GPSIs whose profile data is

 available in the UDR instance.";

 key "start end pattern";

 min-elements 1;

 uses IdentityRange;

 }

 list externalGroupIdentifiersRanges {

 description "List of ranges of external groups whose profile

 data is available in the UDR instance.";

 key "start end pattern";

 min-elements 1;

 uses IdentityRange;

 }

 leaf-list supportedDataSets {

 description "List of supported data sets in the UDR instance.

 If not provided, the UDR supports all data sets.";

 min-elements 1;

 type DataSetId;

 }

 }

 grouping udmInfo {

 leaf groupId {

 description "Identity of the UDM group that is served by the

 UDM instance. If not provided, the UDM instance does

 not pertain to any UDM group.";

 type string;

 }

 list supiRanges {

 description "List of ranges of SUPI's whose profile data is

 available in the UDM instance.";

 key "start end pattern";

 min-elements 1;

 uses SupiRange;

 }

 list gpsiRanges {

 description "List of ranges of GPSIs whose profile data is

 available in the UDM instance.";

 key "start end pattern";

 min-elements 1;

 uses IdentityRange;

 }

 list externalGroupIdentifiersRanges {

 description "List of ranges of external groups whose profile

 data is available in the UDM instance.";

 key "start end pattern";

 min-elements 1;

 uses IdentityRange;

 }

 leaf-list routingIndicators {

 description "List of Routing Indicator information that allows

 to route network signalling with SUCI

 to the UDM instance. If not provided,

 the UDM can serve any Routing Indicator.

 Pattern: '^[0-9]{1,4}$'.";

 min-elements 1;

 type string;

 }

 }

 grouping ausfInfo {

 leaf groupId {

 description "Identity of the AUSF group. If not provided,

 the AUSF instance does not pertain to any AUSF group.";

 type string;

 }

 list supiRanges {

 description "List of ranges of SUPIs that can be served by

 the AUSF instance. If not provided, the AUSF can serve any SUPI.";

 key "start end pattern";

 min-elements 1;

 uses SupiRange;

 }

 leaf-list routingIndicators {

 description "List of Routing Indicator information that allows

 to route network signalling with SUCI

 to the AUSF instance. If not provided,

 the AUSF can serve any Routing Indicator.

 Pattern: '^[0-9]{1,4}$'.";

 min-elements 1;

 type string;

 }

 }

 grouping amfInfo {

 leaf amfRegionId {

 description "AMF region identifier";

 type string;

 }

 leaf amfSetId {

 description "AMF set identifier";

 type string;

 }

 list guamiList {

 description "List of supported GUAMIs.";

 key idx;

 leaf idx { type uint32; }

 min-elements 1;

 uses Guami;

 }

 list taiList {

 description "The list of TAIs the AMF can serve.

 It may contain the non-3GPP access TAI.

 The absence of this attribute and

 the taiRangeList attribute indicate that

 the AMF can be selected for any TAI in the

 serving network.";

 key idx;

 leaf idx { type uint32; }

 min-elements 1;

 uses types3gpp:TaiGrp;

 }

 list taiRangeList {

 description "The range of TAIs the AMF can serve.

 The absence of this attribute and the taiList

 attribute indicate that the AMF can be selected

 for any TAI in the serving network.";

 min-elements 1;

 key idx;

 leaf idx { type uint32; }

 uses TaiRangeGrp;

 }

 list backupInfoAmfFailure {

 description "List of GUAMIs for which the AMF acts

 as a backup for AMF failure.";

 key idx;

 leaf idx { type uint32; }

 min-elements 1;

 uses Guami;

 }

 list backupInfoAmfRemoval {

 description "List of GUAMIs for which the AMF acts

 as a backup for planned AMF removal.";

 key idx;

 leaf idx { type uint32; }

 min-elements 1;

 uses Guami;

 }

 list n2InterfaceAmfInfo {

 description "N2 interface information of the AMF.

 This information needs not be sent in NF Discovery responses.

 It may be used by the NRF to update the DNS for

 AMF discovery by the 5G Access Network.";

 max-elements 1;

 key idx;

 leaf idx { type uint32; }

 uses N2InterfaceAmfInfo;

 }

 }

 grouping smfInfo {

 list sNssaiSmfInfoList {

 description "List of parameters supported by the SMF per S-NSSAI.";

 min-elements 1;

 key idx;

 leaf idx { type uint32; }

 uses sNssaiSmfInfoItem;

 }

 list taiList {

 description "The list of TAIs the SMF can serve.

 It may contain the non-3GPP access TAI.

 The absence of this attribute and the taiRangeList

 attribute indicate that

 the SMF can be selected for any TAI

 in the serving network.";

 key idx;

 leaf idx { type uint32; }

 min-elements 1;

 uses types3gpp:TaiGrp;

 }

 list taiRangeList {

 description "The range of TAIs the SMF can serve.

 The absence of this attribute and the taiList

 attribute indicate that the SMF can be selected

 for any TAI in the serving network.";

 min-elements 1;

 key idx;

 leaf idx { type uint32; }

 uses TaiRangeGrp;

 }

 leaf pgwFqdn {

 description "The FQDN of the PGW if the SMF is a combined SMF/PGW-C.";

 type inet:domain-name;

 }

 leaf-list accessType {

 description "If included, this IE shall contain the access type

 (3GPP\_ACCESS and/or NON\_3GPP\_ACCESS) supported by the SMF.

 If not included, it shall be assumed the both

 access types are supported.";

 min-elements 1;

 max-elements 2;

 type AccessType;

 }

 }

 grouping upfInfo {

 list sNssaiUpfInfoList {

 description "List of parameters supported by the UPF per S-NSSAI.";

 min-elements 1;

 key idx;

 leaf idx { type uint32; }

 uses SnssaiUpfInfoItem;

 }

 leaf-list smfServingArea {

 description "The SMF service area(s) the UPF can serve.

 If not provided, the UPF can serve any

 SMF service area.";

 min-elements 1;

 type string;

 }

 list interfaceUpfInfo {

 description "List of User Plane interfaces configured on the UPF.

 When this IE is provided in the NF Discovery response,

 the NF Service Consumer (e.g. SMF) may use

 this information for UPF selection.";

 key idx;

 leaf idx { type uint32; }

 min-elements 1;

 uses InterfaceUpfInfoItem;

 }

 leaf iwkEpsInd {

 description "Indicates whether interworking with EPS is

 supported by the UPF.

 true: Supported

 false (default): Not Supported";

 type boolean;

 }

 leaf-list pduSessionTypes {

 description "List of PDU session type(s) supported by the UPF.

 The absence of this attribute indicates that the UPF can be selected

 for any PDU session type.";

 min-elements 1;

 type PduSessionType;

 }

 }

 grouping pcfInfo {

 leaf-list dnnList {

 description "DNNs supported by the PCF.

 If not provided, the PCF can serve any DNN.";

 min-elements 1;

 type string;

 }

 list supiRanges {

 description "List of ranges of SUPIs that can be served by

 the PCF instance. If not provided, the PCF can serve any SUPI.";

 key "start end pattern";

 min-elements 1;

 uses SupiRange;

 }

 leaf rxDiamHost {

 description "This IE shall be present if the PCF supports Rx interface.

 When present, this IE shall indicate the Diameter host

 of the Rx interface for the PCF.

 Pattern: '^([A-Za-z0-9]+(-[A-Za-z0-9]+).)+[a-z]{2,}$'.";

 type string;

 }

 leaf rxDiamRealm {

 description "This IE shall be present if the PCF supports Rx interface.

 When present, this IE shall indicate the Diameter realm

 of the Rx interface for the PCF.

 Pattern: '^([A-Za-z0-9]+(-[A-Za-z0-9]+).)+[a-z]{2,}$'.";

 type string;

 }

 }

 grouping bsfInfo {

 list ipv4AddressRanges {

 description "List of ranges of IPv4 addresses handled by BSF.

 If not provided, the BSF can serve any IPv4 address.";

 key "start end";

 uses types3gpp:Ipv4AddressRange;

 }

 leaf-list dnnList {

 description "List of DNNs handled by the BSF

 If not provided, the BSF can serve any DNN.";

 min-elements 1;

 type string;

 }

 leaf-list ipDomainList {

 description "List of IPv4 address domains, as described in

 subclause 6.2 of 3GPP TS 29.513, handled by the BSF.

