3GPP TSG SA WG5 Meeting 136-e TDoc S5-212222

electronic meeting, online, 1 - 9 March 2021

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.541** | **CR** | **0467** | **rev** | - | **Current version:** | **17.1.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network | **x** |

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| ***Title:*** | Correction to NSI and NSSI state management | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | S5 | | | | | | | | | |
| ***Source to TSG:*** | Huawei, Orange, Telefónica | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NETSLICE-5GNRM | | | | |  | ***Date:*** | | | 2021-03-01 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | A |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | The Network Resource Models for NetworkSlice and NetworkSliceSubnet do not follow the recommendations in X.731 for modelling of states.  There is no description of dependencies between states of related objects. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Align state transitions with ITU-T Rec. X.731. Define the behaviour of operational state. | | | | | | | | |
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| ***Consequences if not approved:*** | | Undefined behaviour will cause incompatible implementations. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.4.1, B.1, B.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  |  | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  |  | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

|  |
| --- |
| **1st 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: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: True |
| serviceProfileId | A unique identifier of property of network slice related requirement should be supported by the network slice. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| sliceProfileId | A unique identifier of the property of network slice subnet related requirement should be supported by the network slice subnet. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| operationalState | It indicates the operational state of the network slice or the network slice subnet. It describes whether or not the resource is physically installed and working.  allowedValues: "ENABLED", "DISABLED".  The meaning of these values is as defined in 3GPP TS 28.625 [17] and ITU-T X.731 [18]. | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| administrativeState | It indicates the administrative state of the network slice or the network slice subnet. It describes the permission to use or prohibition against using the managed object instance, imposed through the OAM services.  allowedValues: “LOCKED”, “UNLOCKED”, SHUTTINGDOWN”  The meaning of these values is as defined in 3GPP TS 28.625 [17] and ITU-T X.731 [18]. | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: LOCKED  allowedValues: N/A  isNullable: False |
| nsInfo | This attribute contains the NsInfo of the NS instance corresponding to the network slice subnet instance. The NsInfo is described in clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: NsInfo  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: True |
| nSInstanceId | This attribute specifies the identifier of NS instance corresponding to the network slice subnet instance.  See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: True |
| nsName | This attribute specifies the name of NS instance corresponding to the network slice subnet instance.  See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: True |
| description | This attribute specifies the description of NS instance corresponding to the network slice subnet instance.  See clause 8.3.3.2.2 of ETSI GS NFV-IFA 013 [29]. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: True  defaultValue: No default value  isNullable: True |
| category | This attribute specifies the category of a service requirement/attribute of GST (see GSMA NG.116 [50]).  allowedValues: character, scalability | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| tagging | This attribute specifies the tagging of a service requirement/attribute of GST in character category (see GSMA NG.116 [50]).  allowedValues: performance, function, operation | type: ENUM  multiplicity: 1…3  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| exposure | This attribute specifies exposure mode of a service requirement/attribute of GST (see GSMA NG.116 [50]).  allowedValues: API, KPI | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| sNSSAIList | This parameter specifies the S-NSSAI list to be supported by the network slice new to be created or the existing network slice to be re-used.  sNSSAList is defined in subclause 4.4.1 |  |
| 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 perfReq  Depending on the sST value, the list of perfReq will be  - list of eMBBPerfReq  or  - list of uRLLCPerfReq  or  - list of mIoTPerfReq  NOTE 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 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: PerfReq  multiplicity: \*1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| maxNumberofUEs | An attribute specifies the maximum number of UEs may simultaneously access the network slice. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| coverageAreaTAList | An attribute specifies a list of Tracking Areas for the network slice .  allowedValues:  Legacy TAC and Extended TAC are defined in clause 9.3.3.10 of TS 38.413 [5]. | type: Integer  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| latency | An attribute specifies the packet transmission latency (millisecond) through the RAN, CN, and TN part of 5G network and is used to evaluate utilization performance of the end-to-end network slice. See clause 6.3.1 of 28.554 [27]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| uEMobilityLevel | An attribute specifies the mobility level of UE accessing the network slice. See 6.2.1 of TS 22.261 [28].  allowedValues: stationary, nomadic, restricted mobility, fully mobility. | type: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: True |
