**3GPP TSG-SA5 Meeting #137-e *S5-213487***

**Online, , 10th May 2021 - 19th May 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.541** | **CR** | **0485** | **rev** | **-** | **Current version:** | **17.2.1** |  |
|  |
| *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:***  | perfReq mapping to domain specific attributes |
|  |  |
| ***Source to WG:*** | Ericsson LM |
| ***Source to TSG:*** | SA5 |
|  |  |
| ***Work item code:*** | EMA5SLA |  | ***Date:*** | 2021-05-20 |
|  |  |  |  |  |
| ***Category:*** | **C** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories 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)* |
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| ***Reason for change:*** | The existing performance requirements in perfReq in the SliceProfile needs to be broken down to domain specific requirements which define how these requirements should be mapped to RAN & Core specific ones |
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| ***Summary of change:*** | The existing perfReq attributes have been mapped to domain specific ones:* Delete the perfReq in SliceProfile and move the relevant domain specific attributes from perfReq to TopSliceSubnetProfile, CNSliceSubnetProfile and RANSliceSubnetProfile.
* An Editors note has been added to 6.3.4.3

The term “PerSubnet” have been removed from dLThptPerUEPerSubnet and uLThptPerUEPerSubnet.* The <<datatype>> DLThptSliceSubnet and ULThptSliceSubnet have been deleted.
* The <<datatype>> DLThpt and ULThpt have been replaced with XLThpt
* Some identified related “corrections” also performed: In 6.3.8, C (Conditional) changed to O (optional) to align with 6.3.9

A number of attributes are added to TopSliceSubnetProfile to make it aggregating all the attributes from “subordinate” CNSliceSubnetProfile and RANSliceSubnetProfile |
|  |  |
| ***Consequences if not approved:*** | The mapping of perfReq to domain specific attributes will be vendor specific |
|  |  |
| ***Clauses affected:*** | 6.3.4, 6.3.8, 6.3.9, 6.3.20, 6.3.21, 6.3.22, 6.3.23, 6.3.24, 6.4.1, J.4.4, L2, N2.3, N.2.4, N.2.5, N.2.X |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** | This CR is implementation of the Endorsed proposal A, B, C and D in discussion paper S5-212272 in SA5 #136e meeting. Forge link: https://forge.3gpp.org/rep/sa5/MnS/commits/S5-213117\_Rel-17\_CR\_28.541\_perfReq\_mapping\_to\_domain\_specific\_attributes |
|  |  |
| ***This CR's revision history:*** |  |

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| **1st modified section** |

### 6.3.4 SliceProfile <<dataType>>

#### 6.3.4.1 Definition

This data type represents the properties of network slice subnet related requirement that should be supported by the NetworkSliceSubnet instance in a 5G network.

#### 6.3.4.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| sliceProfileId | M | T | F | T | T |
| sNSSAIList | M | T | T | F | T |
| pLMNIdList | M | T | T | F | T |
|  |  |  |  |  |  |
| CNSliceSubnetProfile | CM | T | T | F | T |
| RANSliceSubnetProfile | CM | T | T | F | T |
| TopSliceSubnetProfile | CM | T | T | F | T |

#### 6.3.4.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| CNSliceSubnetProfile Support Qualifier | Condition: It shall be present when the slice profile defines requirements for CN domain  |
| RANSliceSubnetProfile Support Qualifier | Condition: It shall be present when the slice profile defines requirements for RAN domain. |
| TopSliceSubnetProfileSupport Qualifier | Condition: It shall be present when the slice profile is for top/root network slice subnet |

Editors Note 1: Need for specific slice profile for TN domain is FFS.

Editor's NOTE 3: The common attributes of the three types of SliceProfile may be extracted out and put into the common part of the SliceProfile

Editor's NOTE 4: Whether SliceProfile is dataType or IOC is FFS.

Editor's NOTE 5: Whether RANSliceSubnetProfile is inherited from or contained by SliceProfile is FFS.

Editor's NOTE 6: Whether CNSliceSubnetProfile is inherited from or contained by SliceProfile is FFS.

Editor's NOTE 7: Whether tOPSliceSubnetProfile is inherited from or contained by SliceProfile is FFS.

Editor's NOTE 9: Mapping of the URLLC related attributes cSAvailabilityTarget and cSReliabilityMeanTime to subnet level (as part of perfReq mapping): e.g. if they are captured by the attributes: availability and reliability is FFS

#### 6.3.4.4 Notifications

The subclause 6.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

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| **Next modified section** |

### 6.3.8 XLThpt<<dataType>>

#### 6.3.8.1 Definition

This data type can be used to represent downlink or uplink throughput per network slice, per network slice subnet, or per UE in a network slice (See Clause 3.4.5 and 3.4.6 of GSMA NG.116 [50])

#### 6.3.8.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| servAttrCom | CM | T | F | F | T |
| guaThpt | M | T | F | F | T |
| maxThpt | O | T | F | F | T |

#### 6.3.8.3 Attribute constraints

|  |  |
| --- | --- |
| **Name** | **Definition** |
| servAttrCom Support Qualifier | Condition: This [attribute] is mandatory only *when requirements are being defined on* throughput per: network slice (GSMA attribute), per UE in a network slice (GSMA attribute). Otherwise, the attribute is optional. |

6.3.8.4 Notifications

The subclause 6.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

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6.3.22 CNSliceSubnetProfile<<dataType>>

6.3.22.1 Definition

This data type represents the requirements for CN slice profile.

Editor's NOTE: Whether CNSliceSubnetProfile is an IOC or dataType is FFS.

6.3.22.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Support Qualifier** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| maxNumberofUEs | O | T | T | F | T |
| latency | O | T | T | F | T |
| dLThptPerSliceSubnet | O | T | T | F | T |
| dLThptPerUE | O | T | T | F | T |
| uLThptPerSliceSubnet | O | T | T | F | T |
| uLThptPerUE | O | T | T | F | T |
| maxNumberOfPDUSessions | O | T | T | F | T |
| coverageAreaTAList | O | T | T | F | T |
| resourceSharingLevel | O | T | T | F | T |
| maxPktSize | O | T | T | F | T |
| sliceSimultaneousUse | O | T | T | F | T |
| delayTolerance | O | T | T | F | T |
| deterministicComm | O | T | T | F | T |

6.3.22.3 Attribute constraints

None.

6.3.22.4 Notifications

The subclause 6.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

6.3.23 RANSliceSubnetProfile<<dataType>>

6.3.23.1 Definition

This data type represents the requirements for RAN slice profile.

Editor's NOTE 1: Whether the attributes of RANSliceSubnetProfile need to be modelled by one IOC or more than one IOC is FFS.

Editor's NOTE 2: Whether RANSliceSubnetProfile is an IOC or dataType is FFS.

6.3.23.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Support Qualifier** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
|  |  |  |  |  |  |
| coverageAreaTAList | O | T | T | F | T |
| uEMobilityLevel | O | T | T | F | T |
| resourceSharingLevel | O | T | T | F | T |
| maxNumberofUEs | O | T | T | F | T |
| activityFactor | O | T | T | F | T |
| dLThptPerUE | O | T | T | F | T |
| uLThptPerUE | O | T | T | F | T |
| uESpeed | O | T | T | F | T |
| reliability | O | T | T | F | T |
| serviceType | O | T | T | F | T |
| latency | O | T | T | F | T |
| delayTolerance | O | T | T | F | T |
| sliceSimultaneousUse | O | T | T | F | T |
| maxPktSize | O | T | T | F | T |
| termDensity | O | T | T | F | T |
| survivalTime | O | T | T | F | T |
| deterministicComm | O | T | T | F | T |

6.3.23.3 Attribute constraints

None.