 If not provided, the BSF can serve any IP domain.";

 min-elements 1;

 type string;

 }

 list ipv6PrefixRanges {

 description "List of ranges of IPv6 prefixes handled by the BSF.

 If not provided, the BSF can serve any IPv6 prefix.";

 key "start end";

 uses types3gpp:Ipv6PrefixRange;

 }

 }

 grouping chfInfo {

 list supiRangeList {

 description "List of ranges of SUPIs that can be served by

 the CHF instance. If not provided, the CHF can serve any SUPI.";

 key "start end pattern";

 min-elements 1;

 uses SupiRange;

 }

 list gpsiRangeList {

 description "List of ranges of GPSI that can be served

 by the CHF instance. If not provided, the CHF can serve any GPSI.";

 key "start end pattern";

 min-elements 1;

 uses IdentityRange;

 }

 list plmnRangeList {

 description "List of ranges of PLMNs (including the PLMN

 IDs of the CHF instance) that can be served by the CHF instance.

 If not provided, the CHF can serve any PLMN.";

 min-elements 1;

 key "mcc mnc";

 uses types3gpp:PLMNId;

 }

 }

 grouping nrfInfoGrp {

 list servedUdrInfo {

 description "This attribute contains all the udrInfo

 attributes

 locally configured in the NRF or the NRF received

 during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses udrInfo;

 }

 list servedUdmInfo {

 description "This attribute contains all the udmInfo

 attributes

 locally configured in the NRF or the NRF

 received during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses udmInfo;

 }

 list servedAusfInfo {

 description "This attribute contains all the

 ausfInfo attributes

 locally configured in the NRF or the NRF

 received during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses ausfInfo;

 }

 list servedAmfInfo {

 description "This attribute contains all the amfInfo

 attributes

 locally configured in the NRF or the NRF received

 during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses amfInfo;

 }

 list servedSmfInfo {

 description "This attribute contains all the smfInfo

 attributes

 locally configured in the NRF or the NRF received

 during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses smfInfo;

 }

 list servedUpfInfo {

 description "This attribute contains all the upfInfo

 attributes

 locally configured in the NRF or the NRF received

 during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses upfInfo;

 }

 list servedPcfInfo {

 description "This attribute contains all the pcfInfo

 attributes

 locally configured in the NRF or the NRF received

 during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses pcfInfo;

 }

 list servedBsfInfo {

 description "This attribute contains all the bsfInfo

 attributes

 locally configured in the NRF or the NRF received

 during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses bsfInfo;

 }

 list servedChfInfo {

 description "This attribute contains all the bsfInfo

 attributes

 locally configured in the NRF or the NRF received

 during NF registration.";

 key nfInstanceID;

 leaf nfInstanceID {

 description "String uniquely identifying a NF instance.";

 type string;

 }

 min-elements 1;

 uses chfInfo;

 }

 }

 list nrfInfo {

 description "nrfinfo";

 key idx;

 leaf idx { type uint32; }

 max-elements 1;

 uses nrfInfoGrp;

 }

 leaf customInfo {

 description "Specific data for custom Network Functions.";

 type string;

 }

 leaf recoveryTime {

 description "Timestamp when the NF was (re)started.";

 type yang:date-and-time;

 }

 leaf nfServicePersistence {

 description "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 TS 23.527).

 Otherwise, it indicates that the NF Service

 Instances of

 a same NF Service are not capable to share

 resource state inside the NF Instance.";

 type boolean;

 }

 list nfServices {

 description "List of NF Service Instances. It shall include

 the services produced by the NF that can be

 discovered by other NFs.";

 key serviceInstanceID;

 min-elements 1;

 uses nfs3gpp:NFServiceGrp;

 }

 leaf nfProfileChangesSupportInd {

 description "NF Profile Changes Support Indicator.

 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.";

 type boolean;

 }

 leaf nfProfileChangesInd {

 description "NF Profile Changes Indicator. 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.";

 type boolean;

 }

 list defaultNotificationSubscriptions {

 description "Notification endpoints for different notification types.";

 key notificationType;

 min-elements 1;

 uses types3gpp:DefaultNotificationSubscription;

 }

 }

 typedef NFStatus {

 type enumeration {

 enum REGISTERED;

 enum SUSPENDED;

 }

 }

 typedef DataSetId {

 type enumeration {

 enum SUBSCRIPTION;

 enum POLICY;

 enum EXPOSURE;

 enum APPLICATION;

 }

 }

 grouping SupiRange {

 leaf start {

 description "First value identifying the start of

 a SUPI range.

 To be used when the range of SUPI's can be

 represented

 as a numeric range (e.g., IMSI ranges).";

 type string {

 pattern '^[0-9]+$';

 }

 }

 leaf end {

 description "Last value identifying the end of

 a SUPI range.

 To be used when the range of SUPI's can be

 represented

 as a numeric range (e.g. IMSI ranges).";

 type string {

 pattern '^[0-9]+$';

 }

 }

 leaf pattern {

 description "Pattern representing the set of SUPI's belonging

 to this range.

 A SUPI value is considered part

 of the range

 if and only if the SUPI string

 fully matches the regular expression.";

 type string;

 }

 }

 grouping IdentityRange {

 leaf start {

 description "First value identifying the start of an identity range.

 To be used when the range of identities can be represented

 as a numeric range (e.g., MSISDN ranges).";

 type string {

 pattern '^[0-9]+$';

 }

 }

 leaf end {

 description "Last value identifying the end of an identity range.

 To be used when the range of identities can be represented

 as a numeric range (e.g. MSISDN ranges).";

 type string {

 pattern '^[0-9]+$';

 }

 }

 leaf pattern {

 description "Pattern representing the set of identities

 belonging to this range.

 An identity value is considered part of the range

 if and only if the identity string fully

 matches the regular expression.";

 type string;

 }

 }

 grouping TacRange {

 leaf start {

 description "First value identifying the start of a TAC range,

 to be used when the range of TAC's can be represented

 as a hexadecimal range (e.g., TAC ranges).";

 type string {

 pattern '^([A-Fa-f0-9]{4}|[A-Fa-f0-9]{6}$)';

 }

 }

 leaf end {

 description "Last value identifying the end of a TAC range,

 to be used when the range of TAC's can be represented as

 a hexadecimal range (e.g. TAC ranges).";

 type string {

 pattern '^([A-Fa-f0-9]{4}|[A-Fa-f0-9]{6})$';

 }

 }

 leaf nRTACpattern {

 description "Pattern (regular expression according to the ECMA-262)

 representing the set of TAC's belonging to this range.

 A TAC value is considered part of the range if and only if the

 TAC string fully matches the regular expression.";

 type string;

 }

 }

 grouping SnssaiUpfInfoItem {

 list sNssai {

 description "Supported S-NSSAI.";

 min-elements 1;

 max-elements 1;

 key "sst sd";

 uses Snssai;

 }

 list dnnUpfInfoList {

 description "List of parameters supported by the UPF per DNN.";

 min-elements 1;

 key dnn;

 uses DnnUpfInfoItem;

 }

 }

 grouping DnnUpfInfoItem {

 leaf dnn {

 description "String representing a Data Network.";

 mandatory true;

 type string;

 }

 leaf-list dnaiList {

 description "List of Data network access identifiers supported

 by the UPF for this DNN.

 The absence of this attribute indicates that the UPF

 can be selected for this DNN for any DNAI.";

 min-elements 1;

 type string; //dnai is the type but its only a string with

 //desc: DNAI (Data network access identifier),

 //is this needed as its own typedef or string is ok

 }

 leaf-list pduSessionTypes {

 description "List of PDU session type(s) supported by

 the UPF for a specific DNN.";

 min-elements 1;

 type PduSessionType;

 }

 }

 grouping Snssai {

 leaf sst {

 description "Unsigned integer, within the range 0 to 255,

 representing the Slice/Service Type.

