**3GPP TSG-SA5 Meeting #132e *S5-204394***

**e-meeting 17th 28th August 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **28.541** | **CR** | **366** | **rev** | **1** | **Current version:** | **16.5.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | Addition of attribute for network slice supporting maximum of data volume |
|  |  |
| ***Source to WG:*** | China Mobile |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | eNRM |  | ***Date:*** | 2020-8-28 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories 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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | Maximum of data volume is one of the important parameters to indicate network slice capacity, If it is not considered, when the actual data volume is above maximum data volume predefined in capacity planning, service performance problems such as delay and jitter will be happened and affect the quality of service with limited network resource. So that It is proposed that the maximum of data volume should be considered as configured parameter. |
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| ***Summary of change:*** | Define attribute for maxDLPDCPDataVolume and maxULPDCPDataVolume in ServiceProfile class indicate the maximum DL/UL PDCP data volume supported by the network slice instance. |
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| ***Consequences if not approved:*** | It is not possbile to specify the maximum DL/UL PDCP data volume supported by the network slice instance. |
|  |  |
| ***Clauses affected:*** | 6.3.3.2, 6.4.1, I.4.3, J.4.3  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **1st modified section** |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[…]

[58] 3GPP TS 38.423: "NR; Xn application protocol (XnAP)".

[59] 3GPP TS 28.552: " Management and orchestration; 5G performance measurements".

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| **Next modified section** |

#### 6.3.3.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| serviceProfileId | M | T | F | T | T |
| sNSSAIList | M | T | T | F | T |
| pLMNIdList | M | T | T | F | T |
| maxNumberofUEs | O | T | T | F | T |
| coverageArea | O | T | T | F | T |
| Latency | O | T | T | F | T |
| uEMobilityLevel | O | T | T | F | T |
| resourceSharingLevel | O | T | T | F | T |
| sST | M | T | T | F | T |
| Availability | O | T | T | F | T |
| delayTolerance | O | T | T | F | T |
| deterministicComm | O | T | T | F | T |
| dLThptPerSlice | O | T | T | F | T |
| dLThptPerUE | O | T | T | F | T |
| uLThptPerSlic | O | T | T | F | T |
| uLThptPerUE | O | T | T | F | T |
| maxPktSize | O | T | T | F | T |
| maxNumberofConns | O | T | T | F | T |
| kPIMonitoring | O | T | T | F | T |
| supportedAccessTech | O | T | T | F | T |
| userMgmtOpen | O | T | T | F | T |
| v2XCommModels | O | T | T | F | T |
| termDensity | O | T | T | F | T |
| activityFactor | O | T | T | F | T |
| uESpeed | O | T | T | F | T |
| Jitter | O | T | T | F | T |
| survivalTime | O | T | T | F | T |
| Reliability | O | T | T | F | T |
| maxDLPDCPDataVolume | O | T | T | F | T |
| maxULPDCPDataVolume | O | T | T | F | T |

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| **Next modified section** |