6.3.23.4 Notifications

The subclause 6.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

6.3.24 TopSliceSubnetProfile<<dataType>>

6.3.24.1 Definition

This data type represents the requirements for for the TopSliceSubnetProfile associated with the a SliceProfile. TopSliceSubnetProfile includes the aggregation of the attributes from RANSliceSubnetProfile and CNSliceSubnetProfile.

Editor's NOTE: Whether TopSliceSubnetProfile is an IOC or dataType is FFS.

6.3.24.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **Support Qualifier** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
|  |  |  |  |  |  |
| latency | O | T | T | F | T |
| maxNumberofUEs | O | T | T | F | T |
| dLThptPerSliceSubnet | O | T | T | F | T |
| dLThptPerUE | O | T | T | F | T |
| uLThptPerSliceSubnet | O | T | T | F | T |
| uLThptPerUE | O | T | T | F | T |
| maxPktSize | O | T | T | F | T |
| maxNumberOfPDUSessions | O | T | T | F | T |
| sliceSimultaneousUse | O | T | T | F | T |
| delayTolerance | O | T | T | F | T |
| termDensity | O | T | T | F | T |
| activityFactor | O | T | T | F | T |
| coverageAreaTAList | O | T | T | F | T |
| resourceSharingLevel | O | T | T | F | T |
| uEMobilityLevel | O | T | T | F | T |
| uESpeed | O | T | T | F | T |
| reliability | O | T | T | F | T |
| serviceType | O | T | T | F | T |
| deterministicComm | O | T | T | F | T |
| survivalTime | O | T | T | F | T |

6.3.24.3 Attribute constraints

None.

6.3.24.4 Notifications

The subclause 6.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

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| **Next modified section** |