 It indicates the expected Network Slice behaviour

 in terms of features and services.";

 mandatory true;

 type uint32;

 }

 leaf sd {

 description "3-octet string, representing the Slice Differentiator,

 in hexadecimal representation.";

 type string {

 pattern '^[A-Fa-f0-9]{6}$';

 }

 }

 reference "3GPP TS 29.571";

 }

 typedef PduSessionType {

 type enumeration {

 enum IPV4;

 enum IPV6;

 enum IPV4V6;

 enum UNSTRUCTURED;

 enum ETHERNET;

 }

 }

 grouping Guami {

 list plmnId {

 description "PLMN Identity.";

 min-elements 1;

 max-elements 1;

 key "mcc mnc";

 uses types3gpp:PLMNId;

 }

 list amfId {

 description "AMF Identity.";

 min-elements 1;

 max-elements 1;

 key "amfRegionId amfSetId amfPointer";

 uses types3gpp:AmfIdentifier;

 }

 }

 grouping InterfaceUpfInfoItem {

 leaf interfaceType {

 description "User Plane interface type.";

 mandatory true;

 type UPInterfaceType;

 }

 choice address {

 case ipv4EndpointAddresses {

 leaf-list ipv4EndpointAddresses {

 description "Available endpoint IPv4 address(es) of

 the User Plane interface.";

 min-elements 1;

 type inet:ipv4-address;

 }

 }

 case ipv6EndpointAddresses {

 leaf-list ipv6EndpointAddresses {

 description "Available endpoint IPv6 address(es) of

 the User Plane interface.";

 min-elements 1;

 type inet:ipv6-address;

 }

 }

 case endpointFqdn {

 leaf endpointFqdn {

 description "FQDN of available endpoint of the

 User Plane interface.";

 type inet:domain-name;

 }

 }

 }

 leaf networkInstance {

 description "Network Instance associated to the

 User Plane interface.";

 type string;

 }

 }

 typedef UPInterfaceType {

 type enumeration {

 enum N3;

 enum N6;

 enum N9;

 }

 }

 grouping TaiRangeGrp {

 list plmnId {

 description "PLMN ID related to the TacRange.";

 min-elements 1;

 max-elements 1;

 key "mcc mnc";

 uses types3gpp:PLMNId;

 }

 list tacRangeList {

 description "The range of the TACs.";

 min-elements 1;

 key "start end";

 uses TacRange;

 }

 }

 typedef AccessType {

 type enumeration {

 enum 3GPP\_ACCESS;

 enum NON\_3GPP\_ACCESS;

 }

 }

 grouping N2InterfaceAmfInfo {

 choice address {

 case ipv4EndpointAddress {

 leaf-list ipv4EndpointAddress {

 description "Available AMF endpoint IPv4 address(es) for N2.";

 min-elements 1;

 type inet:ipv4-address;

 }

 }

 case ipv6EndpointAddress {

 leaf-list ipv6EndpointAddress {

 description "Available AMF endpoint IPv6 address(es) for N2.";

 min-elements 1;

 type inet:ipv6-address;

 }

 }

 }

 leaf amfName {

 description "AMF name.";

 type string;

 }

 }

 grouping sNssaiSmfInfoItem {

 list sNssai {

 description "Supported S-NSSAI.";

 min-elements 1;

 max-elements 1;

 key "sst sd";

 uses Snssai;

 }

 list dnnSmfInfoList {

 description "List of parameters supported by the SMF per DNN.

 The absence indicates the DNN can be selected for any DNAI.";

 min-elements 1;

 key dnn;

 uses DnnSmfInfoItem;

 }

 }

 grouping DnnSmfInfoItem {

 leaf dnn {

 description "Supported DNN.";

 mandatory true;

 type string;

 }

 leaf-list dnaiList {

 description "List of Data network access identifiers supported by

 the SMF for this DNN. The absence of this attribute indicates that

 the SMF can be selected for this DNN for any DNAI.";

 min-elements 1;

 type string;

 }

 }

 grouping PlmnSnssai {

 list plmnId {

 description "PLMN ID for which list of supported S-NSSAI(s)

 is provided.";

 min-elements 1;

 max-elements 1;

 key "mcc mnc";

 uses types3gpp:PLMNId;

 }

 list sNssaiList {

 description "The specific list of S-NSSAIs supported

 by the given PLMN.";

 min-elements 1;

 key "sst sd";

 uses Snssai;

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 2 \*\*\*

\*\*\* START OF CHANGE 3 \*\*\*

\*\*\* yang-models/\_3gpp-5gc-nrm-nwdaffunction.yang \*\*\*

<CODE BEGINS>

module \_3gpp-5gc-nrm-nwdaffunction {

 yang-version 1.1;

 namespace urn:3gpp:sa5:\_3gpp-5gc-nrm-nwdaffunction;

 prefix nwdaf3gpp;

 import \_3gpp-common-managed-function { prefix mf3gpp; }

 import \_3gpp-common-managed-element { prefix me3gpp; }

 import ietf-inet-types { prefix inet; }

 import \_3gpp-common-yang-types { prefix types3gpp; }

 import \_3gpp-common-yang-extensions { prefix yext3gpp; }

 import \_3gpp-5g-common-yang-types { prefix types5g3gpp; }

 import \_3gpp-common-top { prefix top3gpp; }

 import \_3gpp-5gc-nrm-nfprofile { prefix nfp3gpp; }

 organization "3gpp SA5";

 contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

 description "This IOC represents the NWDAF function in 5GC. For more

 information about the NWDAF, see 3GPP TS 23.501.

 Copyright 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI,

 TTA, TTC). All rights reserved.";

 reference "3GPP TS 28.541";

 revision 2024-04-12 { reference CR-1218; }

 revision 2023-09-18 { reference CR-1043; }

 revision 2023-04-26 { reference CR-0916; }

 revision 2020-11-08 { reference CR-0412; }

 revision 2019-10-25 { reference "S5-194457 S5-195427 S5-193518"; }

 revision 2019-05-15 {reference "initial revision"; }

 typedef NwdafEvent {

 description "The detailed ENUM value for NwdafEvent see the

 Table 5.1.6.3.4-1 in TS 29.520";

 type union {

 type enumeration {

 enum SLICE\_LOAD\_LEVEL;

 enum NETWORK\_PERFORMANCE;

 enum NF\_LOAD;

 enum SERVICE\_EXPERIENCE;

 enum UE\_MOBILITY;

 enum UE\_COMMUNICATION;

 enum QOS\_SUSTAINABILITY;

 enum ABNORMAL\_BEHAVIOUR;

 enum USER\_DATA\_CONGESTION;

 enum NSI\_LOAD\_LEVEL;

 enum DN\_PERFORMANCE;

 enum DISPERSION;

 enum RED\_TRANS\_EXP;

 enum WLAN\_PERFORMANCE;

 enum SM\_CONGESTION;

 }

 type string;

 }

 }

 grouping NwdafCapabilityGrp {

 description "This data type represents the capability supported by the

 NWDAF.";

 reference "TS 29.510";

 leaf analyticsAggregation {

 type boolean ;

 default false;

 description "It indicates whether the NWDAF supports analytics

 aggregation";

 }

 leaf analyticsMetadataProvisioning {

 type boolean ;

 default false;

 description "It indicate whether the NWDAF supports analytics metadata

 provisioning:";

 }

 }

 grouping MlAnalyticsInfoGrp {

 description "This data type represents ML Analytics Filter information

 supported by the Nnwdaf\_MLModelProvision service.";

 reference "TS 29.510";

 leaf-list mlAnalyticsIds {

 type NwdafEvent;

 ordered-by user;

 description "This attribute represents the Analytic functionalities

 (identified by nwdafEvent defined in TS 29.520 [85]) of the NWDAF

 instance. MnS consumer can configure this attribute to specify

 which Analytic functionalities (identified by nwdafEvent) can be

 performed the NWDAF instance. If the value of this attribute is not

 present, the NWDAF instance can perform any NWDAFEvents

 Analytics Id(s) supported by the Nnwdaf\_MLModelProvision service,

 if none are provided the NWDAF can serve any mlAnalyticsId.";

 }

 list sNSSAIList {

 min-elements 1;

 description "List of S-NSSAIs the managed object is capable of

 supporting.";

 reference "3GPP TS 23.003";

 key "sd sst";

 uses types5g3gpp:SNssai;

 }

 list trackingAreaList {

 description "This attribute represents area of Interest of the ML model,

 if none are provided the ML model for the analytics can apply to any

 TAIs.

