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

Changsha, China, 15 - 19 April 2024

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *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 can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 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).

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 2023-11-14 { 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 \*\*\*