| serviceProfile.resourceSharingLevel | An attribute specifies whether the resources to be allocated to the network slice may be shared with another network slice(s).  allowedValues: shared, non-shared. | type: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: Yes  isNullable: True |
| sliceProfile.resourceSharingLevel | An attribute specifies whether the resources to be allocated to the network slice subnet may be shared with another network slice subnet(s).  allowedValues: shared, non-shared. | type: Enum  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: Yes  isNullable: True |
| serviceProfileList | An attribute specifies a list of ServiceProfile (see clause 6.3.3) supported by the network slice | type: ServiceProfile  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| sliceProfileList | An attribute specifies a list of SliceProfile (see clause 6.3.4) supported by the network slice subnet | type: SliceProfile  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| sST | This parameter specifies the slice/service type in a ServiceProfile to be supported by a network slice.  See clause 5.15.2 of 3GPP TS 23.501 [2]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| delayTolerance | An attribute specifies the properties of service delivery flexibility, especially for the vertical services that are not chasing a high system performance. See clause 4.3 of TS 22.104 [51]. | type: DelayTolerance  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| DelayTolerance.support | An attribute specifies whether or not the network slice supports service delivery flexibility, especially for the vertical services that are not chasing a high system performance.  allowedValues:  "NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| deterministicComm | An attribute specifies the properties of the deterministic communication for periodic user traffic, see clause 4.3 of TS 22.104 [51]. | type: <<DeterminComm>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| DeterminComm.availability | An attribute specifies whether or not the network slice supports deterministic communication for period user traffic.  allowedValues:  "NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| DeterminComm.periodicityList | An attribute specifies a list of periodicities supported by the network slice for deterministic communication. | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| dLThptPerSlice | This attribute defines achievable data rate of the network slice in downlink that is available ubiquitously across the coverage area of the slice, refer NG.116 [50]. | type: DLThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| dLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50]. | type: DLThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| guaThpt | This attribute describes the guaranteed data rate. | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| maxThpt | This attribute describes the maximum data rate. | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| uLThptPerSlice | This attribute defines achievable data rate of the network slice in uplink that is available ubiquitously across the coverage area of the slice, refer NG.116 [50]. | type: ULThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| uLThptPerUE | This attribute defines data rate supported by the network slice per UE, refer NG.116 [50]. | type: ULThpt  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| maxPktSize | This parameter specifies the maximum packet size supported by the network slice, refer NG.116 [50]. | type: MaxPktSize  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| MaxPktSize.maxsize | This parameter specifies the maximum packet size supported by the network slice, refer NG.116 [50]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| maxNumberofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50]. | type: MaxNumberofPDUSessions  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| MaxNumberofPDUSessions.nOofPDUSessions | This parameter defines the maximum number of concurrent PDU sessions supported by the network slice, refer NG.116 [50]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| kPIMonitoring | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: KPIMonitoring  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| KPIMonitoring. kPIList | An attribute specifies the name list of KQIs and KPIs available for performance monitoring. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| nBIoT | An attribute specifies whether NB-IoT is supported in the RAN in the network slice, see NG.116 [50]. | type: NBIoT  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| NBIoT.support | An attribute specifies whether NB-IoT is supported in the RAN in the network slice, see NG.116 [50].  allowedValues:  "NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| userMgmtOpen | An attribute specifies whether or not the network slice supports the capability for the NSC to manage their users or groups of users’ network services and corresponding requirements. | type: UserMgmtOpen  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| UserMgmtOpen.support | An attribute specifies whether or not the network slice supports the capability for the NSC to manage their users or groups of users’ network services and corresponding requirements.  