6.4 Attribute definition

6.4.1 Attribute properties

| **Attribute Name** | **Documentation and Allowed Values** | **Properties** |
| --- | --- | --- |
| availability | This parameter specifies the communication service availability requirement, expressed as a percentage. The communication service availability is defined in clause 3.1 of TS 22.261 [28]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: True |
| serviceProfileId | A unique identifier of property of network slice related requirement should be supported by the network slice. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| sliceProfileId | A unique identifier of the property of network slice subnet related requirement should be supported by the network slice subnet. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| operationalState | It indicates the operational state of the network slice or the network slice subnet. It describes whether or not the resource is physically installed and working.allowedValues: "ENABLED", "DISABLED".The meaning of these values is as defined in 3GPP TS 28.625 [17] and ITU-T X.731 [18]. | type: ENUM multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| administrativeState | It indicates the administrative state of the network slice or the network slice subnet. It describes the permission to use or prohibition against using the managed object instance, imposed through the OAM services.allowedValues: “LOCKED”, “UNLOCKED”, SHUTTINGDOWN” The meaning of these values is as defined in 3GPP TS 28.625 [17] and ITU-T X.731 [18]. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: LOCKEDallowedValues: N/A isNullable: False |
| nsInfo | This attribute contains the NsInfo of the NS instance corresponding to the network slice subnet instance. The NsInfo is described in clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: NsInfomultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| nSInstanceId | This attribute specifies the identifier of NS instance corresponding to the network slice subnet instance.See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| nsName | This attribute specifies the name of NS instance corresponding to the network slice subnet instance.See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| description | This attribute specifies the description of NS instance corresponding to the network slice subnet instance.See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| category | This attribute specifies the category of a service requirement/attribute of GST (see GSMA NG.116 [50]).allowedValues: character, scalability | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/A isNullable: False |
| tagging | This attribute specifies the tagging of a service requirement/attribute of GST in character category (see GSMA NG.116 [50]).allowedValues: performance, function, operation | type: ENUMmultiplicity: 1…3isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/A isNullable: False |
| exposure | This attribute specifies exposure mode of a service requirement/attribute of GST (see GSMA NG.116 [50]).allowedValues: API, KPI | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/A isNullable: False |
| sNSSAIList | This parameter specifies the S-NSSAI list to be supported by the network slice new to be created or the existing network slice to be re-used.sNSSAList is defined in subclause 4.4.1 |  |
|  |  |  |
| maxNumberofUEs | An attribute specifies the maximum number of UEs may simultaneously access the network slice or network slice subnet instance. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| coverageAreaTAList | An attribute specifies a list of Tracking Areas for the network slice .allowedValues:Legacy TAC and Extended TAC are defined in clause 9.3.3.10 of TS 38.413 [5]. | type: Integermultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| latency | An attribute specifies the packet transmission latency (millisecond) through the RAN, CN, and TN part of 5G network and is used to evaluate utilization performance of the end-to-end network slice. See clause 6.3.1 of 28.554 [27]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| topSliceSubnetProfile.latency | An attribute specifies the packet transmission latency (millisecond) through all domains of the network slice and is used to evaluate utilization performance of the end-to-end network slice. See clause 6.3.1 of 28.554 [27]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| CNSliceSubnetProfile.latency | An attribute specifies the packet transmission latency (millisecond) through CN domain of the network slice and is used to evaluate the delay in CN domain, e.g. time between received UL/DL packet on N3/N6 interface of UPF and successfully sent out the packet on N6/N3 interface.  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| RANSliceSubnetProfile.latency | An attribute specifies the packet transmission latency (millisecond) through RAN domain of the network slice and is used to evaluate the delay in RAN domain, e.g. time between received UL/DL packet on air interface/NgU of gNB and successfully sent out the packet on NgU/air interface of the gNB.  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uEMobilityLevel | An attribute specifies the mobility level of UE accessing the network slice. See 6.2.1 of TS 22.261 [28].allowedValues: stationary, nomadic, restricted mobility, fully mobility. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: True |
| serviceProfile.resourceSharingLevel | An attribute specifies whether the resources to be allocated to the network slice may be shared with another network slice(s).allowedValues: shared, non-shared. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: YesisNullable: True |
| sliceProfile.resourceSharingLevel | An attribute specifies whether the resources to be allocated to the network slice subnet may be shared with another network slice subnet(s).allowedValues: shared, non-shared. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: YesisNullable: True |
| serviceProfileList | An attribute specifies a list of ServiceProfile (see clause 6.3.3) supported by the network slice  | type: ServiceProfilemultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| sliceProfileList | An attribute specifies a list of SliceProfile (see clause 6.3.4) supported by the network slice subnet  | type: SliceProfilemultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| sST | This parameter specifies the slice/service type in a ServiceProfile to be supported by a network slice.See clause 5.15.2 of 3GPP TS 23.501 [2]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| delayTolerance | An attribute specifies the properties of service delivery flexibility, especially for the vertical services that are not chasing a high system performance. See clause 4.3 of TS 22.104 [51]. | type: DelayTolerancemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| DelayTolerance.support | An attribute specifies whether or not the network slice supports service delivery flexibility, especially for the vertical services that are not chasing a high system performance.allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| deterministicComm | An attribute specifies the properties of the deterministic communication for periodic user traffic, see clause 4.3 of TS 22.104 [51]. | type: <<DeterminComm>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| DeterminComm.availability | An attribute specifies whether or not the network slice supports deterministic communication for period user traffic.allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| DeterminComm.periodicityList | An attribute specifies a list of periodicities supported by the network slice for deterministic communication. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| dLThptPerSlice | This attribute defines achievable data rate of the network slice in downlink that is available ubiquitously across the coverage area of the slice, refer NG.116 [50]. | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| dLThptPerSliceSubnet | This attribute defines achievable data rate of the network slice subnet in downlink that is available ubiquitously across the coverage area of the slice. | type: XLThpt multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
|  |  |  |
| dLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50].  | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| guaThpt | This attribute describes the guaranteed data rate. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| maxThpt | This attribute describes the maximum data rate. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| uLThptPerSlice | This attribute defines achievable data rate of the network slice in uplink that is available ubiquitously across the coverage area of the slice, refer NG.116 [50].  | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50].  | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uLThptPerSliceSubnet | This attribute defines achievable data rate of the network slice subnet in uplink that is available ubiquitously across the coverage area of the slice. | type: XLThpt multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
|  |  |  |
| maxPktSize | This parameter specifies the maximum packet size supported by the network slice or the network slice subnet, refer NG.116 [50].  | type: MaxPktSizemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| MaxPktSize.maxsize | This parameter specifies the maximum packet size supported by the network slice, refer NG.116 [50].  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| maxNumberofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50].  | type: MaxNumberofPDUSessionsmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| MaxNumberofPDUSessions.nOofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50].  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| kPIMonitoring | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: KPIMonitoringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| KPIMonitoring. kPIList | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| nBIoT | An attribute specifies whether NB-IoT is supported in the RAN in the network slice, see NG.116 [50]. | type: NBIoTmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| NBIoT.support | An attribute specifies whether NB-IoT is supported in the RAN in the network slice, see NG.116 [50].allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| synchronicity | An attribute specifies whether synchronicity of communication devices is supported, Two cases are most important in this context, see clause 3.4.29 of NG.116 [50]:- Synchronicity between a base station and a mobile device and- Synchronicity between mobile devices. | type: Synchronicitymultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Synchronicity.availability | An attribute specifies whether synchronicity of communication devices is supported, see NG.116 [50].allowedValues:"NOT SUPPORTED", "BETWEEN BS AND UE", "BETWEEN BS AND UE & UE AND UE". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Synchronicity.accuracy | An attribute specifies the accuracy of the synchronicity, see NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| userMgmtOpen | An attribute specifies whether or not the network slice supports the capability for the NSC to manage their users or groups of users’ network services and corresponding requirements. | type: UserMgmtOpenmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| UserMgmtOpen.support | An attribute specifies whether or not the network slice supports the capability for the NSC to manage their users or groups of users’ network services and corresponding requirements.allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| v2XCommModels | An attribute specifies whether or not the V2X communication mode is supported by the network slice. | type: V2XCommModemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| V2XCommMode.v2XMode | An attribute specifies whether or not the V2X communication mode is supported by the network slice.allowedValues:"NOT SUPPORTED", "SUPPORTED BY NR". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| coverageArea | An attribute specifies the coverage area of the network slice, i.e. the geographic region where a 3GPP communication service is accessible, see Table 7.1-1 of TS 22.261 [28]) and NG.116 [50]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| termDensity | An attribute specifies the overall user density over the coverage area of the network slice. See Table 7.1-1 of TS 22.261 [28]). | type: TermDensitymultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| TermDensity.density | An attribute specifies the overall user density over the coverage area of the network slice. See Table 7.1-1 of TS 22.261 [28]). | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| positioning | An attribute specifies whether the network slice provides geo-localization methods or supporting methods, see clause 3.4.20 of NG.116 [50]. | type: Positioningmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Positioning.availability | An attribute specifies if this attribute is provided by the network slice and contains a list of positioning methods provided by the slice. If the list is empty this attribute is not available in the network slice and the other parameters might be ignored, see NG.116 [50]. Comma separated multiple values are allowed:CIDE-CID (LTE and NR), OTDOA (LTE and NR), RF fingerprinting, AECID, Hybrid positioning, NET-RTK. | type: ENUMmultiplicity: 1..6isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Positioning.predictionfrequency | An attribute specifies how often location information is provided. This parameter simply defines how often the customer is allowed to request location information. This is not related to the time it takes to determine the location, which is a characteristic of the positioning method, see NG.116 [50].allowedValues:"PERSEC", "PERMIN", "PERHOUR". | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Positioning.accuracy | An attribute specifies the accuracy of the location information. Accuracy depends on the respective positioning solution applied in the network slice, see NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| activityFactor | An attribute specifies the percentage value of the amount of simultaneous active UEs to the total number of UEs where active means the UEs are exchanging data with the network. See Table 7.1-1 of TS 22.261 [28]). | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| uESpeed | An attribute specifies the maximum speed (in km/hour) supported by the network slice or network slice subnet at which a defined QoS can be achieved. See Table 7.1-1 of TS 22.261 [28]). | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| jitter | An attribute specifies the deviation from the desired value to the actual value when assessing time parameters, see clause C.4.1 of TS 22.104 [51]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| survivalTime | An attribute specifies the time that an application consuming a communication service may continue without an anticipated message. See clause 5 of TS 22.104 [51]). | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| reliability | An attribute specifies in the context of network layer packet transmissions, percentage value of the amount of sent network layer packets successfully delivered to a given system entity within the time constraint required by the targeted service, divided by the total number of sent network layer packets, see TS 22.261 [28] and TS 22.104 [51]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| NetworkSlice.networkSliceSubnetRef | This holds a DN of NetworkSliceSubnet relating to the NetworkSlice instance. | type: DNmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| NetworkSliceSubnet.networkSliceSubnetRef | This holds a list of DN of constituent NetworkSliceSubnet supporting NetworkSliceSubnet instance  | type: DNmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| managedFunctionRef | This holds a list of DN of ManagedFunction instances supporting the NetworkSliceSubnet instance. | type: DNmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| ipAddress | This parameter specifies the IP address assigned to a logical transport interface/endpoint. It can be an IPv4 address (See RFC 791 [37]) or an IPv6 address (See RFC 2373 [38]).See note 1 | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| logicInterfaceId | This parameter specifies the identify of a logical transport interface. It could be VLAN ID (See IEEE 802.1Q [39]), MPLS Tag or Segment ID. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| nextHopInfoList | This parameter is used to identify ingress transport node. Each node can be identified by any of combination of IP address of next-hop router of transport network, system name, port name, IP management address of transport nodes. | type: Stringmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| qosProfileRefList | This parameter specifies reference to QoS Profile for a logical transport interface. A QoS profile includes a set of parameters which are locally provisioned on both sides of a logical transport interface. | type: Stringmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: True |
| maxDLDataVolume | An attribute specifies the maximum DL PDCP data volume supported by the network slice instance (performance measurement definition see in TS 28.552[69]). The unit is MByte/day. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| maxULDataVolume | An attribute specifies the maximum UL PDCP data volume supported by the network slice instance (performance measurement definition see in TS 28.552[69]). The unit is MByte/day. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| serviceType | An attribute specifies the standardized network slice type.allowedValues: eMBB, URLLC, MIoT, V2X. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: True |
| epApplicationRef | This parameter specifies a list of application level EPs associated with the logical transport interface.See note 2. | type: DNmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| epTransportRef | This parameter specifies a list of transport level EPs associated with the application level EP (i.e. EP\_N3 or EP\_NgU) or network slice subnet. | type: DNmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: True |
| sliceSimultaneousUse | This attribute describes whether a network slice can be simultaneously used by a device together with other network slices and if so, with which other classes of network slices.allowedValues: “0”, “1”, “2”, “3”, “4”.“0”: Can be used with any network slice“1”: Can be used with network slices with same SST value“2”: Can be used with any network slice with same SD value“3”: Cannot be used with another network slice“4”: Cannot be used by a UE in a specific location | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| NOTE 1: There is no direct relationship between localAddress/remoteAddress in EP\_RP and ipAddress in EP\_transport. While the localAddress/remoteAddress in EP\_RP could be exchanged as part of signalling between GTP-u tunnel end points, ipAddress in EP\_transport is used for transport routing. NOTE 2: Application level EP represents EP\_RP defined in TS 28.622 (see [30]). e.g. including EP\_NgC, EP\_N3, etc... |

|  |
| --- |
| **Next modified section** |

## J.4.3 OpenAPI document "sliceNrm.yaml"

openapi: 3.0.1

info:

 title: Slice NRM

 version: 17.2.0

 description: >-

 OAS 3.0.1 specification of the Slice NRM

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externalDocs:

 description: 3GPP TS 28.541 V17.2.0; 5G NRM, Slice NRM

 url: http://www.3gpp.org/ftp/Specs/archive/28\_series/28.541/

paths: {}

components:

 schemas:

#------------ Type definitions ---------------------------------------------------

 Float:

 type: number

 format: float

 MobilityLevel:

 type: string

 enum:

 - STATIONARY

 - NOMADIC

 - RESTRICTED MOBILITY

 - FULLY MOBILITY

 SynAvailability:

 type: string

 enum:

 - NOT SUPPORTED

 - BETWEEN BS AND UE

 - BETWEEN BS AND UE & UE AND UE

 PositioningAvailability:

 type: array

 items:

 type: string

 enum:

 - CIDE-CID

 - OTDOA

 - RF FINGERPRINTING

 - AECID

 - HYBRID POSITIONING

 - NET-RTK

 Predictionfrequency:

 type: string

 enum:

 - PERSEC

 - PERMIN

 - PERHOUR

 SharingLevel:

 type: string

 enum:

 - SHARED

 - NON-SHARED

 NetworkSliceSharingIndicator:

 type: string

 enum:

 - SHARED

 - NON-SHARED

 ServiceType:

 type: string

 enum:

 - eMBB

 - RLLC

 - MIoT

 - V2X

 SliceSimultaneousUse:

 type: string

 enum:

 - ZERO

 - ONE

 - TWO

 - THREE

 - FOUR

 Category:

 type: string

 enum:

 - CHARACTER

 - SCALABILITY

 Tagging:

 type: array

 items:

 type: string

 enum:

 - PERFORMANCE

 - FUNCTION

 - OPERATION

 Exposure:

 type: string

 enum:

 - API

 - KPI

 ServAttrCom:

 type: object

 properties:

 category:

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

 tagging:

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

 exposure:

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

 Support:

 type: string

 enum:

 - NOT SUPPORTED

 - SUPPORTED

 DelayTolerance:

 type: object

 properties:

 servAttrCom:

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

 support:

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

 DeterministicComm:

 type: object

 properties:

 servAttrCom:

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

 availability:

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

 periodicityList:

 type: string

 XLThpt:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 MaxPktSize:

 type: object

 properties:

 servAttrCom:

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

 maxsize:

 type: integer

 MaxNumberofPDUSessions:

 type: object

 properties:

 servAttrCom:

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

 nOofPDUSessions:

 type: integer

 KPIMonitoring:

 type: object

 properties:

 servAttrCom:

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

 kPIList:

 type: string

 NBIoT:

 type: object

 properties:

 servAttrCom:

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

 support:

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

 Synchronicity:

 type: object

 properties:

 servAttrCom:

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

 availability:

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

 accuracy:

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

 Positioning:

 type: object

 properties:

 servAttrCom:

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

 availability:

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

 predictionfrequency:

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

 accuracy:

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

 UserMgmtOpen:

 type: object

 properties:

 servAttrCom:

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

 support:

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

 V2XCommModels:

 type: object

 properties:

 servAttrCom:

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

 v2XMode:

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

 TermDensity:

 type: object

 properties:

 servAttrCom:

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

 density:

 type: integer

 NsInfo:

 type: object

 properties:

 nsInstanceId:

 type: string

 nsName:

 type: string

 CNSliceSubnetProfile:

 type: object

 properties:

 maxNumberofUEs:

 type: integer

 latency:

 type: integer

 dLThptPerSliceSubnet:

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

 dLThptPerUE:

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

 uLThptPerSliceSubnet:

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

 uLThptPerUE:

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

 maxNumberOfPDUSessions:

 type: integer

 maxPktSize:

 type: integer

 delayTolerance:

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

 sliceSimultaneousUse:

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

 deterministicComm:

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

 RANSliceSubnetProfile:

 type: object

 properties:

 coverageAreaTAList:

 type: integer

 MobilityLevel:

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

 resourceSharingLevel:

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

 maxNumberofUEs:

 type: integer

 activityFactor:

 type: integer

 dLThptPerUE:

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

 uLThptPerUE:

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

 uESpeed:

 type: integer

 reliability:

 type: string

 serviceType:

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

 maxPktSize:

 type: integer

 delayTolerance:

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

 sliceSimultaneousUse:

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

 deterministicComm:

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

 survivalTime:

 type: string

 termDensity:

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

 transferIntervalTarget:

 type: string

 TopSliceSubnetProfile:

 type: object

 properties:

 latency:

 type: integer

 maxNumberofUEs:

 type: integer

 dLThptPerSliceSubnet:

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

 dLThptPerUE:

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

 uLThptPerSliceSubnet: $ref: '#/components/schemas/XLThpt'

 uLThptPerUE:

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

 maxPktSize:

 type: integer

 delayTolerance:

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

 sliceSimultaneousUse:

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

 termDensity:

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

 activityFactor:

 type: integer

 coverageAreaTAList:

 type: integer

 uEMobilityLevel:

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

 resourceSharingLevel:

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

 uESpeed:

 type: integer

 reliability:

 type: string

 serviceType:

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

 deterministicComm:

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

 survivalTime:

 type: string transferIntervalTarget:

 type: string

 ServiceProfile:

 type: object

 properties:

 serviceProfileId:

 type: string

 plmnInfoList:

 $ref: 'nrNrm.yaml#/components/schemas/PlmnInfoList'

 maxNumberofUEs:

 type: number

 latency:

 type: number

 uEMobilityLevel:

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

 sst:

 $ref: 'nrNrm.yaml#/components/schemas/Sst'

 networkSliceSharingIndicator:

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

 availability:

 type: number

 delayTolerance:

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

 deterministicComm:

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

 dLThptPerSlice:

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

 dLThptPerUE:

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

 uLThptPerSlice:

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

 uLThptPerUE:

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

 maxPktSize:

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

 maxNumberofPDUSessions:

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

 kPIMonitoring:

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

 nBIoT:

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

 synchronicity:

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

 positioning:

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

 userMgmtOpen:

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

 v2XModels:

 $ref: '#/components/schemas/V2XCommModels'

 coverageArea:

 type: string

 termDensity:

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

 activityFactor:

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

 uESpeed:

 type: integer

 jitter:

 type: integer

 survivalTime:

 type: string

 reliability:

 type: string

 maxDLDataVolume:

 type: string

 maxULDataVolume:

 type: string

 sliceSimultaneousUse:

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

 SliceProfile:

 type: object

 properties:

 serviceProfileId:

 type: string

 plmnInfoList:

 $ref: 'nrNrm.yaml#/components/schemas/PlmnInfoList'

 cNSliceSubnetProfile:

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

 rANSliceSubnetProfile:

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

 topSliceSubnetProfile:

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

 IpAddress:

 oneOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Ipv4Addr'

 - $ref: 'genericNrm.yaml#/components/schemas/Ipv6Addr'

 ServiceProfileList:

 type: array

 items:

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

 SliceProfileList:

 type: array

 items:

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

#------------ Definition of concrete IOCs ----------------------------------------

 SubNetwork-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top-Attr'

 - type: object

 properties:

 attributes:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-Attr'

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-ncO'

 - type: object

 properties:

 SubNetwork:

 $ref: '#/components/schemas/SubNetwork-Multiple'

 NetworkSlice:

 $ref: '#/components/schemas/NetworkSlice-Multiple'

 NetworkSliceSubnet:

 $ref: '#/components/schemas/NetworkSliceSubnet-Multiple'

 EP\_Transport:

 $ref: '#/components/schemas/EP\_Transport-Multiple'

 NetworkSlice-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top-Attr'

 - type: object

 properties:

 attributes:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-Attr'

 - type: object

 properties:

 networkSliceSubnetRef:

 $ref: 'genericNrm.yaml#/components/schemas/Dn'

 operationalState:

 $ref: 'genericNrm.yaml#/components/schemas/OperationalState'

 administrativeState:

 $ref: 'genericNrm.yaml#/components/schemas/AdministrativeState'

 serviceProfileList:

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

 NetworkSliceSubnet-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top-Attr'

 - type: object

 properties:

 attributes:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/SubNetwork-Attr'

 - type: object

 properties:

 managedFunctionRefList:

 $ref: 'genericNrm.yaml#/components/schemas/DnList'

 networkSliceSubnetRefList:

 $ref: 'genericNrm.yaml#/components/schemas/DnList'

 operationalState:

 $ref: 'genericNrm.yaml#/components/schemas/OperationalState'

 administrativeState:

 $ref: 'genericNrm.yaml#/components/schemas/AdministrativeState'

 nsInfo:

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

 sliceProfileList:

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

 epTransportRefList:

 $ref: 'genericNrm.yaml#/components/schemas/DnList'

 EP\_Transport-Single:

 allOf:

 - $ref: 'genericNrm.yaml#/components/schemas/Top-Attr'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 ipAddress:

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

 logicInterfaceId:

 type: string

 nextHopInfo:

 type: string

 qosProfile:

 type: string

 epApplicationRefs:

 $ref: 'genericNrm.yaml#/components/schemas/DnList'

#-------- Definition of JSON arrays for name-contained IOCs ----------------------

 SubNetwork-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/SubNetwork-Single'

 NetworkSlice-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/NetworkSlice-Single'

 NetworkSliceSubnet-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/NetworkSliceSubnet-Single'

 EP\_Transport-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/EP\_Transport-Single'

#------------ Definitions in TS 28.541 for TS 28.532 -----------------------------

 resources-sliceNrm:

 oneOf:

 - $ref: '#/components/schemas/SubNetwork-Single'

 - $ref: '#/components/schemas/NetworkSlice-Single'

 - $ref: '#/components/schemas/NetworkSliceSubnet-Single'

 - $ref: '#/components/schemas/EP\_Transport-Single'

|  |
| --- |
| **Next modified section** |

# L.2 GSMA GST, ServiceProfile and sliceProfile

The GSMA GST is used as the SLA information for the communication between the NSC (e.g. vertical industry) and the NSP. The SLA requirements can be fulfilled from management aspect and control aspect in a coordinated way. The SLS includes ServiceProfile information model.

As shown in figure L.2.1, the GST [50] is translated and used as input to NRM ServiceProfile, the ServiceProfile can be translated to corresponding requirements for dedicated domains. For example, 5GC SliceProfile is used to carry 5GC domain requirements, NG-RAN SliceProfile is used to carry NG-RAN domain requirements, and TN requirements are translated and provide to TN domain. Some of the information in 5GC SliceProfile and NG-RAN SliceProfile translated to configurable parameters of network function for the control plane SLA support purpose.

Some of the information (as shown in Table L.2.1) in 5GC SliceProfile and NG-RAN SliceProfile is translated to configurable parameters related to network function behaviour for the control plane SLA support purpose. While other information (e.g delay tolerance, determistic communication support) in 5GC SliceProfile and NG-RAN SliceProfile are kept at OAM domain and is used to determine the overall behaviour of the network slice.

The following table show the translation of GST attributes.

Table L.2.1: GST translation

|  |  |  |  |
| --- | --- | --- | --- |
| GST Attributes | ServiceProfile Parameter | SliceProfile Parameter | Configurable Parameter |
| **Maximum number of UEs** | maxNumberofUEs | maxNumberofUE | TBD |
| **Maximum number of PDU sessions** | maxNumberofConns | maxNumberofPDUSessions | TBD |
| **Downlink maximum throughput per UE** | dLThptPerUE | dLThptPerUE | TBD |
| **Uplink maximum throughput per UE** | uLThptPerUE | uLThptPerUE | TBD |

Editors note: The list of exact configurable parameters is to be revisted depending on the requirements from SA2 and RAN WGs.

NOTE: Void.



Figure L.2.1 Relation between GSMA GST, ServiceProfile and SliceProfile

|  |
| --- |
| **Next modified section** |

## N.2.3 module \_3gpp-ns-nrm-perfreq.yang

|  |
| --- |
| **Next modified section** |

## N.2.4 module \_3gpp-ns-nrm-serviceprofile.yang

<CODE BEGINS>

submodule \_3gpp-ns-nrm-serviceprofile {

 yang-version 1.1;

 belongs-to \_3gpp-ns-nrm-networkslice { prefix ns3gpp; }

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

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

 import \_3gpp-5g-ns-common { prefix ns3cmn; }

 organization "3GPP SA5";

 contact

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

 description "A network slice instance in a 5G network.";

 reference "3GPP TS 28.541

 Management and orchestration;

 5G Network Resource Model (NRM);

 Information model definitions for network slice NRM (chapter 6)

 ";

 revision 2020-02-19 {

 description "Introduction of YANG definitions for network slice NRM";

 reference "CR-0458";

 }

 revision 2019-06-23 {

 description "Initial revision";

 reference "3GPP TS 28.541 V15.X.XX";

 }

 typedef availability-percentage {

 description "

 Percentage value of the amount of time the end-to-end communication

 service is delivered according to an agreed QoS, divided by the amount

 of time the system is expected to deliver the end-to-end service

 according to the specification in a specific area.";

 reference "3GPP TS 22.261 3.1";

 type decimal64 {

 fraction-digits 4; // E.g. 99.9999

 range 0..100;

 }

 }

 typedef DeterminCommAvailability {

 type Support-enum;

 }

 typedef V2XMode-enum {

 type enumeration {

 enum NOT\_SUPPORTED;

 enum SUPPORTED\_BY\_NR;

 }

 }

 grouping ServiceProfileGrp {

 leaf serviceProfileId {

 description "Service profile identifier.";

 type types3gpp:DistinguishedName;

 }

 list sNSSAIList {

 description "The S-NSSAI list to be supported by the new NSI to be

 created or the existing NSI to be re-used.";

 min-elements 1;

 key idx;

 unique "sst sd";

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses types5g3gpp:SNssai;

 }

 list pLMNIdList {

 description "List of PLMN IDs.";

 min-elements 1;

 key "mcc mnc";

 ordered-by user;

 uses types3gpp:PLMNId;

 }

 leaf maxNumberofUEs {

 description "The maximum number of UEs that may simultaneously

 access the network slice instance.";

 mandatory true;

 type uint64;

 }

 leaf-list coverageArea {

 min-elements 1;

 description "A list of TrackingAreas where the NSI can be selected.";

 type types3gpp:Tac;

 }

 leaf latency {

 description "The packet transmission latency (milliseconds) through

 the RAN, CN, and TN part of 5G network, used to evaluate utilization

 performance of the end-to-end network slice instance.";

 reference "3GPP TS 28.554 clause 6.3.1";

 mandatory true;

 type uint16;

 units milliseconds;

 }

 leaf uEMobilityLevel {

 description "The mobility level of UE accessing the network slice

 instance.";

 reference "3GPP TS 22.261 clause 6.2.1";

 type types3gpp:UeMobilityLevel;

 }

 leaf resourceSharingLevel {

 description "Specifies whether the resources to be allocated to the

 network slice instance may be shared with another network slice

 instance(s).";

 type types3gpp:ResourceSharingLevel;

 }

 //Stage2 issue: The sNSSAIList above specifies one or potentially

 // several sST objects for the service profile.