 If present, it represents the list of TAIs, it may contain one or

 more non-3GPP access TAIs.";

 key idx ;

 leaf idx { type uint32; }

 uses types3gpp:TaiGrp;

 }

 leaf-list mlModelInterInfo {

 type string {

 pattern "[0-9]{6}";

 }

 description "This attribute defines the list of NWDAF vendors that are

 allowed to retrieve ML models from the NWDAF containing MTLF. The

 absence of this attribute indicates that none of the NWDAF vendors

 can retrieve the ML models.

 allowedValues: 6 decimal digits; if the SMI code has less than

 6 digits, it shall be padded with leading digits '0' to complete a

 6-digit string value.";

 }

 leaf flCapabilityType {

 type enumeration {

 enum FL\_SERVER {

 description "NWDAF containing MTLF as Federated Learning Server";

 }

 enum FL\_CLIENT {

 description "NWDAF containing MTLF as Federated Learning Client";

 }

 enum FL\_SERVER\_AND\_CLIENT {

 description "NWDAF containing MTLF as Federated Learning Server and

 Client.";

 }

 }

 description "This attribute defines the federated learning capability

 type supported by NWDAF containing MTLF.";

 }

 list flTimeInterval {

 key idx ;

 leaf idx { type uint32; }

 description "This attribute defines the time window at which the

 indicated flCapabilityType supported by NWDAF MTLF is available.

 This attribute shall be present only if flCapabilityType attribute

 is present.";

 uses types3gpp:TimeWindowGrp;

 }

 }

 grouping NwdafInfoGrp {

 description "This data type represents specific data for the NWDAF.";

 reference "TS 29.510";

 leaf-list nwdafEvents {

 type NwdafEvent;

 ordered-by user;

 description "This attribute represents the Analytic functionalities

 (identified by nwdafEvent defined in TS 29.520) of the NWDAF instance.

 MnS consumer can configure this attribute to specify which Analytic

 functionalities (identified by nwdafEvent) can be performed the NWDAF

 instance. If the value of this attribute is not present, the NWDAF

 instance can perform any NWDAFEvents.

 The detailed ENUM value for NwdafEvent see the Table 5.1.6.3.4-1

 in TS 29.520";

 }

 leaf-list eventIds {

 type string ;

 min-elements 1;

 description "It represents the EventId(s) supported by the

 Nnwdaf\_AnalyticsInfo service, if none are provided the NWDAF can serve

 any eventId. (see clause TS 29.520)";

 }

 list taiList {

 description "The list of TAIs. ";

 min-elements 1;

 key idx ;

 leaf idx { type uint32; }

 uses types3gpp:TaiGrp;

 }

 list taiRangeList {

 min-elements 1;

 key idx ;

 leaf idx { type uint32; }

 description "The range of TAIs.";

 uses nfp3gpp:TaiRangeGrp;

 }

 list nwdafCapability {

 max-elements 1;

 key idx ;

 leaf idx { type uint32; }

 description "This attribute indicates the capability of the NWDAF.

 If not present, the NWDAF shall be regarded with no capability.";

 uses NwdafCapabilityGrp;

 }

 leaf analyticsDelay {

 type int32 ;

 units seconds;

 description "It represents the supported Analytics Delay related to the

 eventIds and nwdafEvents.

 It is an unsigned integer identifying a period of time in units of

 seconds.(see clause 5.2.2 TS 29.571).";

 }

 leaf-list servingNfTypeList {

 type types3gpp:NfType;

 min-elements 1;

 description "It contains the list of NF type(s) from which the NWDAF NF

 can collect data. The absence of this attribute indicates that the

 NWDAF can collect data from any NF type.";

 }

 leaf-list servingNfSetIdList {

 type string ;

 min-elements 1;

 description "It contains the list of NF type(s) from which the NWDAF NF

 can collect data. The absence of this attribute indicates that the

 NWDAF can collect data from any NF type. (see clause 5.4.2 NfSetId

 in TS 29.571)";

 }

 list mlAnalyticsList {

 min-elements 1;

 key idx ;

 leaf idx { type uint32; }

 description "It represents ML Analytics Filter information supported by

 the Nnwdaf\_MLModelProvision service.";

 uses MlAnalyticsInfoGrp;

 }

 }

 grouping NetworkSliceInfoGrp {

 description "Represents information of network slice when the NWDAF is

 authorized to collect the management data of the network slice. ";

 list sNSSAI {

 description "It represents the S-NSSAI the NetworkSlice managed object

 is supporting. The S-NSSAI is defined in TS 23.003 ";

 key idx;

 min-elements 1;

 max-elements 1;

 leaf idx {

 type string;

 }

 uses types5g3gpp:SNssai;

 }

 leaf-list cNSIId {

 type string;

 description "It represents NSI ID which is an identifier for identifying

 the Core Network part of a Network Slice instance when multiple

 Network Slice instances of the same Network Slice are deployed,

 and there is a need to differentiate between them in the 5GC.

 See NSI ID definition in clause 3.1 of TS 23.501 and

 subclause 6.1.6.2.7 of TS 29.531.";

 }

 leaf networkSliceRef {

 type types3gpp:DistinguishedName;

 mandatory true;

 description "This holds a DN of the NetworkSlice managed object relating

 to the NetworkSlice instance differentiated by sNSSAI and optional

 cNSIId.";

 }

 }

 grouping NWDAFFunctionGrp {

 description "Represents the NWDAFFunction IOC";

 uses mf3gpp:ManagedFunctionGrp;

 list pLMNInfoList {

 description "It defines the PLMN(s) of a Network Function.";

 min-elements 1;

 key "idx";

 leaf idx { type uint32; }

 uses types3gpp:PLMNId;

 uses types5g3gpp:SNssai;

 }

 leaf sBIFQDN {

 description "The FQDN of the registered NF instance in the service-based

 interface.";

 type inet:domain-name;

 }

 list managedNFProfile {

 key idx;

 min-elements 1;

 max-elements 1;

 description "Profile definition of a Managed NF (See TS 23.501)";

 uses types3gpp:ManagedNFProfile;

 }

 list commModelList {

 min-elements 1;

 key "groupId";

 description "Specifies a list of commModel. It can be used by NF and

 NF services to interact with each other in 5G Core network ";

 reference "3GPP TS 23.501";

 uses types5g3gpp:CommModel;

 }

 list networkSliceInfoList {

 key idx;

 min-elements 1;

 description "The attribute specifies a list of NetworkSliceInfo which

 is defined as a datatype (see clause 5.3.95). It can be used by the

 NWDAF to facilitate the data collection from OAM.";

 leaf idx {

 type string;

 }

 uses NetworkSliceInfoGrp;

 yext3gpp:inVariant;

 }

 list nwdafInfo {

 min-elements 1;

 max-elements 1;

 key idx;

 leaf idx { type uint32; }

 description "It represents specific data for the NWDAF.";

 uses NwdafInfoGrp;

 }

 leaf administrativeState {

 type types3gpp:BasicAdministrativeState ;

 mandatory true;

 description "This attribute determines whether the NWDAF is enabled or

 disabled. MnS consumer can configure this attribute to activate or

 de-activate the analytic functionalities (identified by nwdafEvent

 defined in TS 29.520) of the NWDAF instance.";

 }

 leaf nwdafLogicalFuncSupported {

 type enumeration {

 enum NWDAF\_WITH\_ANLF {

 description "Indicates the NWDAF containing Analytics logical

 function (AnLF)";

 }

 enum NWDAF\_WITH\_MTLF {

 description "Indicates the NWDAF containing Model Training logical

 function (MTLF).";

 }

 enum NWDAF\_WITH\_ANLF\_MTLF {

 description "Indicates the NWDAF containing both Analytics logical

 function (AnLF) and Model Training logical function (MTLF).";

 }

 }

 config false;

 description "It represents the logical functions supported by the NWDAF.

 If not present, the NWDAF shall be regarded with no logical

 decomposition, in that case the NWDAF only supports the analytics

 services.";

 }

 }

 augment "/me3gpp:ManagedElement" {

 list NWDAFFunction {

 description "5G Core NWDAF Function.

 For more information about the NWDAF, see TS 23.501. Several

 attributes (including 'nwdafInfo', 'administrativeState' and

 'ManagedNFProfile.servingScope') are used to control the functionalities

 (identified by nwdafEvent defined in TS 29.520) of the NWDAF instance.

 The attribute 'ManagedNFProfile.servingScope' is used to represent

 specified certain geographical area(s) can be served by the NWDAF

 instance.