### 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: Floatmultiplicity: 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 instance. | 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 instance. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| operationalState | It indicates the operational state of the network slice instance or the network slice subnet instance. 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 instance or the network slice subnet instance. It describes the permission to use or prohibition against using the 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: NoneallowedValues: 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 catogary (see GSMA NG.116 [50]).allowedValues: performance, function, operation | type: ENUMmultiplicity: 1isOrdered: 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 new NSI to be created or the existing NSI to be re-used.sNSSAList is defined in subclause 4.4.1 |  |
| perfReq | This parameter specifies the requirements to the network slice subnet in terms of the scenarios defined in the TS 22.261 [28] and TS 22.104 [51], i.e. the "performance requirements for high data rate and traffic density scenarios" in TS 22.261 [28], "periodic deterministic communication, aperiodic deterministic communication, non-deterministic communication, and mixed traffic" in TS 22.104 [51].It is a structure containing the following elements:- list of perfReqDepending on the sST value, the list of perfReq will be- list of eMBBPerfReqor- list of uRLLCPerfReqor- list of mIoTPerfReqNOTE 1: the list of mIoTPerfReq is not addressed in the present document.allowedValues:- list of eMBBPerfReq is a list of entries where an entry identifies the performance requirements to the network slice subnet in terms of the scenarios defined in the Table 7.1-1 of TS 22.261 [28]. An entry has the following attributes: expDataRateDL (Integer), expDataRateUL (Integer), areaTrafficCapDL (Integer), areaTrafficCapUL (Integer), overallUserDensity (Integer), activityFactor (Integer), (see table 7.1-1 of TS 22.261 [28]).- list of uRLLCPerfReq is a list of entries where an entry identifies the performance requirements to the network slice subnet in terms of the scenarios defined in clauses 5.2 through 5.5 of TS 22.104 [51]. An entry has the following attributes: cSAvailabilityTarget (Float), cSReliabilityMeanTime (String), , expDataRate (Integer), msgSizeByte (String), transferIntervalTarget (String), survivalTime (String), , , (see table 5.2-1, table 5.3-1, table 5.4-1 and table 5.5-1 of TS 22.104 [51]).NOTE 2: Limitation on attribute values in instances of SliceProfile is not addressed in the present document.NOTE 3: The attributes inside perfReq here need further breaking down to define requirements for each subnetwork under different SST values. | type: PerfReqmultiplicity: \*1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| maxNumberofUEs | An attribute specifies the maximum number of UEs may simultaneously access the network slice instance. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| coverageAreaTAList | An attribute specifies a list of TrackingAreas where the NSI can be selected.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 instance. See clause 6.3.1 of 28.554 [27]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uEMobilityLevel | An attribute specifies the mobility level of UE accessing the network slice instance. 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 instance may be shared with another network slice instance(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 instance may be shared with another network slice subnet instance(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 instance | 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 instance | type: SliceProfilemultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| sST | This parameter specifies the slice/service type for a ServiceProfile.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 NSI 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 NSI 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 NSI for deterministic communication. | type: Floatmultiplicity: 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: DLThptmultiplicity: 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: DLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| guaThpt | This attribute describes the guaranteed data rate. | type: Floatmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| maxThpt | This attribute describes the maximum data rate. | type: Floatmultiplicity: 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: ULThptmultiplicity: 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: ULThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| maxPktSize | This parameter specifies the maximum packet size supported by the network slice, 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 |
| maxNumberofConns | This parameter defines the maximum number of concurrent sessions supported by the network slice, refer NG.116 [50].  | type: MaxNumberofConnsmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| MaxNumberofConns.nOofConn | This parameter defines the maximum number of concurrent 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 |
| supportedAccessTech | An attribute specifies which access technologies are supported by the NSI. | type: SupportedAccessTechmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| SupportedAccessTech.accTechList | An attribute specifies which access technologies are supported by the NSI.allowedValues:1: NR2: NB-IoT3: WI-Fi4: Fixed access (e.g. DSL, Fibre) | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| userMgmtOpen | An attribute specifies whether or not the NSI 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 NSI 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 NSI. | 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 NSI.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 |
| activityFactor | An attribute specfies 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: Floatmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| uESpeed | An attribute specifies the maximum speed (in km/hour) supported by the network slice 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]). | 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, MPLS Tag or Segment ID. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| nextHopInfo | This parameter is used to identify ingress transport nodes identification. This can be 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: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| qosProfile | This parameter specifies an QoS Profile for a logical transport interface. It is a reference to the set of profile parameters which are locally provisioned on both sides of a logical transport interface. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: True |
| maxDLPDCPDataVolume | An attribute specifies the maximum DL PDCP data volume supported by the network slice instance (performance measurement definition see in 28.552[59]). The unit is Mbit/s(1MBits=1000\*1000 bits) | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| maxULPDCPDataVolume | An attribute specifies the maximum DL PDCP data volume supported by the network slice instance (performance measurement definition see in 28.552[59]). The unit is Mbit/s(1MBits=1000\*1000 bits) | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |

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| **Next modified section** |

## I.4.3 XML schema "sliceNrm.xsd"

<?xml version="1.0" encoding="UTF-8"?>

<!--

 3GPP TS 28.541 network slice Network Resource Model

 XML schema definition

 sliceNrm.xsd

-->

<schema xmlns="http://www.w3.org/2001/XMLSchema"

xmlns:xn="http://www.3gpp.org/ftp/specs/archive/28\_series/28.623#genericNrm"

xmlns:sl="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#sliceNrm"

xmlns:nn="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#nrNrm"

xmlns:ngc="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#ngcNrm"

xmlns:en="http://www.3gpp.org/ftp/specs/archive/28\_series/28.659#eutranNrm"

xmlns:sm="http://www.3gpp.org/ftp/specs/archive/28\_series/28.626#stateManagementIRP"

targetNamespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#sliceNrm" elementFormDefault="qualified">