 // How do they relate?

 leaf sST {

 description "Specifies the slice/service type. See 3GPP TS 23.501

 for defined values.";

 mandatory true;

 type uint32;

 reference "3GPP TS 23.501 5.15.2.2";

 }

 leaf availability {

 description "The availability requirement for a network slice

 instance, expressed as a percentage.";

 type availability-percentage;

 }

 list delayTolerance {

 description "An attribute specifies the properties of service delivery

 flexibility, especially for the vertical services that are not

 chasing a high system performance.";

 reference "TS 22.104 clause 4.3";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf support {

 description "An attribute specifies whether or not the network

 slice supports service delivery flexibility, especially for the

 vertical services that are not chasing a high system performance.";

 type Support-enum;

 }

 }

 list deterministicComm {

 //Stage2 issue: deterministicComm is not defined in 28.541 chapter 6,

 // but I guess determinComm is meant

 description "This list represents the properties of the deterministic

 communication for periodic user traffic. Periodic traffic refers to the

 type of traffic with periodic transmissions.";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf availability {

 //Stage2 issue: Defined differently in 28.541 chapter 6, but XML

 // uses DeterminCommAvailability

 config false;

 type DeterminCommAvailability;

 }

 leaf periodicityList {

 //Stage2 issue: Not defined in 28.541 chapter 6. XML and YAML

 // says "string".

 type string;

 }

 }

 list dLThptPerSlice {

 description "This attribute defines achievable data rate of the

 network slice in downlink that is available ubiquitously across

 the coverage area of the slice";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses cmn:XLThptGrp;

 }

 list dLThptPerUE {

 description "This attribute defines data rate supported by the network

 slice per UE";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses cmn:XLThptGrp;

 }

 list uLThptPerSlic {

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 description "This attribute defines achievable data rate of the

 network slice in uplink that is available ubiquitously across

 the coverage area of the slice";

 uses cmn:XLThptGrp;

 }

 list uLThptPerUE {

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 description "This attribute defines data rate supported by the

 network slice per UE";

 uses cmn:XLThptGrp;

 }

 list maxPktSize {

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 description "This parameter specifies the maximum packet size

 supported by the network slice";

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf maxSize {

 //Stage2 issue: Not defined in 28.541, guessing integer bytes

 type uint32;

 units bytes;

 }

 }

 list maxNumberofPDUSessions {

 description "Represents the maximum number of

 concurrent PDU sessions supported by the network slice";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf nOofPDUSessions {

 //Stage2 issue: Not defined in 28.541, guessing integer

 type uint32;

 }

 }

 list kPIMonitoring {

 description "Represents performance monitoring";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf kPIList {

 //Stage2 issue: Data format not specified, low interoperability

 description "An attribute specifies the name list of KQIs and KPIs

 available for performance monitoring";

 type string;

 }

 }

 list userMgmtOpen {

 description "An attribute specifies whether or not the network slice

 supports the capability for the NSC to manage their users or groups

 of users’ network services and corresponding requirements.";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf support {

 type Support-enum;

 }

 }

 list v2XCommModels {

 description "An attribute specifies whether or not the V2X

 communication mode is supported by the network slice.";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf v2XMode {

 type V2XMode-enum;

 }

 }

 list termDensity {

 description "An attribute specifies the overall user density over

 the coverage area of the network slice";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf density {

 type uint32;

 units users/km2;

 }

 }

 leaf activityFactor {

 //Stage2 issue: This is modeled as writable/config true in 28.542,

 // but that does not appear to match the description

 description "An attribute specifies the percentage value of the

 amount of simultaneous active UEs to the total number of UEs where

 active means the UEs are exchanging data with the network";

 reference "TS 22.261 Table 7.1-1";

 type decimal64 {

 fraction-digits 1;

 }

 }

 leaf uESpeed {

 //Stage2 issue: This is modeled as writable/config true in 28.542,

 // but that does not appear to match the description

 description "An attribute specifies the maximum speed (in km/hour)

 supported by the network slice at which a defined QoS can be

 achieved";

 type uint32;

 units km/h;

 }

 leaf jitter {

 //Stage2 issue: This is modeled as writable/config true in 28.542,

 // but that does not appear to match the description

 description "An attribute specifies the deviation from the desired

 value to the actual value when assessing time parameters";

 reference "TS 22.104 clause C.4.1";

 type uint32;

 units microseconds;

 }

 leaf survivalTime {

 description "An attribute specifies the time that an application

 consuming a communication service may continue without an

 anticipated message.";

 reference "TS 22.104 clause 5";

 type string;

 }

 leaf reliability {

 description "An attribute specifies in the context of network layer

 packet transmissions, percentage value of the amount of sent

 network layer packets successfully delivered to a given system

 entity within the time constraint required by the targeted service,

 divided by the total number of sent network layer packets.";

 reference "TS 22.261, TS 22.104";

 type string;

 }

 leaf maxDLDataVolume {

 //Stage2 issue: Not defined in 28.541. XML and YAML says "string"

 type string;

 }

 leaf maxULDataVolume {

 //Stage2 issue: Not defined in 28.541. XML and YAML says "string"

 type string;

 }

 list nBIoT {

 description "An attribute specifies whether NB-IoT is supported in

 the RAN in the network slice";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf support {

 description "An attribute specifies whether NB-IoT is supported

 in the RAN in the network slice";

 type Support-enum;

 }

 }

 }

}

<CODE ENDS>

|  |
| --- |
| **Next modified section** |

## N.2.5 module \_3gpp-ns-nrm-sliceprofile.yang

<CODE BEGINS>

submodule \_3gpp-ns-nrm-sliceprofile {

 yang-version 1.1;

 belongs-to \_3gpp-ns-nrm-networkslicesubnet { prefix nss3gpp; }

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

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

 import \_3gpp-ns-nrm-serviceprofile {prefix serv3gpp}

 organization "3GPP SA5";

 contact

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

 description "Represents the properties of network slice subnet related

 requirement that should be supported by the network slice subnet

 instance in a 5G network.";

 reference "3GPP TS 28.541

 Management and orchestration;

 5G Network Resource Model (NRM);

 Information model definitions for network slice NRM (chapter 6)

 ";

 revision 2020-02-19 {

 description "Introduction of YANG definitions for network slice NRM";

 reference "CR-0458";

 }

 revision 2019-05-27 {

 description "initial revision.";

 reference "Based on

 3GPP TS 28.541 V15.X.XX";

 }

grouping TopSliceSubnetProfileGrp {

 leaf latency {

 description "The packet transmission latency (milliseconds) through

 the RAN, CN, and TN part of 5G network, used to evaluate

 utilization performance of the end-to-end network slice instance.";

 reference "3GPP TS 28.554 clause 6.3.1";

 //optional support

 mandatory true;

 type uint16;

 units milliseconds;