 The attribute 'NwdafInfo.taiList' and 'NwdafInfo.taiRangeList' is used

 to represent specified certain tracking area(s) can be served by the

 NWDAF instance.";

 reference "3GPP TS 28.541 3GPP TS 23.501";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses NWDAFFunctionGrp;

 }

 uses mf3gpp:ManagedFunctionContainedClasses;

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 3 \*\*\*

\*\*\* START OF CHANGE 9 \*\*\*

\*\*\* yang-models/\_3gpp-nr-nrm-eutranfreqrelation.yang \*\*\*

<CODE BEGINS>

module \_3gpp-nr-nrm-eutranfreqrelation {

 yang-version 1.1;

 namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-eutranfreqrelation";

 prefix "eutranfreqrel3gpp";

 import \_3gpp-common-yang-types { prefix types3gpp; }

 import \_3gpp-common-managed-function { prefix mf3gpp; }

 import \_3gpp-common-managed-element { prefix me3gpp; }

 import \_3gpp-common-top { prefix top3gpp; }

 import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

 import \_3gpp-nr-nrm-nrcellcu { prefix nrcellcu3gpp; }

 organization "3GPP SA5";

 description "Defines the YANG mapping of the EUtranFreqRelation Information

 Object Class (IOC) that is part of the NR Network Resource Model (NRM).

 Copyright 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI,

 TTA, TTC). All rights reserved.";

 reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

 revision 2024-02-24 { reference CR-1218; }

 revision 2023-09-18 { reference CR-1043; }

 revision 2019-10-28 { reference S5-193518 ; }

 revision 2019-06-17 {

 description "Initial revision";

 }

 grouping EUtranFreqRelationGrp {

 description "Represents the EUtranFreqRelation IOC.";

 reference "3GPP TS 28.541";

 uses mf3gpp:ManagedFunctionGrp;

 leaf cellIndividualOffset {

 description "Offset applicable to a neighbouring cell. Used for

 evaluating the neighbouring cell for handover in connected mode.

 Used by the HandOver parameter Optimization (HOO) function or

 Load Balancing Optimization (LBO) function.";

 reference "cellIndividualOffset in MeasObjectEUTRA in 3GPP TS 38.331";

 default 0;

 type types3gpp:QOffsetRange;

 }

 leaf-list blockListEntry {

 description "A list of Physical Cell Identities (PCIs) that are

 blocklisted in E-UTRAN measurements.";

 reference "3GPP TS 38.331";

 min-elements 0;

 type uint16 { range "0..1007"; }

 }

 leaf-list blockListEntryIdleMode {

 description "A list of Physical Cell Identities (PCIs) that are

 blocklisted in SIB4 and SIB5.";

 min-elements 0;

 type uint16 { range "0..1007"; }

 }

 leaf cellReselectionPriority {

 description "The absolute priority of the carrier frequency used by the

 cell reselection procedure. Value 0 means lowest priority. The value

 must not already used by other RAT, i.e. equal priorities between RATs

 are not supported. The UE behaviour when no value is entered is

 specified in subclause 5.2.4.1 of 3GPP TS 38.304.";

 reference "CellReselectionPriority in 3GPP TS 38.331, priority in

 3GPP TS 38.304";

 mandatory true;

 type int32 { range "0..7"; }

 }

 leaf cellReselectionSubPriority {

 description "Indicates a fractional value to be added to the value of

 cellReselectionPriority to obtain the absolute priority of the

 concerned carrier frequency for E-UTRA and NR.";

 reference "3GPP TS 38.331";

 type uint8 { range "2 | 4 | 6 | 8"; }

 units "0.1";

 }

 leaf pMax {

 description "Used for calculation of the parameter Pcompensation

 (defined in 3GPP TS 38.304), at cell reselection to a cell.";

 reference "PEMAX in 3GPP TS 38.101-1";

 mandatory true;

 type int32 { range "-30..33"; }

 units dBm;

 }

 leaf qOffsetFreq {

 description "The frequency specific offset applied when evaluating

 candidates for cell reselection.";

 type int32;

 default 0;

 }

 leaf qQualMin {

 description "Indicates the minimum required quality level in the cell.

 Value 0 means that it is not sent and UE applies in such case the

 (default) value of negative infinity for Qqualmin. Sent in SIB3 or

 SIB5.";

 reference "qQualMin in TS 38.304";

 mandatory true;

 type int32 { range "-34..-3 | 0"; }

 units dB;

 }

 leaf qRxLevMin {

 description "Indicates the required minimum received Reference Symbol

 Received Power (RSRP) level in the (E-UTRA) frequency for cell

 reselection. Broadcast in SIB3 or SIB5, depending on whether the

 related frequency is intra- or inter-frequency. Resolution is 2.";

 reference "Qrxlevmin in 3GPP TS 38.304";

 mandatory true;

 type int32 { range "-140..-44"; }

 units dBm;

 }

 leaf threshXHighP {

 description "Specifies the Srxlev threshold used by the UE when

 reselecting towards a higher priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold. Resolution is 2.";

 reference "ThreshX, HighP in 3GPP TS 38.304";

 mandatory true;

 type int32 { range "0..62"; }

 units dB;

 }

 leaf threshXHighQ {

 description "Specifies the Squal threshold used by the UE when

 reselecting towards a higher priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold.";

 reference "ThreshX, HighQ in 3GPP TS 38.304";

 mandatory true;

 type int32 { range 0..31; }

 units dB;

 }

 leaf threshXLowP {

 description "Specifies the Srxlev threshold used by the UE when

 reselecting towards a lower priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold. Resolution is 2.";

 reference "ThreshX, LowP in 3GPP TS 38.304";

 mandatory true;

 type int32 { range "0..62"; }

 units dB;

 }

 leaf threshXLowQ {

 description "Specifies the Squal threshold used by the UE when

 reselecting towards a lower priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold.";

 reference "ThreshX, LowQ in 3GPP TS 38.304";

 mandatory false;

 type int32 { range "0..31"; }

 units dB;

 }

 leaf tReselectionEutra {

 description "Cell reselection timer for intra frequency E-UTRA cell

 reselection. May be used for Mobility Robustness Optimization.";

 reference "t-ReselectionEUTRA in 3GPP TS 36.331 and in 3GPP TS 23.207";

 mandatory true;

 type uint8 { range "0..7"; }

 units s;

 }

 leaf tReselectionEutraSfHigh {

 description "The attribute tReselectionEutra (parameter TreselectionEUTRA

 in 3GPP TS 38.304) multiplied with this scaling factor if the UE is in

 high mobility state.";

 reference "Speed dependent ScalingFactor for TreselectionEUTRA for high

 mobility state in 3GPP TS 38.304";

 mandatory true;

 type uint8 { range "25 | 50 | 75 | 100"; }

 units %;

 }

 leaf tReselectionEutraSfMedium {

 description "The attribute tReselectionEutra (parameter TreselectionEUTRA

 in 3GPP TS 38.304) multiplied with this scaling factor if the UE is in

 medium mobility state.";

 reference "Speed dependent ScalingFactor for TreselectionEUTRA for medium

 mobility state in 3GPP TS 38.304";

 mandatory true;

 type uint8 { range "25 | 50 | 75 | 100"; }

 units %;

 }

 leaf eUtranFrequencyRef {

 description "Reference to a corresponding EUtranFrequency instance.";

 mandatory true;

 type types3gpp:DistinguishedName;

 }

 }

 augment /me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction/nrcellcu3gpp:NRCellCU {

 list EUtranFreqRelation {

 description "Represents a frequency relation between an NR cell and an

 E-UTRAN cell.";

 reference "3GPP TS 28.541";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses EUtranFreqRelationGrp;

 }

 uses mf3gpp:ManagedFunctionContainedClasses;

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 9 \*\*\*

\*\*\* START OF CHANGE 10 \*\*\*

\*\*\* yang-models/\_3gpp-nr-nrm-gnbcucpfunction.yang \*\*\*

<CODE BEGINS>

module \_3gpp-nr-nrm-gnbcucpfunction {

 yang-version 1.1;

 namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-gnbcucpfunction";

 prefix "gnbcucp3gpp";

 import \_3gpp-common-yang-types { prefix types3gpp; }

 import \_3gpp-common-yang-extensions { prefix yext3gpp; }

 import \_3gpp-common-managed-function { prefix mf3gpp; }

 import \_3gpp-common-managed-element { prefix me3gpp; }

 import \_3gpp-common-top { prefix top3gpp; }

 import \_3gpp-5gc-nrm-configurable5qiset { prefix fiveqi3gpp; }

 import ietf-inet-types { prefix inet; }

 organization "3GPP SA5";

 contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

 description "Defines the YANG mapping of the GNBCUCPFunction Information

 Object Class (IOC) that is part of the NR Network Resource Model (NRM).