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.623#genericNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#nrNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.541#ngcNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.659#eutranNrm"/>

 <import namespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.626#stateManagementIRP"/>

 <simpleType name="MobilityLevel">

 <restriction base="string">

 <enumeration value="STATIONARY"/>

 <enumeration value="NOMADIC"/>

 <enumeration value="RESTRICTED MOBILITY"/>

 <enumeration value="FULLY MOBILITY"/>

 </restriction>

 </simpleType>

 <simpleType name="SharingLevel">

 <restriction base="string">

 <enumeration value="SHARED"/>

 <enumeration value="NON-SHARED"/>

 </restriction>

 </simpleType>

 <simpleType name="Category">

 <restriction base="string">

 <enumeration value="character"/>

 <enumeration value="scalability"/>

 </restriction>

 </simpleType>

 <simpleType name="Tagging">

 <restriction base="string">

 <enumeration value="performance"/>

 <enumeration value="function"/>

 <enumeration value="operation"/>

 </restriction>

 </simpleType>

 <simpleType name="Exposure">

 <restriction base="string">

 <enumeration value="API"/>

 <enumeration value="KPI"/>

 </restriction>

 </simpleType>

 <complexType name="ServAttrCom">

 <sequence>

 <element name="category" type="sl:Category"/>

 <element name="tagging" type="sl:Tagging" minOccurs="0"/>

 <element name="exposure" type="sl:Exposure" minOccurs="0"/>

</sequence>

</complexType >

 <simpleType name="DelayToleranceSupport">

 <restriction base="string">

 <enumeration value="NOT SUPPORTED"/>

 <enumeration value="SUPPORTED"/>

 </restriction>

 </simpleType>

 <simpleType name="DeterminCommAvailability">

 <restriction base="string">

 <enumeration value="NOT SUPPORTED"/>

 <enumeration value="SUPPORTED"/>

 </restriction>

 </simpleType>

 <simpleType name="UserMgmtOpenSupport">

 <restriction base="string">

 <enumeration value="NOT SUPPORTED"/>

 <enumeration value="SUPPORTED"/>

 </restriction>

 </simpleType>

 <simpleType name="V2XCommModelsV2XMode">

 <restriction base="string">

 <enumeration value="NOT SUPPORTED"/>

 <enumeration value="SUPPORTED BY NR"/>

 </restriction>

 </simpleType>

 <complexType name="DelayTolerance">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="support" type="sl:DelayToleranceSupport"/>

 </sequence>

 </complexType>

 <complexType name="DeterminComm">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="availability" type="sl:DeterminCommAvailability"/>

 <element name="periodicityList" type="string"/>

 </sequence>

 </complexType>

 <complexType name="DLThpt">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="guaThpt" type="float"/>

 <element name="maxThpt" type="float"/>

 </sequence>

 </complexType>

 <complexType name="ULThpt">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="guaThpt" type="float" minOccurs="0"/>

 <element name="maxThpt" type="float" minOccurs="0"/>

 </sequence>

 </complexType>

 <complexType name="MaxPktSize">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="maxsize" type="integer"/>

 </sequence>

 </complexType>

 <complexType name="KPIMonitoring">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="kPIList" type="string"/>

 </sequence>

 </complexType>

 <complexType name="SupportedAccessTech">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="accTechList" type="integer"/>

 </sequence>

 </complexType>

 <complexType name="UserMgmtOpen">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="support" type="sl:UserMgmtOpenSupport"/>

 </sequence>

 </complexType>

 <complexType name="V2XCommMode">

 <sequence>

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="v2XMode" type="sl:V2XCommModelsV2XMode"/>

