**3GPP TSG-SA5 Meeting #137-e *S5-213117***

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

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.541** | **CR** | **0485** | **rev** | **-** | **Current version:** | **17.2.1** |  |
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| *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:*** | | | 2021-04-29 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | The existing performance requirements in perfReq in the SliceProfile needs to be broken down to domain specific requirements which will dfines how these requirements should be mapped to RAN & Core specific ones | | | | | | | | |
|  | |  | | | | | | | | |
| ***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 merged into 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.2.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 ... | | |
|  | |  | | | | | | | | |
| ***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\_CR28.541\_InternalThpt | | | | | | | | |
|  | |  | | | | | | | | |
| ***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. |
| TopSliceSubnetProfile  Support 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 throughput requirements are being defined for one of the following: network slice, UE in a network slice (GSMA attribute) or network slicesubnet.  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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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: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: True |
| serviceProfileId | A unique identifier of property of network slice related requirement should be supported by the network slice. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| sliceProfileId | A unique identifier of the property of network slice subnet related requirement should be supported by the network slice subnet. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: LOCKED  allowedValues: 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: NsInfo  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: True |
| category | This attribute specifies the category of a service requirement/attribute of GST (see GSMA NG.116 [50]).  allowedValues: character, scalability | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: 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: ENUM  multiplicity: 1…3  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: 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: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Integer  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: Yes  isNullable: 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: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: Yes  isNullable: True |
| serviceProfileList | An attribute specifies a list of ServiceProfile (see clause 6.3.3) supported by the network slice | type: ServiceProfile  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| sliceProfileList | An attribute specifies a list of SliceProfile (see clause 6.3.4) supported by the network slice subnet | type: SliceProfile  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: DelayTolerance  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| DeterminComm.periodicityList | An attribute specifies a list of periodicities supported by the network slice for deterministic communication. | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: XLThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| dLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50]. | type: XLThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| guaThpt | This attribute describes the guaranteed data rate. | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| maxThpt | This attribute describes the maximum data rate. | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: XLThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| uLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50]. | type: XLThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| maxPktSize | This parameter specifies the maximum packet size supported by the network slice or the network slice subnet, refer NG.116 [50]. | type: MaxPktSize  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| MaxPktSize.maxsize | This parameter specifies the maximum packet size supported by the network slice, refer NG.116 [50]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| maxNumberofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50]. | type: MaxNumberofPDUSessions  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| MaxNumberofPDUSessions.nOofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| kPIMonitoring | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: KPIMonitoring  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| KPIMonitoring. kPIList | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| nBIoT | An attribute specifies whether NB-IoT is supported in the RAN in the network slice, see NG.116 [50]. | type: NBIoT  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: Synchronicity  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| Synchronicity.accuracy | An attribute specifies the accuracy of the synchronicity, see NG.116 [50]. | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: UserMgmtOpen  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| v2XCommModels | An attribute specifies whether or not the V2X communication mode is supported by the network slice. | type: V2XCommMode  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: TermDensity  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: Positioning  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: ENUM  multiplicity: 1..6  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| NetworkSlice.networkSliceSubnetRef | This holds a DN of NetworkSliceSubnet relating to the NetworkSlice instance. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| NetworkSliceSubnet.networkSliceSubnetRef | This holds a list of DN of constituent NetworkSliceSubnet supporting NetworkSliceSubnet instance | type: DN  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| managedFunctionRef | This holds a list of DN of ManagedFunction instances supporting the NetworkSliceSubnet instance. | type: DN  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: 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: String  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: 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: String  multiplicity: \*  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: 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: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| serviceType | An attribute specifies the standardized network slice type.  allowedValues: eMBB, URLLC, MIoT, V2X. | type: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: True |
| epApplicationRef | This parameter specifies a list of application level EPs associated with the logical transport interface.  See note 2. | type: DN  multiplicity: \*  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: 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: DN  multiplicity: \*  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: 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: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: 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.2.5 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>

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