 Copyright 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI,

 TTA, TTC). All rights reserved.";

 reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

 revision 2024-02-24 { reference CR-1218; }

 revision 2024-01-12 { reference CR-1138; }

 revision 2023-09-18 { reference CR-1043; }

 revision 2023-04-26 { reference CR-0916; }

 revision 2022-07-28 { reference "CR-0770"; }

 revision 2021-11-06 { reference "CR-0611" ; }

 revision 2021-11-05 { reference "CR-0609"; }

 revision 2020-10-02 { reference CR-0384; }

 revision 2020-08-06 { reference "CR-0333"; }

 revision 2020-08-03 { reference "CR-0321"; }

 revision 2020-06-03 { reference "CR-0286"; }

 revision 2020-05-08 { reference S5-203316 ; }

 revision 2020-04-28 { reference "0260"; }

 revision 2020-02-14 { reference S5-20XXXX ; }

 revision 2019-10-28 { reference S5-193518 ; }

 revision 2019-06-17 { reference "Initial revision"; }

 feature Configurable5QISetUnderGNBCUCPFunction {

 description "The Configurable5QISet shall be contained under

 GNBCUCPFunction";

 }

 feature DESManagementFunction {

 description "Class representing Distributed SON Energy Saving feature";

 }

 feature DANRManagementFunction {

 description "Class representing D-SON function of ANR Management feature";

 }

 feature DMROFunction {

 description "Class representing D-SON function of MRO feature";

 }

 grouping GNBCUCPFunctionGrp {

 description "Represents the GNBCUCPFunction IOC.";

 reference "3GPP TS 28.541";

 uses mf3gpp:ManagedFunctionGrp;

 leaf gNBId {

 description "Identifies a gNB within a PLMN. The gNB Identifier (gNB ID)

 is part of the NR Cell Identifier (NCI) of the gNB cells.";

 reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

 mandatory true;

 type int64 { range "0..4294967295"; }

 }

 leaf gNBIdLength {

 description "Indicates the number of bits for encoding the gNB ID.";

 reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

 mandatory true;

 type int32 { range "22..32"; }

 }

 leaf gNBCUName {

 description "Identifies the Central Unit of an gNB.";

 reference "3GPP TS 38.473";

 mandatory true;

 type string { length "1..150"; }

 }

 list pLMNId {

 description "The PLMN identifier to be used as part of the global RAN

 node identity.";

 key "mcc mnc";

 min-elements 1;

 max-elements 1;

 yext3gpp:inVariant;

 uses types3gpp:PLMNId;

 }

 leaf-list x2BlockList {

 type string;

 description "List of nodes to which X2 connections are prohibited.";

 }

 leaf-list x2AllowList {

 type string;

 description "List of nodes to which X2 connections are enforced.";

 }

 leaf-list xnBlockList {

 type string;

 description "List of nodes to which Xn connections are prohibited.";

 }

 leaf-list xnAllowList {

 type string;

 description "List of nodes to which X2 connections are enforced.";

 }

 leaf-list xnHOBlockList {

 type string;

 description "List of nodes to which handovers over Xn are prohibited.";

 }

 leaf configurable5QISetRef {

 type types3gpp:DistinguishedName;

 description "DN of the Configurable5QISet that the GNBCUCPFunction

 supports (is associated to).";

 }

 leaf-list x2HOBlockList {

 type string;

 description "List of nodes to which handovers over X2 are prohibited.";

 }

 leaf dynamic5QISetRef {

 type types3gpp:DistinguishedName;

 description "DN of the Dynamic5QISet that the GNBCUCPFunction supports

 (is associated to).";

 }

 leaf dCHOControl {

 type boolean;

 description "This attribute determines whether the CHO function is

 enabled or disabled.";

 }

 leaf dDAPSHOControl {

 type boolean;

 description "This attribute determines whether the DAPS handover function

 is enabled or disabled.";

 }

 list qceIdMappingInfoList {

 description "List of the mapping relationship between QoE collection entity

 identity, PLMN where QoE collection entity resides, and the IP address of

 the QoE collection entity.";

 key idx;

 min-elements 1;

 uses QceIdMappingInfoGrp;

 leaf idx { type string; }

 }

 }

 grouping QceIdMappingInfoGrp {

 leaf qoECollectionEntityAddress {

 type inet:ip-address;

 description "Specifies the address to which the QMC reports shall be

 transferred. Ipv4 or Ipv6 address may be used.";

 }

 leaf qoECollectionEntityIdentity {

 type string;

 description "Specifies the unique identity to which the QMC reports

 shall be transferred.";

 }

 list pLMNTarget {

 description "The PLMN identifier where QoE collection entity

 resides. ";

 key "mcc mnc";

 min-elements 1;

 max-elements 1;

 yext3gpp:inVariant;

 uses types3gpp:PLMNId;

 }

 }

 augment "/me3gpp:ManagedElement" {

 list GNBCUCPFunction {

 description "Represents the logical function CU-CP of gNB and en-gNB.";

 reference "3GPP TS 28.541";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses GNBCUCPFunctionGrp;

 }

 uses mf3gpp:ManagedFunctionContainedClasses;

 uses fiveqi3gpp:Configurable5QISetSubtree {

 if-feature Configurable5QISetUnderGNBCUCPFunction;

 }

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 10 \*\*\*

\*\*\* START OF CHANGE 11 \*\*\*

\*\*\* yang-models/\_3gpp-nr-nrm-gnbdufunction.yang \*\*\*

<CODE BEGINS>

module \_3gpp-nr-nrm-gnbdufunction {

 yang-version 1.1;

 namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-gnbdufunction";

 prefix "gnbdu3gpp";

 import \_3gpp-common-managed-function { prefix mf3gpp; }

 import \_3gpp-common-managed-element { prefix me3gpp; }

 import \_3gpp-common-top { prefix top3gpp; }

 import \_3gpp-common-yang-types { prefix types3gpp; }

 import \_3gpp-common-yang-extensions { prefix yext3gpp; }

 import \_3gpp-5gc-nrm-configurable5qiset { prefix fiveqi3gpp; }

 organization "3GPP SA5";

 contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

 description "Defines the YANG mapping of the GNBDUFunction Information

 Object Class (IOC) that is part of the NR Network Resource Model (NRM).

 Copyright 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI,

 TTA, TTC). All rights reserved.";

 reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

 revision 2024-02-24 { reference CR-1218; }

 revision 2023-09-18 { reference CR-1043 ; }

 revision 2023-04-26 { reference CR-0916; }

 revision 2022-11-02 { reference "CR-0753"; }

 revision 2022-07-28 { reference "CR-0770"; }

 revision 2021-10-28 { reference CR-0607 ; }

 revision 2021-04-30 { reference CR-0490 ; }

 revision 2020-10-02 { reference CR-0384 ; }

 revision 2020-03-12 { reference "SP-200233 S5-201547" ; }

 revision 2020-02-14 { reference S5-20XXXX ; }

 revision 2019-10-28 { reference S5-193518 ; }

 revision 2019-08-21 {reference "Initial revision."; }

 feature Configurable5QISetUnderGNBDUFunction {

 description "The Configurable5QISet shall be contained under

 GNBDUFunction";

 }

 feature DRACHOptimizationFunction {

 description "Class representing D-SON function of RACH optimization

 feature";

 }

 grouping RimRSReportInfoGrp {

 description "This data type defines necessary reporting information

 derived from the detected RIM-RS, including

 1) The detected set ID;

 2) Propagation delay in number of OFDM symbols

 3) Functionality of the RS (RS-1 or RS-2, Enough or Not enough

 mitigation for RS-1).

 RS-1 is equivalent to RIM-RS type 1 (see 38.211, subclause 7.4.1.6).

 RS-2 is equivalent to RIM-RS type 2 (see 38.211, subclause 7.4.1.6).

 Enough mitigation for RS-1 means 'Enough' / 'Not enough' indication

 functionality is enabled for RIM RS-1 and RIM-RS type 1 is used to

 indicate 'enough mitigation' functionality.

