**3GPP TSG-SA5 Meeting #143-eS5-223220**

**e-meeting, 9 - 17 May 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **0713** | **rev** |  | **Current version:** |  |  |
|  |
| *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:***  | Add Job IOCs for asynchronous network slicing provisioning procedures |
|  |  |
| ***Source to WG:*** | Ericsson, Deutsche Telekom |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | eNETSLICE\_PRO  |  | ***Date:*** | 2022-04-29 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | The current procedures for network slicing are based on synchronous operations. In reality the procedures may take longer and the consumer has no information about the progress and status of the operation. A solution needs to be defined based on an asynchronous pattern. |
|  |  |
| ***Summary of change:*** | Three new IOCs are added to support asynchronous procedures for allocation, deallocation and modification on both slice and slice subnet levels. These IOCs are based on a common job pattern that in turn re-uses the ProcessMonitor datatype from TS 28.622. Except for changing to an asynchronous model, the semantics of the existing operations in TS 28.531 are preserved.The approved draft CRs S5-222640 and S5-222724 introduced new procedures and solutions for resource reservation. In order to work with NRM-based asynchronous solution for allocation, the ‘writable’ properties of serviceProfileId and sliceProfileId are changed to True, allowing the MnS consumer to specify an existing profile ID in certain scenarios. |
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| ***Consequences if not approved:*** | No asynchronous option is available for the network slicing provisioning procedures. |
|  |  |
| ***Clauses affected:*** | 6.1, 6.2.1, 6.2.2, 6.3.3, 6.3.4, 6.3.x, 6.3.y, 6.3.z, 6.4.1, J.4.3, N.2.x |
|  |  |
|  | **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:*** | <<Forge model below needs to be updated.>> [6a65eab7](https://forge.3gpp.org/rep/sa5/MnS/-/commit/6a65eab70136059e1ede57dc8eecdd7b63170f8e) <https://forge.3gpp.org/rep/sa5/MnS/-/tree/Rel17_CR_0713_28.541_Add_Job_IOCs_for_asynchronous_network_slicing_provisioning_procedures> |
|  |  |
| ***This CR's revision history:*** |  |
|  |  |

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| **First Change** |

# 6 Information model definitions for network slice NRM

6.1 Imported information entities and local labels

|  |  |
| --- | --- |
| **Label reference** | **Local label** |
| TS 28.622 [30], IOC, Top | Top |
| TS 28.622 [30], IOC, SubNetwork | SubNetwork |
| TS 28.622 [30], IOC, ManagedFunction | ManagedFunction |
| TS 28.622 [30], datatype, ProcessMonitor | ProcessMonitor |
| TS 28.658 [19], dataType, PLMNId | PLMNId |

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| **Second Change** |

## 6.2 Class diagram

### 6.2.1 Relationships



Figure 6.2.1-1: Network slice NRM fragment relationship

NOTE 1: The <<OpenModelClass>> NetworkService and <<OpenModelClass>> VNF are defined in [40].

NOTE 2: The target Network Service (NS) instance represents a group of VNFs and PNFs that are supporting the source network slice subnet instance.

NOTE 3: The instance tree of this NRM fragment would not contain the instances of NetworkService and VNF. However, the NetworkSliceSubNet instances would have an attribute holding the identifiers of NetworkService instances and the ManagedFunction instance would have an attribute holding identifiers of VNF instances.



Figure 6.2.1-2: Transport EP NRM fragment relationship



Figure 6.2.1-3: containment relationship for network slice fragment

Figure 6.2.1-X: Network slicing provisioning jobs fragment relationship

### 6.2.2 Inheritance



Figure 6.2.2-1: Network slice inheritance relationship



Figure 6.2.2-X: Network slicing provisioning jobs fragment inheritance relationship

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| **Third Change** |

6.3.3 ServiceProfile <<dataType>>

6.3.3.1 Definition

This data type represents the properties of the network slice related requirements that should be supported by a NetworkSlice instance in a 5G network. The network slice related requirements apply to a one-to-one relationship between a Network Slice Customer (NSC) and a Network Slice Provider (NSP). A network slice can be tailored based on the specific requirements adhered to an SLA agreed between NSC and NSP, see clause 2 of [50]. An NSP may add additional requirements not directly derived from SLA’s, associated to the NSP internal [business] goals. The GST defined by GSMA (see [50]) and the service performance requirements defined in 3GPP TS 22.261 [28] and TS 22.104 [51] are all considered as input for the network slice related requirements.

6.3.3.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **S** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| serviceProfileId | M | T | T | T | T |
| pLMNInfoList | M | T | F | F | T |
| maxNumberofUEs | O | T | T | F | T |
| coverageArea | O | T | T | F | T |
| dLLatency | O | T | T | F | T |
| uLLatency | O | T | T | F | T |
| uEMobilityLevel | O | T | T | F | T |
| networkSliceSharingIndicator | O | T | T | F | T |
| sST | M | T | T | F | T |
| availability | O | T | T | F | T |
| delayTolerance | O | T | T | F | T |
| dLDeterministicComm | O | T | T | F | T |
| uLDeterministicComm | O | T | T | F | T |
| dLThptPerSlice | O | T | T | F | T |
| dLThptPerUE | O | T | T | F | T |
| uLThptPerSlice | O | T | T | F | T |
| uLThptPerUE | O | T | T | F | T |
| dLMaxPktSize | O | T | T | F | T |
| uLMaxPktSize | O | T | T | F | T |
| maxNumberofPDUSessions | O | T | T | F | T |
| kPIMonitoring | 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 |
| radioSpectrum | O | T | T | F | T |
| reliability | O | T | T | F | T |
| maxDLDataVolume | O | T | T | F | T |
| maxULDataVolume | O | T | T | F | T |
| nBIoT | O | T | T | F | T |
| synchronicity | O | T | T | F | T |
| positioning | O | T | T | F | T |
| sliceSimultaneousUse | O | T | T | F | T |
| energyEfficiency | O | T | T | F | T |
| nssaaSupport | O | T | T | F | T |
| n6Protection | O | T | T | F | T |

NOTE: The attributes in ServiceProfile represent mapped requirements from an NSC (e.g. an enterprise) to an NSP

6.3.3.3 Attribute constraints

None.

6.3.3.4 Notifications

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

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** | **S** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| sliceProfileId | M | T | T | T | T |
| pLMNInfoList | 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 S | Condition: It shall be present when the slice profile defines requirements for CN domain  |
| RANSliceSubnetProfile S | Condition: It shall be present when the slice profile defines requirements for RAN domain. |
| TopSliceSubnetProfileS | Condition: It shall be present when the slice profile is for top/root network slice subnet |

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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| **4th Change** |

### 6.3.x AllocateJob

#### 6.3.x.1 Definition

This IOC represents a network slice or network slice subnet allocation job that is used for asynchronous network slicing provisioning procedures. It can be name-contained by SubNetwork.