allowedValues:  "NOT SUPPORTED", "SUPPORTED". | type: <<enumeration>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| v2XCommModels | An attribute specifies whether or not the V2X communication mode is supported by the network slice. | type: V2XCommMode  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| V2XCommMode.v2XMode | An attribute specifies whether or not the V2X communication mode is supported by the network slice.  allowedValues:  "NOT SUPPORTED", "SUPPORTED BY NR". | type: <<enumeration>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| coverageArea | An attribute specifies the coverage area of the network slice, i.e. the geographic region where a 3GPP communication service is accessible, see Table 7.1-1 of TS 22.261 [28]) and NG.116 [50]. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| termDensity | An attribute specifies the overall user density over the coverage area of the network slice. See Table 7.1-1 of TS 22.261 [28]). | type: TermDensity  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| TermDensity.density | An attribute specifies the overall user density over the coverage area of the network slice. See Table 7.1-1 of TS 22.261 [28]). | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| activityFactor | An attribute specifies the percentage value of the amount of simultaneous active UEs to the total number of UEs where active means the UEs are exchanging data with the network. See Table 7.1-1 of TS 22.261 [28]). | type: Real  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| uESpeed | An attribute specifies the maximum speed (in km/hour) supported by the network slice at which a defined QoS can be achieved. See Table 7.1-1 of TS 22.261 [28]). | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| jitter | An attribute specifies the deviation from the desired value to the actual value when assessing time parameters, see clause C.4.1 of TS 22.104 [51]. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| survivalTime | An attribute specifies the time that an application consuming a communication service may continue without an anticipated message. See clause 5 of TS 22.104 [51]). | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| reliability | An attribute specifies in the context of network layer packet transmissions, percentage value of the amount of sent network layer packets successfully delivered to a given system entity within the time constraint required by the targeted service, divided by the total number of sent network layer packets, see TS 22.261 [28] and TS 22.104 [51]. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: True |
| NetworkSlice.networkSliceSubnetRef | This holds a DN of NetworkSliceSubnet relating to the NetworkSlice instance. | type: DN  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| NetworkSliceSubnet.networkSliceSubnetRef | This holds a list of DN of constituent NetworkSliceSubnet supporting NetworkSliceSubnet instance | type: DN  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| managedFunctionRef | This holds a list of DN of ManagedFunction instances supporting the NetworkSliceSubnet instance. | type: DN  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| ipAddress | This parameter specifies the IP address assigned to a logical transport interface/endpoint.  It can be an IPv4 address (See RFC 791 [37]) or an IPv6 address (See RFC 2373 [38]).  See note 1 | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| logicInterfaceId | This parameter specifies the identify of a logical transport interface. It could be VLAN ID (See IEEE 802.1Q [39]), MPLS Tag or Segment ID. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| nextHopInfoList | This parameter is used to identify ingress transport node. Each node can be identified by any of combination of IP address of next-hop router of transport network, system name, port name, IP management address of transport nodes. | type: String  multiplicity: \*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| qosProfileRefList | This parameter specifies reference to QoS Profile for a logical transport interface. A QoS profile includes a set of parameters which are locally provisioned on both sides of a logical transport interface. | type: String  multiplicity: \*  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: True |
| maxDLDataVolume | An attribute specifies the maximum DL PDCP data volume supported by the network slice instance (performance measurement definition see in TS 28.552[69]). The unit is MByte/day. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| maxULDataVolume | An attribute specifies the maximum UL PDCP data volume supported by the network slice instance (performance measurement definition see in TS 28.552[69]). The unit is MByte/day. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  allowedValues: N/A  isNullable: False |
| epApplicationRef | This parameter specifies a list of application level EPs associated with the logical transport interface.  See note 2. | type: DN  multiplicity: 1..\*  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: False |
| epTransportRef | This parameter specifies a list of transport level EPs associated with the application level EP | type: DN  multiplicity: \*  isOrdered: N/A  isUnique: True  defaultValue: None  isNullable: True |
| NOTE 1: There is no direct relationship between localAddress/remoteAddress in EP\_RP and ipAddress in EP\_transport. While the localAddress/remoteAddress in EP\_RP could be exchanged as part of signalling between GTP-u tunnel end points, ipAddress in EP\_transport is used for transport routing.  NOTE 2: Application level EP represents EP\_RP defined in TS 28.622 (see [30]). e.g. including EP\_NgC, EP\_N3, etc... | | |