 Not enough mitigation for RS-1 means 'Enough' / 'Not enough' indication

 functionality is enabled for RIM RS-1 and RIM-RS type 1 is used to

 indicate 'Not enough mitigation' functionality.";

 leaf detectedSetID {

 type uint32 ;

 description "Set ID of the detected RIM-RS

 allowedValues: 0,1...max{totalnrofSetIdofRS1, totalnrofSetIdofRS2}";

 }

 leaf propagationDelay {

 type uint32 ;

 must '. <= ../../maxPropagationDelay' {

 error-message "allowedValues: 0, 1.. maxPropagationDelay";

 }

 description "This attribute indicates the propagation delay of the

 detected RIM-RS, in number of OFDM symbol.";

 }

 leaf functionalityOfRIMRS {

 type enumeration {

 enum RS1;

 enum RS2;

 enum RS1\_FOR\_ENOUGH\_MITIGATION;

 enum RS1\_FOR\_NOT\_ENOUGH\_MITIGATION;

 }

 mandatory true;

 description "Indicates the functionality of the detected RIM-RS.

 If the indication of enableEnoughNotEnoughIndication is 'enabled',

 valid values are {RS2, RS1forEnoughMitigation,

 RS1forNotEnoughMitigation};

 If the indication of enableEnoughNotEnoughIndication is 'disabled',

 valid values are {RS1, RS2}.

 RS1forEnoughMitigation means RIM-RS type 1 is used to indicate

 'enough mitigation' functionality.

 RS1forNotEnoughMitigation means RIM-RS type 1 is used to indicate

 'Not enough mitigation' functionality.";

 }

 }

 grouping RimRSReportConfGrp {

 description "Defines RIM-RS reporting configuration";

 leaf reportIndicator {

 type types3gpp:EnabledDisabled;

 default DISABLED;

 description "Used to enable or disable the RS report on a gNB.

 If the indication is 'enable', the gNB starts to periodically report

 necessary information derived from the detected RIM-RS to OAM.

 If the indication is 'disable', the gNB stops reporting.";

 }

 leaf reportInterval {

 type uint32;

 mandatory true;

 units ms;

 description "Used to define reporting interval of a gNB in ms.";

 }

 leaf nrofRIMRSReportInfo {

 type uint32;

 mandatory true;

 description "Used to define the maximum number of RIMRSReportInfo in

 a single report.";

 }

 leaf maxPropagationDelay {

 type uint32 {

 range "0..327679";

 }

 mandatory true;

 description "Used to define the maximum reported OFDM symbol number for

 the propagation delay of the detected RIM-RS in each RIMRSReportInfo.

 allowedValues: 0, 1..20\*\*2\*maxNrofSymbols-1, where maxNrofSymbols=14.";

 }

 list RimRSReportInfoList {

 key detectedSetID;

 description "Represents a list (the length of the list is

 nrofRIMRSReportInfo) of necessary information derived from the

 detected RIM-RS.";

 uses RimRSReportInfoGrp;

 }

 }

 grouping GNBDUFunctionGrp {

 description "Represents the GNBDUFunction IOC.";

 reference "3GPP TS 28.541";

 uses mf3gpp:ManagedFunctionGrp;

 leaf gNBId {

 type int64 { range "0..4294967295"; }

 mandatory true;

 description "Identifies a gNB within a PLMN. The gNB Identifier (gNB ID)

 is part of the NR Cell Identifier (NCI) of the gNB cells.";

 reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

 }

 leaf gNBIdLength {

 type int32 { range "22..32"; }

 mandatory true;

 description "Indicates the number of bits for encoding the gNB ID.";

 reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

 }

 leaf gNBDUId {

 type int64 { range "0..68719476735"; }

 mandatory true;

 description "Uniquely identifies the DU at least within a gNB.";

 reference "3GPP TS 38.473";

 }

 leaf gNBDUName {

 type string { length "1..150"; }

 description "Identifies the Distributed Unit of an NR node";

 reference "3GPP TS 38.473";

 }

 list rimRSReportConf {

 key reportInterval;

 config false;

 min-elements 1;

 max-elements 1;

 yext3gpp:inVariant;

 description "Used to configure gNBs to report the all necessary

 information derived from the detected RIM-RS to OAM.";

 uses RimRSReportConfGrp;

 }

 leaf configurable5QISetRef {

 type types3gpp:DistinguishedName;

 description "DN of the Configurable5QISet that the GNBDUFunction supports (is associated

 to).";

 }

 leaf dynamic5QISetRef {

 type types3gpp:DistinguishedName;

 description "DN of the Dynamic5QISet that the GNBDUFunction supports (is associated to).";

 }

 }

 augment "/me3gpp:ManagedElement" {

 list GNBDUFunction {

 key id;

 description "Represents the logical function DU of gNB or en-gNB.";

 reference "3GPP TS 28.541";

 uses top3gpp:Top\_Grp;

 container attributes {

 uses GNBDUFunctionGrp;

 }

 uses mf3gpp:ManagedFunctionContainedClasses;

 uses fiveqi3gpp:Configurable5QISetSubtree {

 if-feature Configurable5QISetUnderGNBDUFunction;

 }

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 11 \*\*\*

\*\*\* START OF CHANGE 12 \*\*\*

\*\*\* yang-models/\_3gpp-nr-nrm-nrfreqrelation.yang \*\*\*

<CODE BEGINS>

module \_3gpp-nr-nrm-nrfreqrelation {

 yang-version 1.1;

 namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-nrfreqrelation";

 prefix "nrfreqrel3gpp";

 import \_3gpp-common-yang-types { prefix types3gpp; }

 import \_3gpp-common-managed-element { prefix me3gpp; }

 import \_3gpp-common-top { prefix top3gpp; }

 import \_3gpp-nr-nrm-gnbcucpfunction { prefix gnbcucp3gpp; }

 import \_3gpp-nr-nrm-nrcellcu { prefix nrcellcu3gpp; }

 organization "3GPP SA5";

 description "Defines the YANG mapping of the NRFreqRelation Information

 Object Class (IOC) that is part of the NR Network Resource Model (NRM).

 Copyright 2024, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI,

 TTA, TTC). All rights reserved.";

 reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

 revision 2024-02-24 { reference CR-1218; }

 revision 2023-09-18 { reference CR-1043; }

 revision 2023-04-26 { reference CR-0916; }

 revision 2020-04-23 { reference CR-0281; }

 revision 2019-10-28 { reference S5-193518; }

 revision 2019-06-17 {

 description "Initial revision";

 }

 grouping NRFreqRelationGrp {

 description "Represents the NRFreqRelation IOC.";

 reference "3GPP TS 28.541";

 container offsetMO {

 description "A set of offset values applicable to all measured cells

 with reference signal(s) indicated in corresponding MeasObjectNR. It

 is used to indicate a cell, beam or measurement object specific offset

 to be applied when evaluating candidates for cell re-selection or when

 evaluating triggering conditions for measurement reporting. It is

 defined for rsrpOffsetSSB, rsrqOffsetSSB, sinrOffsetSSB,

 rsrpOffsetCSI-RS, rsrqOffsetCSI-RS and sinrOffsetCSI-RS.";

 reference "offsetMO in MeasObjectNR in 3GPP TS 38.331";

 leaf rsrpOffsetSsb {

 description "Offset value of rsrpOffsetSSB.";

 default 0;

 type types3gpp:QOffsetRange;

 }

 leaf rsrqOffsetSsb {

 description "Offset value of rsrqOffsetSSB.";

 default 0;

 type types3gpp:QOffsetRange;

 }

 leaf sinrOffsetSsb {

 description "Offset value of sinrOffsetSSB.";

 default 0;

 type types3gpp:QOffsetRange;

 }

 leaf rsrpOffsetCsiRs {

 description "Offset value of rsrpOffsetCSI-RS.";

 default 0;

 type types3gpp:QOffsetRange;

 }

 leaf rsrqOffsetCsiRs {

 description "Offset value of rsrqOffsetCSI-RS.";

 default 0;

 type types3gpp:QOffsetRange;

 }

 leaf sinrOffsetCsiRs {

 description "Offset value of sinrOffsetCSI-RS.";

 default 0;

 type types3gpp:QOffsetRange;

 }

 }

 leaf-list blockListEntry {

 description "A list of Physical Cell Identities (PCIs) that are

 blocklisted in NR measurements.";

 reference "3GPP TS 38.331";

 min-elements 0;

 type uint16 { range "0..1007"; }

 }

 leaf-list blockListEntryIdleMode {

 description "A list of Physical Cell Identities (PCIs) that are

 blocklisted in SIB4 and SIB5.";

 min-elements 0;

 type uint16 { range "0..1007"; }

 }

 leaf cellReselectionPriority {

 description "The absolute priority of the carrier frequency used by the

 cell reselection procedure. Value 0 means lowest priority. The value

 must not already used by other RAT, i.e. equal priorities between RATs

 are not supported. The UE behaviour when no value is entered is

 specified in subclause 5.2.4.1 of 3GPP TS 38.304.";

 reference "CellReselectionPriority in 3GPP TS 38.331, priority in

 3GPP TS 38.304";

 type uint32;

 default 0;