To initiate an allocation procedure, the MnS consumer creates an instance of the AllocateJob IOC and provides the slice or slice subnet requirements via initial attribute values. To initiate a network slice allocation procedure, the serviceProfile attribute shall be present. To initiate a network slice subnet allocation procedure, the sliceProfile attribute shall be present. If the MnS consumer wishes to use already reserved resources, the supplied profile shall include a serviceProfileId or sliceProfileId that matches the serviceProfileId or sliceProfileId from an existing instance of FeasibilityCheckAndReservationJob that has successfully completed a reservation process. If the MnS consumer doesn’t wish to use already reserved resources, the supplied profile shall not contain any serviceProfileId or sliceProfileId. In this case the serviceProfileId or sliceProfileId will be assigned by the MnS producer as part of the allocation process.

Note: When reserved resources are used, the MnS producer may reject a request if some requirement values in the profile are different from the corresponding profile in the FeasibilityCheckAndResourceReservationJob.

To obtain the progress information of an AllocateJob instance, the MnS consumer can monitor the progress of the AllocateJob via the processMonitor attribute.

When the value of processMonitor.status is FINISHED, the corresponding allocation procedure has been completed successfully. In this state additional MOI attribute values will have been assigned by the MnS producer.

* For a network slice allocation procedure, the attribute networkSliceRefOut will contain the DN of the selected NetworkSlice instance, which can be either an existing instance or a newly created instance. In addition, the serviceProfile attribute will contain also any values assigned by the MnS producer.
* For a network slice subnet allocation procedure, the attribute networkSliceSubnetRefOut will contain the DN of the selected NetworkSliceSubnet instance, which can be either an existing instance or a newly created instance. In addition, the sliceProfile attribute will contain also any values assigned by the MnS producer.

If the procedure fails, the additional output attributes will not be populated by the MnS producer.

Once an AllocateJob instance has reached one of the possible end states as indicated by the processMonitor.status attribute, it should be deleted by the MnS consumer.

Editor’s note: Using deleteMOI to cancel an ongoing allocation process may lead to undesirable race conditions where the consequences of MOI deletion would be completely different depending on if requested just before or after the process is finished, while the deletion response would not provide any indication of what actually happened in the producer. It is for further study if a separate mechanism should be defined for cancellation of an ongoing allocation process.

#### 6.3.x.2 Attributes

The AllocateJob IOC includes attributes inherited from Top IOC (defined in TS 28.622 [30]) and the following attributes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| serviceProfile | CM | T | T | F | T |
| sliceProfile | CM | T | T | F | T |
| processMonitor | M | T | F | F | T |
| Attribute related to role |  |  |  |  |  |
| networkSliceRefOut | CM | T | F | F | T |
| networkSliceSubnetRefOut | CM | T | F | F | T |

#### 6.3.x.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| serviceProfile S | Condition: This attribute shall be supported if network slice allocation is supported. |
| sliceProfile S | Condition: This attribute shall be supported if network slice subnet allocation is supported. |
| networkSliceRefOut S | Condition: This attribute shall be supported if network slice allocation is supported. |
| networkSliceSubnetRefOut S | Condition: This attribute shall be supported if network slice subnet allocation is supported. |

#### 6.3.x.4 Notifications

The common notifications defined in subclause 6.5 are valid for this IOC, without exceptions or additions.

### 6.3.y DeallocateJob

#### 6.3.y.1 Definition

This IOC represents a network slice or network slice subnet deallocation job that is used for asynchronous network slicing provisioning procedures. It can be name-contained by SubNetwork.

To initiate a deallocation procedure, the MnS consumer creates an instance of the DeallocateJob IOC and indicates the ServiceProfile or SliceProfile to be deallocated via its associated identifiersprovided as initial attribute values. To initiate a network slice deallocation procedure, the networkSliceRef and serviceProfileId attributes shall be present. To initiate a network slice subnet deallocation procedure, the networkSliceSubnetRef and sliceProfileId attributes shall be present.

To obtain the progress information of a DeallocateJob instance, the MnS consumer can monitor the progress of the DeallocateJob via the processMonitor attribute.

Once a DeallocateJob instance has reached one of the possible end states as indicated by the processMonitor.status attribute, it should be deleted by the MnS consumer.

#### 6.3.y.2 Attributes

The DeallocateJob IOC includes attributes inherited from Top IOC (defined in TS 28.622 [30]) and the following attributes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| serviceProfileId | CM | T | T | T | T |
| sliceProfileId | CM | T | T | T | T |
| processMonitor | M | T | F | F | T |
| Attribute related to role |  |  |  |  |  |
| networkSliceRef | CM | T | T | T | T |
| networkSliceSubnetRef | CM | T | T | T | T |

#### 6.3.y.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| serviceProfileId S | Condition: This attribute shall be supported if network slice deallocation is supported. |
| sliceProfileId S | Condition: This attribute shall be supported if network slice subnet deallocation is supported. |
| networkSliceRef S | Condition: This attribute shall be supported if network slice deallocation is supported. |
| networkSliceSubnetRef S | Condition: This attribute shall be supported if network slice subnet deallocation is supported. |

#### 6.3.y.4 Notifications

The common notifications defined in subclause 6.5 are valid for this IOC, without exceptions or additions.

### 6.3.z ModifyJob

#### 6.3.z.1 Definition

This IOC represents a network slice or network slice subnet modification job that is used for asynchronous network slicing provisioning procedures. It can be name-contained by SubNetwork.

To initiate a modification procedure, the MnS consumer creates an instance of the ModifyJob IOC and provides the associated identifiers and updated requirements via initial attribute values. To initiate a network slice modification procedure, the networkSliceRef and serviceProfile attributes shall be present. The serviceProfile shall include a serviceProfileId that uniquely identifies a previously allocated ServiceProfile. To initiate a network slice subnet modification procedure, the networkSliceSubnetRef and sliceProfile attributes shall be present. The sliceProfile shall include a sliceProfileId that uniquely identifies a previously allocated SliceProfile. In all cases the MnS consumer must provide the full set of requirements as input rather than only the changed requirements. This is because the MnS producer would otherwise not be able to deduce whether a missing attribute value represents no requirement or an unchanged requirement. If there is an existing instance of FeasibilityCheckAndReservationJob that has successfully completed a reservation process for the same serviceProfileId or sliceProfileId, the MnS producer will perform the modification using the already reserved resources.

Note: When reserved resources are used, the MnS producer may reject a request if some requirement values in the profile are different from the corresponding profile in the FeasibilityCheckAndResourceReservationJob.

To obtain the progress information of a ModifyJob instance, the MnS consumer can monitor the progress of the ModifyJob via the processMonitor attribute.

Once a ModifyJob instance has reached one of the possible end states as indicated by the processMonitor.status attribute, it should be deleted by the MnS consumer.

Editor’s note: Using deleteMOI to cancel an ongoing modification process may lead to undesirable race conditions where the consequences of MOI deletion would be completely different depending on if requested just before or after the process is finished, while the deletion response would not provide any indication of what actually happened in the producer. It is for further study if a separate mechanism should be defined for cancellation of an ongoing modification process.