 </sequence>

 </complexType>

 <complexType name="TermDensity">

 <sequence>

 <choice minOccurs="1" maxOccurs="1">

 <element name="servAttrCom" type="sl:ServAttrCom"/>

 <element name="density" type="integer"/>

 </choice>

 </sequence>

 </complexType>

 <complexType name="ServiceProfile">

 <sequence>

 <element name="serviceProfileId" type="string"/>

 <element name="sNSSAIList" type="ngc:SnssaiList"/>

 <element name="pLMNIdList" type="en:PLMNIdList"/>

 <element name="maxNumberofUEs" type="long" minOccurs="0"/>

 <element name="latency" type="integer" minOccurs="0"/>

 <element name="uEMobilityLevel" type="integer" minOccurs="0"/>

 <element name="resourceSharingLevel" type="integer" minOccurs="0"/>

 <element name="sst" type="ngc:Sst"/>

 <element name="availability" type="float" minOccurs="0"/>

 <element name="delayTolerance" type="sl:DelayTolerance" minOccurs="0"/>

 <element name="deterministicComm" type="sl:DeterminComm" minOccurs="0"/>

 <element name="dLThptPerSlice" type="sl:DLThpt" minOccurs="0"/>

 <element name="dLThptPerUE" type="sl:DLThpt" minOccurs="0"/>

 <element name="uLThptPerSlic" type="sl:ULThpt" minOccurs="0"/>

 <element name="uLThptPerUE" type="sl:ULThpt" minOccurs="0"/>

 <element name="maxPktSize" type="sl:MaxPktSize" minOccurs="0"/>

 <element name="maxNumberofConns" type="sl:MaxNumberofConns" minOccurs="0"/>

 <element name="kPIMonitoring" type="sl:KPIMonitoring" minOccurs="0"/>

 <element name="supportedAccessTech" type="sl:SupportedAccessTech" minOccurs="0"/>

 <element name="userMgmtOpen" type="sl:UserMgmtOpen" minOccurs="0"/>

 <element name="v2XCommModels" type="sl:V2XCommMode" minOccurs="0"/>

 <element name="coverageArea" type="string" minOccurs="0"/>

 <element name="termDensity" type="sl:TermDensity" minOccurs="0"/>

 <element name="activityFactor" type="float" minOccurs="0"/>

 <element name="uESpeed" type="integer" minOccurs="0"/>

 <element name="jitter" type="integer" minOccurs="0"/>

 <element name="survivalTime" type="string" minOccurs="0"/>

 <element name="reliability" type="string" minOccurs="0"/>

 <element name="maxDLPDCPDataVolume" type="string" minOccurs="0"/>

 <element name="maxULPDCPDataVolume" type="string" minOccurs="0"/>

 </sequence>

 </complexType>

 <complexType name="ServiceProfileList">

 <sequence>

 <element name="serviceProfile" type="sl:ServiceProfile"/>

 </sequence>

 </complexType>

 <complexType name="SliceProfile">

 <sequence>

 <element name="sliceProfileId" type="string"/>

 <element name="sNSSAIList" type=" ngc:SnssaiList"/>

 <element name="pLMNIdList" type="en:PLMNIdList"/>

 <element name="perfReq" type="sl:PerfReq"/>

 <element name="maxNumberofUEs" type="long" minOccurs="0"/>

 <element name="coverageAreaTAList" type="ngc:NrTACList" minOccurs="0"/>

 <element name="latency" type="integer" minOccurs="0"/>

 <element name="uEMobilityLevel" type="sl:MobilityLevel" minOccurs="0"/>

 <element name="resourceSharingLevel" type="integer" minOccurs="0"/>

 </sequence>

 </complexType>

 <complexType name="SliceProfileList">

 <sequence>

 <element name="sliceProfile" type="sl:SliceProfile"/>

 </sequence>

 </complexType>

 <complexType name="NsInfo">

 <!-- Refer to definitions in subclause 8.3.3.2.2 of ETSI NFV IFA013 -->

 <sequence>

 <element name="nsInstanceId" type="string"/>

 <element name="nsName" type="string"/>

 <element name="description" type="string"/>

 </sequence>

 </complexType>

 <element name="NetworkSlice" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">

 <complexType>

 <complexContent>

 <extension base="xn:NrmClass">

 <sequence>

 <element name="attributes">

 <complexType>

 <all>

 <!-- Inherited attributes from SubNetwork -->

 <element name="dnPrefix" type="string" minOccurs="0"/>

 <element name="userLabel" type="string"/>

 <element name="userDefinedNetworkType" type="string"/>

 <element name="setOfMcc" type="string" minOccurs="0"/>

 <element name="measurements" type="xn:MeasurementTypesAndGPsList" minOccurs="0"/>