 }

 leaf maxNumberofUEs {

 description "Specifies the maximum number of UEs may simultaneously

 access the network slice instance.";

 //optional support

 mandatory true;

 type uint64;

 }

 list dLThptPerSliceSubnet {

 description "This attribute defines achievable data rate of the

 network slice subnet in downlink that is available ubiquitously

 across the coverage area of the slice";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list dLThptPerUE {

 description "This attribute defines data rate supported by the

 network slice per UE, refer NG.116.";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list uLThptPerSliceSubnet {

 description "This attribute defines achievable data rate of the

 network slice subnet in uplink that is available ubiquitously

 across the coverage area of the slice";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list uLThptPerUE {

 description "This attribute defines data rate supported by the

 network slice per UE, refer NG.116";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list maxPktSize {

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 description "This parameter specifies the maximum packet size

 supported by the network slice";

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ns3gpp:ServAttrComGrp;

 }

 leaf maxSize {

 //Stage2 issue: Not defined in 28.541, guessing integer bytes

 type uint32;

 units bytes;

 }

 }

 list maxNumberofPDUSessions {

 description "Represents the maximum number of

 concurrent PDU sessions supported by the network slice";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ns3gpp:ServAttrComGrp;

 }

 leaf nOofPDUSessions {

 //Stage2 issue: Not defined in 28.541, guessing integer

 type uint32;

 }

 }

 list delayTolerance {

 description "An attribute specifies the properties of service delivery

 flexibility, especially for the vertical services that are not

 chasing a high system performance.";

 reference "TS 22.104 clause 4.3";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ns3gpp:ServAttrComGrp;

 }

 leaf support {

 description "An attribute specifies whether or not the network

 slice supports service delivery flexibility, especially for the

 vertical services that are not chasing a high system performance.";

 type ns3gpp:Support-enum;

 }

 }

 list termDensity {

 description "An attribute specifies the overall user density over

 the coverage area of the network slice";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ns3gpp:ServAttrComGrp;

 }

 leaf density {

 type uint32;

 units users/km2;

 }

 }

 leaf activityFactor {

 //Stage2 issue: This is modeled as writable/config true in 28.542,

 // but that does not appear to match the description

 description "An attribute specifies the percentage value of the

 amount of simultaneous active UEs to the total number of UEs where

 active means the UEs are exchanging data with the network";

 reference "TS 22.261 Table 7.1-1";

 type decimal64 {

 fraction-digits 1;

 }

 }

 leaf-list coverageAreaTAList {

 description "A list of TrackingAreas where the NSI can be selected.";

 //optional support

 min-elements 1;

 type types3gpp:Tac;

 }

 leaf uEMobilityLevel {

 description "The mobility level of UE accessing the network slice

 instance.";

 //optional support

 type types3gpp:UeMobilityLevel;

 }

 leaf resourceSharingLevel {

 description "Specifies whether the resources to be allocated to the

 network slice subnet instance may be shared with another network

 slice subnet instance(s).";

 //optional support

 type types3gpp:ResourceSharingLevel;

 }

 leaf uESpeed {

 //Stage2 issue: This is modeled as writable/config true in 28.542,

 // but that does not appear to match the description

 description "An attribute specifies the maximum speed (in km/hour)

 supported by the network slice at which a defined QoS can be

 achieved";

 type uint32;

 units km/h;

 }

 leaf reliability {

 description "An attribute specifies in the context of network layer

 packet transmissions, percentage value of the amount of sent

 network layer packets successfully delivered to a given system

 entity within the time constraint required by the targeted service,

 divided by the total number of sent network layer packets.";

 reference "TS 22.261, TS 22.104";

 type string;

 }

 list deterministicComm {

 //Stage2 issue: deterministicComm is not defined in 28.541 chapter 6,

 // but I guess determinComm is meant

 description "This list represents the properties of the deterministic

 communication for periodic user traffic. Periodic traffic refers to the

 type of traffic with periodic transmissions.";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ns3gpp:ServAttrComGrp;

 }

 leaf availability {

 //Stage2 issue: Defined differently in 28.541 chapter 6, but XML

 // uses DeterminCommAvailability

 config false;

 type DeterminCommAvailability;

 }

 leaf periodicityList {

 //Stage2 issue: Not defined in 28.541 chapter 6. XML and YAML

 // says "string".

 type string;

 }

 }

 leaf survivalTime {

 description "An attribute specifies the time that an application

 consuming a communication service may continue without an

 anticipated message.";

 reference "TS 22.104 clause 5";

 type string;

 }

 }

grouping CNSliceSubnetProfileGrp {

 leaf latency {

 description "The packet transmission latency (milliseconds) through

 the RAN, CN, and TN part of 5G network, used to evaluate

 utilization performance of the end-to-end network slice instance.";

 reference "3GPP TS 28.554 clause 6.3.1";

 //optional support

 mandatory true;

 type uint16;

 units milliseconds;

 }

 leaf maxNumberofUEs {

 description "Specifies the maximum number of UEs may simultaneously

 access the network slice instance.";

 //optional support

 mandatory true;

 type uint64;

 }

 list dLThptPerSliceSubnet {

 description "This attribute defines achievable data rate of the

 network slice subnet in downlink that is available ubiquitously

 across the coverage area of the slice";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list dLThptPerUE {

 description "This attribute defines data rate supported by the

 network slice per UE, refer NG.116.";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list uLThptPerSliceSubnet {

 description "This attribute defines achievable data rate of the

 network slice subnet in uplink that is available ubiquitously

 across the coverage area of the slice";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list uLThptPerUE {

 description "This attribute defines data rate supported by the

 network slice per UE, refer NG.116";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list maxPktSize {

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 description "This parameter specifies the maximum packet size

 supported by the network slice";

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf maxSize {

 //Stage2 issue: Not defined in 28.541, guessing integer bytes

 type uint32;

 units bytes;

 }

 }

 list maxNumberofPDUSessions {

 description "Represents the maximum number of

 concurrent PDU sessions supported by the network slice";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf nOofPDUSessions {

 //Stage2 issue: Not defined in 28.541, guessing integer

 type uint32;

 }

 }

 list delayTolerance {

 description "An attribute specifies the properties of service delivery

 flexibility, especially for the vertical services that are not

 chasing a high system performance.";

 reference "TS 22.104 clause 4.3";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf support {

 description "An attribute specifies whether or not the network

 slice supports service delivery flexibility, especially for the

 vertical services that are not chasing a high system performance.";

 type Support-enum;

 }

 }

 leaf-list coverageAreaTAList {

 description "A list of TrackingAreas where the NSI can be selected.";

 //optional support

 min-elements 1;

 type types3gpp:Tac;

 }

 leaf resourceSharingLevel {

 description "Specifies whether the resources to be allocated to the

 network slice subnet instance may be shared with another network

 slice subnet instance(s).";

 //optional support

 type types3gpp:ResourceSharingLevel;

 }

 list deterministicComm {

 //Stage2 issue: deterministicComm is not defined in 28.541 chapter 6,

 // but I guess determinComm is meant

 description "This list represents the properties of the deterministic

 communication for periodic user traffic. Periodic traffic refers to the

 type of traffic with periodic transmissions.";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf availability {

 //Stage2 issue: Defined differently in 28.541 chapter 6, but XML

 // uses DeterminCommAvailability

 config false;

 type DeterminCommAvailability;

 }

 leaf periodicityList {

 //Stage2 issue: Not defined in 28.541 chapter 6. XML and YAML

 // says "string".

 type string;