#### 6.3.z.2 Attributes

The ModifyJob IOC includes attributes inherited from Top IOC (defined in TS 28.622 [30]) and the following attributes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| serviceProfile | CM | T | T | F | T |
| sliceProfile | CM | T | T | F | T |
| processMonitor | M | T | F | F | T |
| Attribute related to role |  |  |  |  |  |
| networkSliceRef | CM | T | T | T | T |
| networkSliceSubnetRef | CM | T | T | T | T |

#### 6.3.z.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| serviceProfile S | Condition: This attribute shall be supported if network slice modification is supported. |
| sliceProfile S | Condition: This attribute shall be supported if network slice subnet modification is supported. |
| networkSliceRef S | Condition: This attribute shall be supported if network slice modification is supported. |
| networkSliceSubnetRef S | Condition: This attribute shall be supported if network slice subnet modification is supported. |

#### 6.3.z.4 Notifications

The common notifications defined in subclause 6.5 are valid for this IOC, without exceptions or additions.

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| **5th Change** |

6.4.1 Attribute properties

| **Attribute Name** | **Documentation and Allowed Values** | **Properties** |
| --- | --- | --- |
| availability | This parameter specifies the communication service availability requirement, expressed as a percentage. The communication service availability is defined in clause 3.1 of TS 22.261 [28]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: True |
| serviceProfileId | A unique identifier of property of network slice related requirement should be supported by the network slice. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| sliceProfileId | A unique identifier of the property of network slice subnet related requirement should be supported by the network slice subnet. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| operationalState | It indicates the operational state of the network slice or the network slice subnet. It describes whether or not the resource is physically installed and working.allowedValues: "ENABLED", "DISABLED".The meaning of these values is as defined in 3GPP TS 28.625 [17] and ITU-T X.731 [18]. | type: ENUM multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| administrativeState | It indicates the administrative state of the network slice or the network slice subnet. It describes the permission to use or prohibition against using the managed object instance, imposed through the OAM services.allowedValues: “LOCKED”, “UNLOCKED”, SHUTTINGDOWN” The meaning of these values is as defined in 3GPP TS 28.625 [17] and ITU-T X.731 [18]. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: LOCKEDallowedValues: N/A isNullable: False |
| nsInfo | This attribute contains the NsInfo of the NS instance corresponding to the network slice subnet instance. The NsInfo is described in clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: NsInfomultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| nSInstanceId | This attribute specifies the identifier of NS instance corresponding to the network slice subnet instance.See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| nsName | This attribute specifies the name of NS instance corresponding to the network slice subnet instance.See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| description | This attribute specifies the description of NS instance corresponding to the network slice subnet instance.See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No default valueisNullable: True |
| category | This attribute specifies the category of a service requirement/attribute of GST (see GSMA NG.116 [50]).allowedValues: character, scalability | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/A isNullable: False |
| tagging | This attribute specifies the tagging of a service requirement/attribute of GST in character category (see GSMA NG.116 [50]).allowedValues: performance, function, operation | type: ENUMmultiplicity: 1…3isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/A isNullable: False |
| exposure | This attribute specifies exposure mode of a service requirement/attribute of GST (see GSMA NG.116 [50]).allowedValues: API, KPI | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/A isNullable: False |
| maxNumberofUEs | An attribute specifies the maximum number of UEs may simultaneously access the network slice or network slice subnet instance. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| coverageAreaTAList | An attribute specifies a list of Tracking Areas for the network slice .allowedValues:Legacy TAC and Extended TAC are defined in clause 9.3.3.10 of TS 38.413 [5]. | type: Integermultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| dLLatency | An attribute specifies the DL packet transmission latency (millisecond) through the RAN, CN, and TN part of 5G network and is used to evaluate utilization performance of the end-to-end network slice. See clause 6.3.1 of 28.554 [27]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uLLatency | An attribute specifies the UL packet transmission latency (millisecond) through the RAN, CN, and TN part of 5G network and is used to evaluate utilization performance of the end-to-end network slice. See clause 6.3.1 of 28.554 [27]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| topSliceSubnetProfile.dLLatency | An attribute specifies the DL packet transmission latency (millisecond) through all domains of the network slice and is used to evaluate utilization performance of the end-to-end network slice. See clause 6.3.1 of 28.554 [27]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| topSliceSubnetProfile.uLLatency | An attribute specifies the UL packet transmission latency (millisecond) through all domains of the network slice and is used to evaluate utilization performance of the end-to-end network slice. See clause 6.3.1 of 28.554 [27]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| CNSliceSubnetProfile.dLLatency | An attribute specifies the DL 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 DL packet on N3/N6 interface of UPF and successfully sent out the packet on N6/N3 interface.  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| CNSliceSubnetProfile.uLLatency | An attribute specifies the UL 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 packet on N3/N6 interface of UPF and successfully sent out the packet on N6/N3 interface.  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| RANSliceSubnetProfile.dLLatency | An attribute specifies the DL 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 DL packet on air interface/NgU of gNB and successfully sent out the packet on NgU/air interface of the gNB.  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| RANSliceSubnetProfile.uLLatency | An attribute specifies the UL 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 packet on air interface/NgU of gNB and successfully sent out the packet on NgU/air interface of the gNB.  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uEMobilityLevel | An attribute specifies the mobility level of UE accessing the network slice. See 6.2.1 of TS 22.261 [28].allowedValues: stationary, nomadic, restricted mobility, fully mobility. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: True |
| serviceProfilenetworkSlice.SharingIndicator | The attribute specifies whether a service, defined by the ServiceProfile, can share a NetworkSlice instance with other services or not. If “non-shared” the service needs a dedicated NetworkSlice instance. If “shared” the service may share a NetworkSlice instance with other service(s).allowedValues: shared, non-shared. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| serviceProfile.pLMNInfoList | It defines which PLMN and S-NSSAI combinations that are assigned for the service to satisfy service requirements represented by the ServiceProfile in case of network slicing feature is supported.allowedValues: Not applicable. | type: PLMNInfomultiplicity: 1..\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| sliceProfile.pLMNInfoList | It defines which PLMN and S-NSSAI combinations that are served by the SliceProfile in case of network slicing feature is supported.allowedValues: Not applicable. | type: PLMNInfomultiplicity: 1..\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| sliceProfile.resourceSharingLevel | An attribute specifies whether the resources to be allocated to the network slice subnet may be shared with another network slice subnet(s).allowedValues: shared, non-shared. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: YesisNullable: True |
| serviceProfileList | An attribute specifies a list of ServiceProfile (see clause 6.3.3) supported by the network slice  | type: ServiceProfilemultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| sliceProfileList | An attribute specifies a list of SliceProfile (see clause 6.3.4) supported by the network slice subnet.All members of the list, instances of SliceProfile, shall contain the same datatype representing slice profile requirements: TopSliceSubnetProfile, RANSliceSubnetProfile or CNSliceSubnetProfile. E.g. the sliceProfileList may contain only instances of sliceProfile containing RANSliceSubnetProfile datatype; the sliceProfileList may not contain instances of sliceProfile containing RANSliceSubnetProfile and CNSliceSubnetProfile datatypesMembers of the list may contain TopSliceSubnetProfile datatype only when this attribute (sliceProfileList) belongs to a NetworkSliceSubnet that is directly referenced by a NetworkSlice | type: SliceProfilemultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| sST | This parameter specifies the slice/service type in a ServiceProfile to be supported by a network slice.See clause 5.15.2 of 3GPP TS 23.501 [2]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| delayTolerance | An attribute specifies the properties of service delivery flexibility, especially for the vertical services that are not chasing a high system performance. See clause 4.3 of TS 22.104 [51]. | type: DelayTolerancemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| DelayTolerance.support | An attribute specifies whether or not the network slice supports service delivery flexibility, especially for the vertical services that are not chasing a high system performance.allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| dLDeterministicComm | An attribute specifies the properties of the deterministic communication in downlink for periodic user traffic, see clause 4.3 of TS 22.104 [51]. | type: DeterministicCommmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| uLDeterministicComm | An attribute specifies the properties of the deterministic communication in uplink for periodic user traffic, see clause 4.3 of TS 22.104 [51]. | type: DeterministicCommmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| DeterministicComm.availability | An attribute specifies whether or not the network slice supports deterministic communication for period user traffic.allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| DeterministicComm.periodicityList | An attribute specifies a list of periodicities supported by the network slice for deterministic communication. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| dLThptPerSlice | This attribute defines achievable data rate of the network slice in downlink that is available ubiquitously across the coverage area of the slice, refer NG.116 [50]. | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| dLThptPerSliceSubnet | This attribute defines achievable data rate of the network slice subnet in downlink that is available ubiquitously across the coverage area of the slice. | type: XDLThpt multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| dLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50].  | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| guaThpt | This attribute describes the guaranteed data rate. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| maxThpt | This attribute describes the maximum data rate. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| uLThptPerSlice | This attribute defines achievable data rate of the network slice in uplink that is available ubiquitously across the coverage area of the slice, refer NG.116 [50].  | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50].  | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uLThptPerSliceSubnet | This attribute defines achievable data rate of the network slice subnet in uplink that is available ubiquitously across the coverage area of the slice. | type: XLThptmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| dLMaxPktSize | This parameter specifies the maximum packet size supported by the network slice or the network slice subnet, in downlink refer NG.116 [50].  | type: MaxPktSizemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| uLMaxPktSize | This parameter specifies the maximum packet size supported by the network slice or the network slice subnet in uplink, refer NG.116 [50]. | type: MaxPktSizemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| MaxPktSize.maxsize | This parameter specifies the maximum packet size supported by the network slice, refer NG.116 [50].  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| maxNumberofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50].  | type: MaxNumberofPDUSessionsmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| MaxNumberofPDUSessions.nOofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50].  | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| kPIMonitoring | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: KPIMonitoringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| KPIMonitoring. kPIList | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| nBIoT | An attribute specifies whether NB-IoT is supported in the RAN in the network slice, see NG.116 [50]. | type: NBIoTmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| NBIoT.support | An attribute specifies whether NB-IoT is supported in the RAN in the network slice, see NG.116 [50].allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| synchronicity | An attribute specifies whether synchronicity of communication devices is supported, Two cases are most important in this context, see clause 3.4.29 of NG.116 [50]:- Synchronicity between a base station and a mobile device and- Synchronicity between mobile devices. | type: Synchronicitymultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Synchronicity.availability | An attribute specifies whether synchronicity of communication devices is supported, see NG.116 [50].allowedValues:"NOT SUPPORTED", "BETWEEN BS AND UE", "BETWEEN BS AND UE & UE AND UE". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Synchronicity.accuracy | An attribute specifies the accuracy of the synchronicity, see NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| RANSliceSubnetProfile.synchronicity | An attribute specifies whether synchronicity of communication devices is supported in the RAN domain, 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: SynchronicityRANSubnetmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| SynchronicityRANSubnet.availability | An attribute specifies whether synchronicity of communication devices is supported in the RAN domain, see NG.116 [50].allowedValues:"NOT SUPPORTED", "BETWEEN BS AND UE", "BETWEEN BS AND UE & UE AND UE". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| SynchronicityRANSubnet.accuracy | An attribute specifies the accuracy of the synchronicity in the RAN domain, see NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| userMgmtOpen | An attribute specifies whether or not the network slice supports the capability for the NSC to manage their users or groups of users’ network services and corresponding requirements. | type: UserMgmtOpenmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| UserMgmtOpen.support | An attribute specifies whether or not the network slice supports the capability for the NSC to manage their users or groups of users’ network services and corresponding requirements.allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| v2XCommModels | An attribute specifies whether or not the V2X communication mode is supported by the network slice. | type: V2XCommModemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| V2XCommMode.v2XMode | An attribute specifies whether or not the V2X communication mode is supported by the network slice.allowedValues:"NOT SUPPORTED", "SUPPORTED BY NR". | type: <<enumeration>>multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| coverageArea | An attribute specifies the coverage area of the network slice, i.e. the geographic region where a 3GPP communication service is accessible, see Table 7.1-1 of TS 22.261 [28]) and NG.116 [50]. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| termDensity | An attribute specifies the overall user density over the coverage area of the network slice. See Table 7.1-1 of TS 22.261 [28]). | type: TermDensitymultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| TermDensity.density | An attribute specifies the overall user density over the coverage area of the network slice. See Table 7.1-1 of TS 22.261 [28]). | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| positioning | An attribute specifies whether the network slice provides geo-localization methods or supporting methods, see clause 3.4.20 of NG.116 [50]. | type: Positioningmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Positioning.availability | An attribute specifies if this attribute is provided by the network slice and contains a list of positioning methods provided by the slice. If the list is empty this attribute is not available in the network slice and the other parameters might be ignored, see NG.116 [50]. Comma separated multiple values are allowed:CIDE-CID (LTE and NR), OTDOA (LTE and NR), RF fingerprinting, AECID, Hybrid positioning, NET-RTK. | type: ENUMmultiplicity: 1..6isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Positioning.predictionfrequency | An attribute specifies how often location information is provided. This parameter simply defines how often the customer is allowed to request location information. This is not related to the time it takes to determine the location, which is a characteristic of the positioning method, see NG.116 [50].allowedValues:"PERSEC", "PERMIN", "PERHOUR". | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| Positioning.accuracy | An attribute specifies the accuracy of the location information. Accuracy depends on the respective positioning solution applied in the network slice, see NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| RANSliceSubnetProfile.positioning | An attribute specifies whether the RAN domain of the network slice provides geo-localization methods or supporting methods, see clause 3.4.20 of NG.116 [50]. | type: PositioningRANSubnetmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| PositioningRANSubnet.availability | An attribute specifies if this attribute is provided by the RAN domain of the network slice and contains a list of positioning methods provided by the RAN domain. If the list is empty this attribute is not available in the RAN domain and the other parameters might be ignored, see NG.116 [50]. Comma separated multiple values are allowed:CIDE-CID (LTE and NR), OTDOA (LTE and NR), RF fingerprinting, AECID, Hybrid positioning, NET-RTK. | type: ENUMmultiplicity: 1..6isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| PositioningRANSubnet.predictionfrequency | An attribute specifies how often location information is provided. This parameter simply defines how often the customer is allowed to request location information. This is not related to the time it takes to determine the location, which is a characteristic of the positioning method, see NG.116 [50].allowedValues:"PERSEC", "PERMIN", "PERHOUR". | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| PositioningRANSubnet.accuracy | An attribute specifies the accuracy of the location information. Accuracy depends on the respective positioning solution applied in the RAN domain of the network slice, measurement unit is meter, see NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| activityFactor | An attribute specifies the percentage value of the amount of simultaneous active UEs to the total number of UEs where active means the UEs are exchanging data with the network. See Table 7.1-1 of TS 22.261 [28]). | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| uESpeed | An attribute specifies the maximum speed (in km/hour) supported by the network slice or network slice subnet at which a defined QoS can be achieved. See Table 7.1-1 of TS 22.261 [28]). | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: True |
| jitter | An attribute specifies the deviation from the desired value to the actual value when assessing time parameters. | 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 which is part of a RAN or CN SubNetwork. It can be an IPv4 address (See RFC 791 [37]) or an IPv6 address (See RFC 2373 [38]).See note 1 | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| logicInterfaceInfo | This parameter specifies the information of a logical transport interface (LogicalInterfaceInfo), which includes logicInterfaceType and logicInterfaceId.  | type: LogicalInterfaceInfomultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| logicInterfaceType | This parameter specifies the type of a logical transport interface. It could be VLAN, MPLS or Segment.Allowed Value: VLAN,MPLS,Segment | type:Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| logicInterfaceId | This parameter specifies the identify of a logical transport interface which is part of a RAN or CN SubNetwork. It could be VLAN ID (See IEEE 802.1Q [39]), MPLS Tag or Segment ID.In case logical transport interface is VLAN, it is VLAN Id (See IEEE 802.1Q [39]).In case logical transport interface is MPLS, it is MPLS Tag.In case logical transport interface is Segment, it is Segment ID. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| nextHopInfoList | This parameter is used to identify ingress node (s) which are part of a transport network. Each node can be identified by any of a combination of - IP address of next-hop router (the ingress node) in the transport network, - system name, - port name, - IP management address of transport nodes. | type: Stringmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| qosProfile | This parameter specifies the 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.An example of the parameter value could be “DSCP” (See RFC 8436 [74]) | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: True |