 <!-- End of inherited attributes from SubNetwork -->

 <element name="operationalState" type="sm:operationalStateType"/>

 <element name="administrativeState" type="sm:administrativeStateType"/>

 <element name="serviceProfileList" type="sl:ServiceProfileList"/> <element *name*="networkSliceSubnetRef" *type*="xn:dn"/>

 </all>

 </complexType>

 </element>

 <choice minOccurs="0" maxOccurs="unbounded">

 <element ref="xn:MeasurementControl"/>

 </choice>

 </sequence>

 </extension>

 </complexContent>

 </complexType>

 </element>

 <element name="NetworkSliceSubnet" substitutionGroup="xn:SubNetworkOptionallyContainedNrmClass">

 <complexType>

 <complexContent>

 <extension base="xn:NrmClass">

 <sequence>

 <element name="attributes">

 <complexType>

 <all>

 <!-- Inherited attributes from SubNetwork -->

 <element name="dnPrefix" type="string" minOccurs="0"/>

 <element name="userLabel" type="string"/>

 <element name="userDefinedNetworkType" type="string"/>

 <element name="setOfMcc" type="string" minOccurs="0"/>

 <element name="measurements" type="xn:MeasurementTypesAndGPsList" minOccurs="0"/>

 <!-- End of inherited attributes from SubNetwork -->

 <element name="operationalState" type="sm:operationalStateType"/>

 <element name="administrativeState" type="sm:administrativeStateType"/>

 <element name="nsInfo" type="sl:NsInfo" minOccurs="0"/>

 <element name="sliceProfileList" type="sl:SliceProfileList"/>

 <element *name*="managedFunctionRef" *type*="xn:dnlist"/>

 <element *name*="networkSliceSubnetRef" *type*="xn:dnlist"/>

 </all>

 </complexType>

 </element>

 <choice minOccurs="0" maxOccurs="unbounded">

 <element ref="xn:MeasurementControl"/>

 </choice>

 </sequence>

 </extension>

 </complexContent>

 </complexType>

 </element>

</schema>

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

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

openapi: 3.0.1

info:

 title: Slice NRM

 version: 16.4.0

 description: >-

 OAS 3.0.1 specification of the Slice NRM

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externalDocs:

 description: 3GPP TS 28.541 V16.4.0; 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

 SharingLevel:

 type: string

 enum:

 - SHARED

 - NON-SHARED

 Category:

 type: string

 enum:

 - CHARACTER

 - SCALABILITY

 Tagging:

 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

 DLThptPerSlice:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 DLThptPerUE:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 ULThptPerSlice:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 ULThptPerUE:

 type: object

 properties:

 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

 MaxNumberofConns:

 type: object

 properties:

 servAttrCom:

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

 nOofConn:

 type: integer

 KPIMonitoring:

 type: object

 properties:

 servAttrCom:

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

 kPIList:

 type: string

 SupportedAccessTech:

 type: object

 properties:

 servAttrCom:

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

 accTechList:

 type: integer

 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

 ServiceProfileList:

 type: object

 additionalProperties:

 type: object

 properties:

 snssaiList:

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

 plmnIdList:

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

 maxNumberofUEs:

 type: number

 latency:

 type: number

 uEMobilityLevel:

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

 sst:

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

 resourceSharingLevel:

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

 availability:

 type: number

 delayTolerance:

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

 deterministicComm:

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

 dLThptPerSlice:

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

 dLThptPerUE:

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

 uLThptPerSlice:

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

 uLThptPerUE:

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

 maxPktSize:

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

 maxNumberofConns:

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

 kPIMonitoring:

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

 supportedAccessTech:

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

 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

maxDLPDCPDataVolume:

 type: string

maxULPDCPDataVolume:

 type: string

 SliceProfileList:

 type: object

 additionalProperties:

 type: object

 properties:

 snssaiList:

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

 plmnIdList:

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

 maxNumberofUEs:

 type: number

 coverageAreaTAList:

 $ref: '5gcNrm.yaml#/components/schemas/TACList'

 latency:

 type: number

 uEMobilityLevel:

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

 resourceSharingLevel:

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

 IpAddress:

 oneOf:

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

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

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

 NetworkSlice:

 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:

 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'

 EPTransport:

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

 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

 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/NetworkSlice'

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

|  |
| --- |
| **End of modifications** |