 }

 }

 }

 grouping RANSliceSubnetProfileGrp {

 leaf latency {

 description "The packet transmission latency (milliseconds) through

 the RAN, CN, and TN part of 5G network, used to evaluate

 utilization performance of the end-to-end network slice instance.";

 reference "3GPP TS 28.554 clause 6.3.1";

 //optional support

 mandatory true;

 type uint16;

 units milliseconds;

 }

 leaf maxNumberofUEs {

 description "Specifies the maximum number of UEs may simultaneously

 access the network slice instance.";

 //optional support

 mandatory true;

 type uint64;

 }

 list dLThptPerUE {

 description "This attribute defines data rate supported by the

 network slice per UE, refer NG.116.";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list uLThptPerUE {

 description "This attribute defines data rate supported by the

 network slice per UE, refer NG.116";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses XLThptGrp;

 }

 list maxPktSize {

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 description "This parameter specifies the maximum packet size

 supported by the network slice";

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf maxSize {

 //Stage2 issue: Not defined in 28.541, guessing integer bytes

 type uint32;

 units bytes;

 }

 }

 list delayTolerance {

 description "An attribute specifies the properties of service delivery

 flexibility, especially for the vertical services that are not

 chasing a high system performance.";

 reference "TS 22.104 clause 4.3";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf support {

 description "An attribute specifies whether or not the network

 slice supports service delivery flexibility, especially for the

 vertical services that are not chasing a high system performance.";

 type Support-enum;

 }

 }

 list termDensity {

 description "An attribute specifies the overall user density over

 the coverage area of the network slice";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf density {

 type uint32;

 units users/km2;

 }

 }

 leaf activityFactor {

 //Stage2 issue: This is modeled as writable/config true in 28.542,

 // but that does not appear to match the description

 description "An attribute specifies the percentage value of the

 amount of simultaneous active UEs to the total number of UEs where

 active means the UEs are exchanging data with the network";

 reference "TS 22.261 Table 7.1-1";

 type decimal64 {

 fraction-digits 1;

 }

 }

 leaf-list coverageAreaTAList {

 description "A list of TrackingAreas where the NSI can be selected.";

 //optional support

 min-elements 1;

 type types3gpp:Tac;

 }

 leaf uEMobilityLevel {

 description "The mobility level of UE accessing the network slice

 instance.";

 //optional support

 type types3gpp:UeMobilityLevel;

 }

 leaf resourceSharingLevel {

 description "Specifies whether the resources to be allocated to the

 network slice subnet instance may be shared with another network

 slice subnet instance(s).";

 //optional support

 type types3gpp:ResourceSharingLevel;

 }

 leaf uESpeed {

 //Stage2 issue: This is modeled as writable/config true in 28.542,

 // but that does not appear to match the description

 description "An attribute specifies the maximum speed (in km/hour)

 supported by the network slice at which a defined QoS can be

 achieved";

 type uint32;

 units km/h;

 }

 leaf reliability {

 description "An attribute specifies in the context of network layer

 packet transmissions, percentage value of the amount of sent

 network layer packets successfully delivered to a given system

 entity within the time constraint required by the targeted service,

 divided by the total number of sent network layer packets.";

 reference "TS 22.261, TS 22.104";

 type string;

 }

 list deterministicComm {

 //Stage2 issue: deterministicComm is not defined in 28.541 chapter 6,

 // but I guess determinComm is meant

 description "This list represents the properties of the deterministic

 communication for periodic user traffic. Periodic traffic refers to the

 type of traffic with periodic transmissions.";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf availability {

 //Stage2 issue: Defined differently in 28.541 chapter 6, but XML

 // uses DeterminCommAvailability

 config false;

 type DeterminCommAvailability;

 }

 leaf periodicityList {

 //Stage2 issue: Not defined in 28.541 chapter 6. XML and YAML

 // says "string".

 type string;

 }

 }

 leaf survivalTime {

 description "An attribute specifies the time that an application

 consuming a communication service may continue without an

 anticipated message.";

 reference "TS 22.104 clause 5";

 type string;

 }

 }

 }}

 grouping SliceProfileGrp {

 leaf sliceProfileId {

 description "A unique identifier of the property of network slice

 subnet related requirement should be supported by the network

 slice subnet instance.";

 type types3gpp:DistinguishedName;

 }

 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 idx;

 unique "sst sd";

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses types5g3gpp:SNssai;

 }

 list pLMNIdList {

 description "List of at most six entries of PLMN Identifiers, but at

 least one (the primary PLMN Id). The PLMN Identifier is composed

 of a Mobile Country Code (MCC) and a Mobile Network Code (MNC).";

 min-elements 1;

 max-elements 6;

 key "mcc mnc";

 ordered-by user;

 uses types3gpp:PLMNId;

 }

 list CNSliceSubnetProfile {

 description " This represents the requirements for the CN slice associated with the

 network slice. ";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses CNSliceSubnetProfileGrp;

 }

 list RANSliceSubnetProfile {

 description " This represents the requirements for the RAN slice associated with the

 network slice. ";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses RANSliceSubnetProfileGrp;

 }

 list TopSliceSubnetProfile {

 description " This represents the requirements for the top slice associated with the

 network slice. ";

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses TopSliceSubnetProfileGrp;

 }

 }

}

<CODE ENDS>

|  |
| --- |
| **Next modified section** |

## N.2.X module \_3gpp-ns-common.yang

<CODE BEGINS>

module \_3gpp-ns-nrm-common {

 yang-version 1.1;

 namespace urn:3gpp:sa5:\_3gpp-ns-nrm-common;

 prefix ns3cmn;

 // import \_3gpp-common-subnetwork { prefix subnet3gpp; }

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

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

 organization "3GPP SA5";

 contact

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

 description "Common network slice definitions";

 reference "3GPP TS 28.541

 Management and orchestration;

 5G Network Resource Model (NRM);

 Information model definitions for network slice NRM (chapter 6)

 ";

 revision 2021-05-17 {

 description "Introduction of Common Data types";

 reference "CR-0485";

 }

 grouping XLThptGrp {

 list servAttrCom {

 description "This list represents the common properties of service

 requirement related attributes.";

 reference "GSMA NG.116 corresponding to Attribute categories,

 tagging and exposure";

 config false;

 key idx;

 max-elements 1;

 leaf idx {

 description "Synthetic index for the element.";

 type uint32;

 }

 uses ServAttrComGrp;

 }

 leaf guaThpt {

 description "This attribute describes the guaranteed data rate.";

 type uint64;

 units kbits/s;

 }

 leaf maxThpt {

 description "This attribute describes the maximum data rate.";

 type uint64;

 units kbits/s;

 }

 }

 typedef Tagging-enum {

 type enumeration {

 enum performance;

 enum function;

 enum operation;

 }

 }

 typedef Exposure-enum {

 type enumeration {

 enum API;

 enum KPI;

 }

 }

 typedef Category-enum {

 type enumeration {

 enum character;

 enum scalability;

 }

 }

 typedef Support-enum {

 type enumeration {

 enum NOT\_SUPPORTED;

 enum SUPPORTED;

 }

 }

 grouping ServAttrComGrp {

 leaf category {

 description "This attribute specifies the category of a service

 requirement/attribute of GST";

 type Category-enum;

 }

 leaf-list tagging {

 description "This attribute specifies the tagging of a service

 requirement/attribute of GST in character category";

 when "../category = 'character'";

 type Tagging-enum;

 }

 leaf exposure {

 description "This attribute specifies exposure mode of a service

 requirement/attribute of GST";

 type Exposure-enum;

 }

 }

 typedef DeterminCommAvailability {

 type Support-enum;

 }

}

<CODE ENDS>

|  |
| --- |
| **End of modified section** |