| maxDLDataVolume | An attribute specifies the maximum DL PDCP data volume supported by the network slice instance (performance measurement definition see in TS 28.552[69]). The unit is MByte/day. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| maxULDataVolume | An attribute specifies the maximum UL PDCP data volume supported by the network slice instance (performance measurement definition see in TS 28.552[69]). The unit is MByte/day. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| radioSpectrum | This attribute represents the radio spectrum in which the network slice should be supported (see clause 3.4.21 of GSMA NG.116 [50]). | type: RadioSpectrummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| nROperatingBands | This attribute represents which 5G NR frequency bands can be used to access the network slice. 5G NR operating bands are defined in 3GPP TS 38.101-1 [42]. | type: Stringmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| serviceType | An attribute specifies the standardized network slice type.allowedValues: eMBB, URLLC, MIoT, V2X. | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: True |
| epApplicationRef | This parameter specifies a list of application level EPs (i.e. EP\_N3 or EP\_NgU or EP\_F1U) associated with the logical transport interface. | type: DNmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| epTransportRef | This parameter specifies a list of transport level EPs associated with the application level EP (i.e. EP\_N3 or EP\_NgU) or network slice subnet. | type: DNmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: True |
| sliceSimultaneousUse | This attribute describes whether a network slice can be simultaneously used by a device together with other network slices and if so, with which other classes of network slices.allowedValues: “0”, “1”, “2”, “3”, “4”.“0”: Can be used with any network slice“1”: Can be used with network slices with same SST value“2”: Can be used with any network slice with same SD value“3”: Cannot be used with another network slice“4”: Cannot be used by a UE in a specific location | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| energyEfficiency | An attribute which describes the energy efficiency of a network slice, i.e. the ratio between the performance of a network slice and its energy consumption (EC) when assessed during the same time frame, see clause 3.4.7 of NG.116 [50]. | type: EnergyEfficiencymultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| EnergyEfficiency.performance | Depending on the sST value, EnergyEfficiency.performance will be- eMBBEEPerfReqor- uRLLCEEPerfReqor- mIoTEEPerfReqallowedValues:- eMBBEEPerfReq identifies the requirement in terms of energy efficiency, i.e. the performance per consumed Joule in type Real, where performance can take one of the following forms (type: ENUM): - number of bits (Integer) (see TS 28.554 [27] clause 6.7.2.2). - number of bits (Integer) for RAN-based network slice (see TS 28.554 [27] clause 6.7.2.2a).- uRLLCEEPerfReq identifies the requirement in terms of energy efficiency, i.e. the performance per consumed Joule in type Real, where performance can take one of the following forms (type: ENUM): - inverse of the latency in 0.1ms (Real) (see TS 28.554 [27] clause 6.7.2.3.2). - number of bits multiplied by the inverse of the latency in 0.1ms (Real) (see TS 28.554 [27] clause 6.7.2.3.3).- mIoTEEPerfReq identifies the requirement in terms of energy efficiency, i.e. the performance per consumed Joule in type Real, where performance can take one of the following forms (type: ENUM): - maximum number of registered subscribers (Integer) (see TS 28.554 [27] clause 6.7.2.4.1), - mean number of active UEs (Integer) (see TS 28.554 [27] clause 6.7.2.4.2).See NOTE 3. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| topSliceSubnetProfile.energyEfficiency | An attribute which describes the energy efficiency through all domains of the network slice, i.e. the ratio between the performance and the energy consumption (EC) when assessed during the same time frame, see clause 3.4.7 of NG.116 [50]. | type: EnergyEfficiency multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| CNSliceSubnetProfile. energyEfficiency | An attribute which describes the energy efficiency through CN domain of the network slice, i.e. the ratio between the performance and the energy consumption (EC) when assessed during the same time frame, see clause 3.4.7 of NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| RANSliceSubnetProfile. energyEfficiency | An attribute which describes the energy efficiency through RAN domain of the network slice, i.e. the ratio between the performance and the energy consumption (EC) when assessed during the same time frame, see clause 3.4.7 of NG.116 [50]. | type: Realmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| nssaaSupport | An attribute specifies whether for the Network Slice, devices need to be also authenticated and authorized by a AAA server using additional credentials different than the ones used forthe primary authentication, see clause 3.4.37 of NG.116 [50].allowedValues: N/A | type: NSSAASupportmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| nssaaSupport.support | An attribute specifies whether or not the Network Slice, devices need to be also authenticated and authorized by a AAA server using additional credentials different than the ones used forthe primary authentication.allowedValues:"NOT SUPPORTED", "SUPPORTED". | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FalseisNullable: False |
| ServiceProfile.n6Protection | An attribute which includes required security functions and corresponding rules of each function for network slice N6 interface protection.allowedValues: N/A | type: N6Protectionmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| CNSliceSubnetProfile. n6Protection | An attribute which includes required security functions and corresponding rules of each function for network slice N6 interface protection.allowedValues: N/A | type: N6Protectionmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| secFuncList | An attribute which holds the list of security control functions/features required by the Network Slice or Network Slice Subnet consumer. allowedValues: N/A | type: SecFuncmultiplicity: 1..\*isOrdered: FalseisUnique: TruedefaultValue: NoneisNullable: False |
| secFunId | An attribute which identifies a security function.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| secFunType | An attribute which describes the type of the security function. E.g. Firewall, NAT, antimalware, parental control, DDoS protection function, etc.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| secRules | An attribute which could be configured on each function. If it's absent, the default rules could be applied.allowedValues: N/A | type: Stringmultiplicity: 0..\*isOrdered: FalseisUnique: N/AdefaultValue: NoneisNullable: False |
| networkSliceSubnetType | An attribute indicating type of network slice subnet, including:- Top network slice subnet- RAN network slice subnet- CN network slice subnetAllowed Value: TOP\_SLICESUBNET,RAN\_SLICESUBNET,CN\_SLICESUBNET | type:Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| processMonitor | An attribute containing information about a background process associated with a network slice provisioning Job MOI.The attribute value including sub-attributes are updated by the MnS producer. | type:ProcessMonitormultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| serviceProfile | An attribute which holds the network slice related requirements. It is used to provide input to certain asynchronous network slice provisioning procedures.The attribute value is provided by the MnS consumer when creating the related Job MOI. Depending on scenario, values for certain sub-attributes may also be assigned by the MnS producer. | type:ServiceProfilemultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| sliceProfile | An attribute which holds the network slice subnet related requirements. It is used to provide input to certain asynchronous network slice provisioning procedures.The attribute value is provided by the MnS consumer when creating the related Job MOI. Depending on scenario, values for certain sub-attributes may also be assigned by the MnS producer. | type:SliceProfilemultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| networkSliceRefOut | An attribute containing the DN of a NetworkSlice instance selected by the MnS producer as part of an asynchronous allocation procedure.The attribute value is populated by the MnS producer when the allocation procedure has finished successfully. | type:DNmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| networkSliceSubnetRefOut | An attribute containing the DN of a NetworkSliceSubnet instance selected by the MnS producer as part of an asynchronous allocation procedure.The attribute value is populated by the MnS producer when the allocation procedure has finished successfully. | type:DNmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| networkSliceRef | An attribute which holds a DN of a NetworkSlice instance. It is used for certain asynchronous network slice provisioning procedures to indicate a target instance.The attribute value is provided by the MnS consumer when creating the related Job MOI. | type:Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| networkSliceSubnetRef | An attribute which holds a DN of a NetworkSliceSubnet instance. It is used for certain asynchronous network slice subnet provisioning procedures to indicate a target instance.The attribute value is provided by the MnS consumer when creating the related Job MOI. | type:Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| serviceProfileId | An attribute which holds an ID of a ServiceProfile instance. It is used for certain asynchronous network slice provisioning procedures to indicate a target instance.The attribute value is provided by the MnS consumer when creating the related Job MOI. | type:Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| sliceProfileId | An attribute which holds an ID of a SliceProfile instance. It is used for certain asynchronous network slice provisioning procedures to indicate a target instance.The attribute value is provided by the MnS consumer when creating the related Job MOI. | type:Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: 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: voidNOTE 3: energy efficiency requirement for V2X is not part of the current document. |