 }

 leaf cellReselectionSubPriority {

 description "Indicates a fractional value to be added to the value of

 cellReselectionPriority to obtain the absolute priority of the

 concerned carrier frequency for E-UTRA and NR.";

 reference "3GPP TS 38.331";

 type uint8 { range "2 | 4 | 6 | 8"; }

 units "0.1";

 }

 leaf pMax {

 description "Used for calculation of the parameter Pcompensation

 (defined in 3GPP TS 38.304), at cell reselection to a cell.";

 reference "PEMAX in 3GPP TS 38.101-1";

 mandatory false;

 type int32 { range "-30..33"; }

 units dBm;

 }

 leaf qOffsetFreq {

 description "The frequency specific offset applied when evaluating

 candidates for cell reselection.";

 mandatory false;

 type types3gpp:QOffsetRange;

 default 0;

 }

 leaf qQualMin {

 description "Indicates the minimum required quality level in the cell.

 Value 0 means that it is not sent and UE applies in such case the

 (default) value of negative infinity for Qqualmin. Sent in SIB3 or

 SIB5.";

 reference "3GPP TS 38.304";

 type int32 { range "-34..-3 | 0"; }

 units dB;

 default 0;

 }

 leaf qRxLevMin {

 description "Indicates the required minimum received Reference Symbol

 Received Power (RSRP) level in the NR frequency for cell reselection.

 Broadcast in SIB3 or SIB5, depending on whether the related frequency

 is intra- or inter-frequency. Resolution is 2.";

 reference "3GPP TS 38.304";

 mandatory true;

 type int32 { range "-140..-44"; }

 units dBm;

 }

 leaf threshXHighP {

 description "Specifies the Srxlev threshold used by the UE when

 reselecting towards a higher priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold. Resolution is 2.";

 reference "ThreshX, HighP in 3GPP TS 38.304";

 mandatory true;

 type int32 { range "0..62"; }

 units dB;

 }

 leaf threshXHighQ {

 description "Specifies the Squal threshold used by the UE when

 reselecting towards a higher priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold.";

 reference "ThreshX, HighQ in 3GPP TS 38.304";

 mandatory true;

 type int32 { range "0..31"; }

 units dB;

 }

 leaf threshXLowP {

 description "Specifies the Srxlev threshold used by the UE when

 reselecting towards a lower priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold. Resolution is 2.";

 reference "ThreshX, LowP in 3GPP TS 38.304";

 mandatory true;

 type int32 { range "0..62"; }

 units dB;

 }

 leaf threshXLowQ {

 description "Specifies the Squal threshold used by the UE when

 reselecting towards a lower priority RAT/frequency than the current

 serving frequency. Each frequency of NR and E-UTRAN might have a

 specific threshold.";

 reference "ThreshX, LowQ in 3GPP TS 38.304";

 mandatory true;

 type int32 { range "0..31"; }

 units dB;

 }

 leaf tReselectionNR {

 description "Cell reselection timer for NR.";

 reference "TreselectionRAT for NR in 3GPP TS 38.331";

 mandatory true;

 type int32 { range "0..7"; }

 units s;

 }

 leaf tReselectionNRSfHigh {

 description "The attribute tReselectionNr (parameter TreselectionNR in

 3GPP TS 38.304) is multiplied with this scaling factor if the UE is

 in high mobility state.";

 reference "Speed dependent ScalingFactor for TreselectionNR for high

 mobility state in 3GPP TS 38.304";

 mandatory true;

 type uint8 { range "25 | 50 | 75 | 100"; }

 units %;

 }

 leaf tReselectionNRSfMedium {

 description "The attribute tReselectionNr (parameter TreselectionNR in

 3GPP TS 38.304) multiplied with this scaling factor if the UE is in

 medium mobility state.";

 reference "Speed dependent ScalingFactor for TreselectionNR for medium

 mobility state in 3GPP TS 38.304";

 mandatory true;

 type uint8 { range "25 | 50 | 75 | 100"; }

 units %;

 }

 leaf nRFrequencyRef {

 description "Reference to a corresponding NRFrequency instance.";

 mandatory true;

 type types3gpp:DistinguishedName;

 }

 }

 augment /me3gpp:ManagedElement/gnbcucp3gpp:GNBCUCPFunction/nrcellcu3gpp:NRCellCU {

 list NRFreqRelation {

 description "Together with the target NRFrequency, it represents the

 frequency properties applicable to the referencing NRFreqRelation.";

 reference "3GPP TS 28.541";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses NRFreqRelationGrp;

 }

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 12 \*\*\*

\*\*\* START OF CHANGE 13 \*\*\*

\*\*\* yang-models/\_3gpp-nr-nrm-operatordu.yang \*\*\*

<CODE BEGINS>

module \_3gpp-nr-nrm-operatordu {

 yang-version 1.1;

 namespace "urn:3gpp:sa5:\_3gpp-nr-nrm-operatordu";

 prefix "operdu3gpp";

 import \_3gpp-common-top { prefix top3gpp; }

 import \_3gpp-common-managed-element { prefix me3gpp; }

 import \_3gpp-nr-nrm-gnbdufunction {prefix gnbdu3gpp; }

 import \_3gpp-common-yang-types { prefix types3gpp; }

 organization "3GPP SA5";

 contact "https://www.3gpp.org/DynaReport/TSG-WG--S5--officials.htm?Itemid=464";

 description "Defines the YANG mapping of the OperatorDU Information Object

 Class (IOC) that is part of the NR Network Resource Model (NRM).

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 TTA, TTC). All rights reserved.";

 reference "3GPP TS 28.541 5G Network Resource Model (NRM)";

 revision 2024-02-24 { reference CR-1218; }

 revision 2023-11-14 { reference "CR1136"; }

 revision 2023-09-30 { reference "CR1048"; }

 revision 2023-09-18 { reference CR-1043 ; }

 revision 2021-10-01 { reference "Initial revision"; }

 grouping OperatorDUGrp {

 description "Represents the OperatorDU IOC.";

 reference "3GPP TS 28.541";

 leaf gNBId {

 type int64 { range "0..4294967295"; }

 mandatory true;

 description "Identifies a gNB within a PLMN. The gNB Identifier (gNB ID)

 is part of the NR Cell Identifier (NCI) of the gNB cells.";

 reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

 }

 leaf gNBIdLength {

 type int32 { range "22..32"; }

 mandatory true;

 description "Indicates the number of bits for encoding the gNB ID.";

 reference "gNB ID in 3GPP TS 38.300, Global gNB ID in 3GPP TS 38.413";

 }

 leaf configurable5QISetRef {

 type types3gpp:DistinguishedName;

 description "DN of the Configurable5QISet that the OperatorDU

 supports (is associated to).";

 }

 leaf dynamic5QISetRef {

 type types3gpp:DistinguishedName;

 description "DN of the Dynamic5QISet that the OperatorDU

 supports (is associated to).";

 }

 }

 augment "/me3gpp:ManagedElement/gnbdu3gpp:GNBDUFunction" {

 list OperatorDU {

 description "This IOC contains attributes to support operator specific

 gNB-DU level information to support the NG-RAN Multi-Operator Core

 Network (NG-RAN MOCN) network sharing with multiple Cell Identity

 broadcast feature. An instance of OperatorDU <<IOC>> should be created

 and configured for each POP. When configured the attributes override

 those in parent GNBDUFunction instance.

 The OperatorDU <<IOC>> is only used to support NG-RAN MOCN with

 multiple cell identity broadcast feature. If NG-RAN MOCN with multiple

 cell identity broadcast feature is not supported, is not used.

 For scenarios with an F1 interface supporting multiple PLMN broadcast,

 the values of the EP\_F1C and EP\_F1U attributes contained by different

 OperatorDU of the same GNBDUFunction should be same.";

 reference "3GPP TS 28.541";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses OperatorDUGrp;

 }

 uses gnbdu3gpp:GNBDUFunctionGrp;

 }

 }

}

<CODE ENDS>

\*\*\* END OF CHANGE 13 \*\*\*