|  |
| --- |
| **6th Change** |

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

openapi: 3.0.1

info:

 title: Slice NRM

 version: 17.6.0

 description: >-

 OAS 3.0.1 specification of the Slice NRM

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externalDocs:

 description: 3GPP TS 28.541; 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'

 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'

 RadioSpectrum:

 type: object

 properties:

 servAttrCom:

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

 nROperatingBands:

 type: string

 Synchronicity:

 type: object

 properties:

 servAttrCom:

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

 availability:

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

 accuracy:

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

 SynchronicityRANSubnet:

 type: object

 properties:

 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'

 PositioningRANSubnet:

 type: object

 properties:

 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

 EmbbEEPerfReq:

 type: object

 properties:

 kpiType:

 type: string

 enum:

 - NUMOFBITS

 - NUMOFBITS\_RANBASED

 req:

 type: number

 UrllcEEPerfReq:

 type: object

 properties:

 kpiType:

 type: string

 enum:

 - INVOFLATENCY

 - NUMOFBITS\_MULTIPLIED\_INVOFLATENCY

 req:

 type: number

 MIoTEEPerfReq:

 type: object

 properties:

 kpiType:

 type: string

 enum:

 - MAXREGSUBS

 - MEANACTIVEUES

 req:

 type: number

 EEPerfReq:

 oneOf:

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

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

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

 EnergyEfficiency:

 type: object

 properties:

 servAttrCom:

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

 performance:

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

 NSSAASupport:

 type: object

 properties:

 servAttrCom:

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

 support:

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

 SecFunc:

 type: object

 properties:

 secFunId:

 type: string

 secFunType:

 type: string

 secRules:

 type: array

 items:

 type: string

 N6Protection:

 type: object

 properties:

 servAttrCom:

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

 secFuncList:

 type: array

 items:

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

 CNSliceSubnetProfile:

 type: object

 properties:

 maxNumberofUEs:

 type: integer

 dLLatency:

 type: integer

 uLLatency:

 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

 coverageAreaTAList:

 type: integer

 resourceSharingLevel:

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

 dLMaxPktSize:

 type: integer

 uLMaxPktSize:

 type: integer

 delayTolerance:

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

 synchronicity:

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

 sliceSimultaneousUse:

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

 reliability:

 type: string

 energyEfficiency:

 type: number

 dLDeterministicComm:

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

 uLDeterministicComm:

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

 survivalTime:

 type: string

 nssaaSupport:

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

 n6Protection:

 $ref: '#/components/schemas/N6Protection'

 RANSliceSubnetProfile:

 type: object

 properties:

 coverageAreaTAList:

 type: integer

 dLLatency:

 type: integer

 uLLatency:

 type: integer

 uEMobilityLevel:

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

 resourceSharingLevel:

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

 maxNumberofUEs:

 type: integer

 activityFactor:

 type: integer

 dLThptPerSliceSubnet:

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

 dLThptPerUE:

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

 uLThptPerSliceSubnet:

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

 uLThptPerUE:

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

 uESpeed:

 type: integer

 reliability:

 type: string

 serviceType:

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

 dLMaxPktSize:

 type: integer

 uLMaxPktSize:

 type: integer

 nROperatingBands:

 type: string

 delayTolerance:

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

 positioning:

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

 sliceSimultaneousUse:

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

 energyEfficiency:

 type: number

 termDensity:

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

 survivalTime:

 type: string

 synchronicity:

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

 dLDeterministicComm:

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

 uLDeterministicComm:

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

 TopSliceSubnetProfile:

 type: object

 properties:

 dLLatency:

 type: integer

 uLLatency:

 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'

 dLMaxPktSize:

 type: integer

 uLMaxPktSize:

 type: integer

 maxNumberOfPDUSessions:

 type: integer

 nROperatingBands:

 type: string

 sliceSimultaneousUse:

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

 energyEfficiency:

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

 synchronicity:

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

 delayTolerance:

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

 positioning:

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

 termDensity:

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

 activityFactor:

 type: integer

 coverageAreaTAList:

 type: integer

 resourceSharingLevel:

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

 uEMobilityLevel:

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

 uESpeed:

 type: integer

 reliability:

 type: string

 serviceType:

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

 dLDeterministicComm:

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

 uLDeterministicComm:

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

 survivalTime:

 type: string

 ServiceProfile:

 type: object

 properties:

 serviceProfileId:

 type: string

 plmnInfoList:

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

 maxNumberofUEs:

 type: number

 dLLatency:

 type: number

 uLLatency:

 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'

 dLDeterministicComm:

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

 uLDeterministicComm:

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

 dLThptPerSlice:

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

 dLThptPerUE:

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

 uLThptPerSlice:

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

 uLThptPerUE:

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

 dLMaxPktSize:

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

 uLMaxPktSize:

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

 maxNumberofPDUSessions:

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

 kPIMonitoring:

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

 nBIoT:

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

 radioSpectrum:

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

 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'

 energyEfficiency:

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

 nssaaSupport:

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

 n6Protection:

 $ref: '#/components/schemas/N6Protection'

 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: 'comDefs.yaml#/components/schemas/Ipv4Addr'

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

 LogicInterfaceInfo:

 type: object

 properties:

 logicalInterfceType:

 type: string

 enum:

 - VLAN

 - MPLS

 - Segment

 logicalInterfceId:

 type: string

 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'

 - 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'

 - type: object

 properties:

 attributes:

 allOf:

 - type: object

 properties:

 networkSliceSubnetRef:

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

 operationalState:

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

 administrativeState:

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

 serviceProfileList:

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

 NetworkSliceSubnet-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

 - type: object

 properties:

 managedFunctionRefList:

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

 networkSliceSubnetRefList:

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

 operationalState:

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

 administrativeState:

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

 nsInfo:

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

 sliceProfileList:

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

 epTransportRefList:

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

 priorityLabel:

 type: integer

 networkSliceSubnetType:

 type: string

 enum:

 - TOP\_SLICESUBNET

 - RAN\_SLICESUBNET

 - CN\_SLICESUBNET

 EP\_Transport-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 type: object

 properties:

 ipAddress:

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

 logicInterfaceInfo:

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

 nextHopInfo:

 type: string

 qosProfile:

 type: string

 epApplicationRefs:

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

 AllocateJob-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

 - type: object

 properties:

 serviceProfile:

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

 sliceProfile:

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

 processMonitor:

 $ref: 'genericNrm.yaml#/components/schemas/ProcessMonitor’

 networkSliceRefOut:

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

 networkSliceSubnetRefOut:

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

 DeallocateJob-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

 - type: object

 properties:

 serviceProfileId:

 type: string

 sliceProfileId:

 type: string

 processMonitor:

 $ref: 'genericNrm.yaml#/components/schemas/ProcessMonitor’

 networkSliceRef:

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

 networkSliceSubnetRef:

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

 ModifyJob-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

 - type: object

 properties:

 serviceProfile:

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

 sliceProfile:

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

 processMonitor:

 $ref: 'genericNrm.yaml#/components/schemas/ProcessMonitor’

 networkSliceRef:

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

 networkSliceSubnetRef:

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

#-------- 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'

 AllocateJob-Multiple:

 type: array

 items:

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

 DeallocateJob-Multiple:

 type: array

 items:

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

 ModifyJob-Multiple:

 type: array

 items:

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

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

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

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

|  |
| --- |
| **7th Change** |

## N.2.x module \_3gpp-ns-nrm-provisioningjobs.yang

<CODE BEGINS>

module \_3gpp-ns-nrm-provisioningjobs {

 yang-version 1.1;

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

 prefix nspj3gpp;

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

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

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

 import \_3gpp-ns-nrm-networkslice { prefix ns3gpp; }

 import \_3gpp-ns-nrm-networkslicesubnet { prefix nss3gpp; }

 organization "3GPP SA5";

 contact

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

 description "Defines IOCs for network slicing provisioning.";

 reference "3GPP TS 28.541

 Management and orchestration;

 5G Network Resource Model (NRM);

 Information model definitions for network slice NRM (chapter 6)

 ";

 revision 2022-04-29 {

 reference "CR-NNN";

 }

 grouping AllocateJobGrp {

 list serviceProfile {

 description "An attribute which holds the network slice related

 requirements. It is used to provide input to certain asynchronous

 network slice provisioning procedures.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI. Depending on scenario, values for certain

 sub-attributes may also be assigned by the MnS producer.";

 max-elements 1;

 key "idx";

 leaf idx {

 type uint32;

 }

 uses ns3gpp:ServiceProfileGrp;

 }

 list sliceProfile {

 description "An attribute which holds the network slice subnet related

 requirements. It is used to provide input to certain asynchronous

 network slice provisioning procedures.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI. Depending on scenario, values for certain

 sub-attributes may also be assigned by the MnS producer.";

 max-elements 1;

 key "idx";

 leaf idx {

 type uint32;

 }

 uses nss3gpp:SliceProfileGrp;

 }

 list processMonitor {

 description "An attribute containing information about a background

 process associated with a network slice provisioning Job MOI.

 The attribute value including sub-attributes are updated by the MnS

 producer.";

 min-elements 1;

 max-elements 1;

 config false;

 uses types3gpp:ProcessMonitor;

 }

 leaf networkSliceRefOut {

 description "An attribute containing the DN of a NetworkSlice instance

 selected by the MnS producer as part of an asynchronous allocation

 procedure.

 The attribute value is populated by the MnS producer when the allocation

 procedure has finished successfully.";

 config false;

 type types3gpp:DistinguishedName;

 }

 leaf networkSliceSubnetRefOut {

 description "An attribute containing the DN of a NetworkSliceSubnet

 instance selected by the MnS producer as part of an asynchronous

 allocation procedure.

 The attribute value is populated by the MnS producer when the allocation

 procedure has finished successfully.";

 config false;

 type types3gpp:DistinguishedName;

 }

 }

 grouping DeallocateJobGrp {

 leaf serviceProfileId {

 description "An attribute which holds an ID of a ServiceProfile instance.

 It is used for certain asynchronous network slice provisioning

 procedures to indicate a target instance.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI.";

 type string;

 }

 leaf sliceProfileId {

 description "An attribute which holds an ID of a SliceProfile instance.

 It is used for certain asynchronous network slice provisioning

 procedures to indicate a target instance.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI.";

 type string;

 }

 list processMonitor {

 description "An attribute containing information about a background

 process associated with a network slice provisioning Job MOI.

 The attribute value including sub-attributes are updated by the MnS

 producer.";

 min-elements 1;

 max-elements 1;

 config false;

 uses types3gpp:ProcessMonitor;

 }

 leaf networkSliceRef {

 description "An attribute which holds a DN of a NetworkSlice instance.

 It is used for certain asynchronous network slice provisioning

 procedures to indicate a target instance.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI.";

 type types3gpp:DistinguishedName;

 }

 leaf networkSliceSubnetRef {

 description "An attribute which holds a DN of a NetworkSliceSubnet

 instance. It is used for certain asynchronous network slice

 provisioning procedures to indicate a target instance.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI.";

 type types3gpp:DistinguishedName;

 }

 }

 grouping ModifyJobGrp {

 list serviceProfile {

 description "An attribute which holds the network slice related

 requirements. It is used to provide input to certain asynchronous

 network slice provisioning procedures.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI. Depending on scenario, values for certain

 sub-attributes may also be assigned by the MnS producer.";

 max-elements 1;

 key "idx";

 leaf idx {

 type uint32;

 }

 uses ns3gpp:ServiceProfileGrp;

 }

 list sliceProfile {

 description "An attribute which holds the network slice subnet related

 requirements. It is used to provide input to certain asynchronous

 network slice provisioning procedures.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI. Depending on scenario, values for certain

 sub-attributes may also be assigned by the MnS producer.";

 max-elements 1;

 key "idx";

 leaf idx {

 type uint32;

 }

 uses nss3gpp:SliceProfileGrp;

 }

 list processMonitor {

 description "An attribute containing information about a background

 process associated with a network slice provisioning Job MOI.

 The attribute value including sub-attributes are updated by the MnS

 producer.";

 min-elements 1;

 max-elements 1;

 config false;

 uses types3gpp:ProcessMonitor;

 }

 leaf networkSliceRef {

 description "An attribute which holds a DN of a NetworkSlice instance.

 It is used for certain asynchronous network slice provisioning

 procedures to indicate a target instance.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI.";

 type types3gpp:DistinguishedName;

 }

 leaf networkSliceSubnetRef {

 description "An attribute which holds a DN of a NetworkSliceSubnet

 instance. It is used for certain asynchronous network slice

 provisioning procedures to indicate a target instance.

 The attribute value is provided by the MnS consumer when creating the

 related Job MOI.";

 type types3gpp:DistinguishedName;

 }

 }

 augment "/subnet3gpp:SubNetwork" {

 list AllocateJob {

 description "This IOC represents a network slice or network slice subnet

 allocation job that is used for asynchronous network slicing

 provisioning procedures. It can be name-contained by SubNetwork.

 To initiate an allocation procedure, the MnS consumer creates an

 instance of the AllocateJob IOC and provides the slice or slice subnet

 requirements via initial attribute values. To initiate a network slice

 allocation procedure, the serviceProfile attribute shall be present.

 To initiate a network slice subnet allocation procedure, the

 sliceProfile attribute shall be present. If the MnS consumer wishes to

 use already reserved resources, the supplied profile shall include a

 serviceProfileId or sliceProfileId that matches the serviceProfileId

 or sliceProfileId from an existing instance of

 FeasibilityCheckAndReservationJob that has successfully completed a

 reservation process. If the MnS consumer doesn’t wish to use already

 reserved resources, the supplied profile shall not contain any

 serviceProfileId or sliceProfileId. In this case the serviceProfileId

 or sliceProfileId will be assigned by the MnS producer as part of the

 allocation process.

 Note: When reserved resources are used, the MnS producer may reject a

 request if some requirement values in the profile are different from

 the corresponding profile in the

 FeasibilityCheckAndResourceReservationJob.

 To obtain the progress information of an AllocateJob instance, the MnS

 consumer can monitor the progress of the AllocateJob via the

 processMonitor attribute.

 When the value of processMonitor.status is FINISHED, the corresponding

 allocation procedure has been completed successfully. In this state

 additional MOI attribute values will have been assigned by the MnS

 producer.

 - For a network slice allocation procedure, the attribute

 networkSliceRefOut will contain the DN of the selected NetworkSlice

 instance, which can be either an existing instance or a newly

 created instance. In addition, the serviceProfile attribute will

 contain also any values assigned by the MnS producer.

 - For a network slice subnet allocation procedure, the attribute

 networkSliceSubnetRefOut will contain the DN of the selected

 NetworkSliceSubnet instance, which can be either an existing

 instance or a newly created instance. In addition, the sliceProfile

 attribute will contain also any values assigned by the MnS producer.

 If the procedure fails, the additional output attributes will not be

 populated by the MnS produicer.

 Once an AllocateJob instance has reached one of the possible end

 states as indicated by the processMonitor.status attribute, it should

 be deleted by the MnS consumer.";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses AllocateJobGrp;

 }

 }

 list DeallocateJob {

 description "This IOC represents a network slice or network slice subnet

 deallocation job that is used for asynchronous network slicing

 provisioning procedures. It can be name-contained by SubNetwork.

 To initiate a deallocation procedure, the MnS consumer creates an

 instance of the DeallocateJob IOC and indicates the ServiceProfile or

 SliceProfile to be deallocated via its associated identifiers provided

 as initial attribute values. To initiate a network slice deallocation

 procedure, the networkSliceRef and serviceProfileId attributes shall

 be present. To initiate a network slice subnet deallocation procedure,

 the networkSliceSubnetRef and sliceProfileId attributes shall be

 present.

 To obtain the progress information of a DeallocateJob instance, the

 MnS consumer can monitor the progress of the DeallocateJob via the

 processMonitor attribute.

 Once a DeallocateJob instance has reached one of the possible end

 states as indicated by the processMonitor.status attribute, it should

 be deleted by the MnS consumer.";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses DeallocateJobGrp;

 }

 }

 list ModifyJob {

 description "This IOC represents a network slice or network slice subnet

 modification job that is used for asynchronous network slicing

 provisioning procedures. It can be name-contained by SubNetwork.

 To initiate a modification procedure, the MnS consumer creates an

 instance of the ModifyJob IOC and provides the associated identifiers

 and updated requirements via initial attribute values. To initiate a

 network slice modification procedure, the networkSliceRef and

 serviceProfile attributes shall be present. The serviceProfile shall

 include a serviceProfileId that uniquely identifies a previously

 allocated ServiceProfile. To initiate a network slice subnet

 modification procedure, the networkSliceSubnetRef and sliceProfile

 attributes shall be present. The sliceProfile shall includeing a

 sliceProfileId that uniquely identifies a previously allocated

 SliceProfile. In all cases the MnS consumer must provide the full set

 of requirements as input rather than only the changed requirements.

 This is because the MnS producer would otherwise not be able to deduce

 whether a missing attribute value represents no requirement or an

 unchanged requirement. If there is an existing instance of

 FeasibilityCheckAndReservationJob that has successfully completed a

 reservation process for the same serviceProfileId or sliceProfileId,

 the MnS producer will perform the modification using the already

 reserved resources.

 Note: When reserved resources are used, the MnS producer may reject a

 request if some requirement values in the profile are different from

 the corresponding profile in the

 FeasibilityCheckAndResourceReservationJob.

 To obtain the progress information of a ModifyJob instance, the MnS

 consumer can monitor the progress of the ModifyJob via the

 processMonitor attribute.

 Once a ModifyJob instance has reached one of the possible end states

 as indicated by the processMonitor.status attribute, it should be

 deleted by the MnS consumer.";

 key id;

 uses top3gpp:Top\_Grp;

 container attributes {

 uses ModifyJobGrp;

 }

 }

 }

}

<CODE ENDS>

|  |
| --- |
| **End of Changes** |