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| **2nd change** |

# B.1 NSI state handling

A NetworkSlice instance (NSI) is a logical object in the management system that represents a complex grouping of resources that may be in various states. At any time, the management system needs to know the state of an NSI.

The ITU-T X.731 [18], to which [17] refers, has defined the inter-relation between the administrative state and operational state of systems in general.

*administrativeState* **LOCKED**

*administrativeState***UNLOCKED**

*administrativeState***SHUTTING DOWN**

*operationalState***DISABLED**

*operationalState***ENABLED**

*operationalState***DISABLED**

*operationalState***ENABLED**

*operationalState***ENABLED**

0

1

3

2

1

2a

2

1

2

4

3

4

55

Initial and Final state

2b

Figure B.1: Combined NSI state diagram

The interactions specified under the column "The state transition events and actions" of "NSI state transition table" below shall be present for the state transition.

Table B.1: The NSI state transition table

|  |  |
| --- | --- |
| Trigger number | The state transition events and actions |
| 0 | Operation allocateNsi results in the creation of NSI. The administrative state is set to LOCKED and operationalState is set to DISABLED  -- or –  CM operation creates NSI. The administrative state is set to LOCKED and operationalState is set to DISABLED |
| 1 | CM operation sets administrative state to UNLOCKED |
| 2 | CM operation sets administrative state to LOCKED |
| 2a | CM operation sets administrative state to SHUTTING DOWN |
| 2b | The last user of the network slice stops using the network slice |
| 3 | The related NSSI (identified by NetworkSlice.networkSliceSubnetRef) changes state to UNLOCKED and ENABLED |
| 4 | The related NSSI (identified by NetworkSlice.networkSliceSubnetRef) changes state to LOCKED  -- or –  The related NSSI (identified by NetworkSlice.networkSliceSubnetRef) changes state to DISABLED |
| 5 | Operation deallocateNsi results in the deletion of NSI  -- or –  CM operation deletes NSI |

# B.2 State handling of NSSI

A NetworkSliceSubnet instance (NSSI) is a logical object in the management system that represents a complex grouping of resources that may be in various states. At any time the management system needs to know the state of an NSSI.

The ITU-T X.731 [18], to which [17] refers, has defined the inter-relation between the administrative state and operational state of systems in general.

*administrativeState* **LOCKED**

*administrativeState***UNLOCKED**

*administrativeState***SHUTTING DOWN**

*operationalState***DISABLED**

*operationalState***ENABLED**

*operationalState***DISABLED**

*operationalState***ENABLED**

*operationalState***ENABLED**

0

1

3

2

1

2a

2

1

2

4

3

4

55

Initial and Final state

2b

Figure B.2.1: Combined NSSI state diagram

The interactions specified under the column "The state transition events and actions" of "NSSI state transition table" below shall be present for the state transition.

Table B.2.1: The NSSI state transition table

|  |  |
| --- | --- |
| Trigger number | The state transition events and actions |
| 0 | Operation allocateNssi results in the creation of NSSI. The administrative state is set to LOCKED and operationalState is set to DISABLED  -- or –  CM operation creates NSSI. The administrative state is set to LOCKED and operationalState is set to DISABLED |
| 1 | CM operation to set administrative state to UNLOCKED |
| 2 | CM operation sets administrative state to LOCKED |
| 2a | CM operation sets administrative state to SHUTTING DOWN |
| 2b | The last user of the network slice subnet stops using the network slice subnet |
| 3 | All constituent NSSIs (identified by NetworkSliceSubnet.networkSliceSubnetRef) change state to UNLOCKED and ENABLED |
| 4 | At least one constituent NSSI (identified by NetworkSliceSubnet.networkSliceSubnetRef) changes state to LOCKED  -- or –  At least one constituent NSSI (identified by NetworkSliceSubnet.networkSliceSubnetRef) changes state to DISABLED |
| 5 | Operation deallocateNssi results in the deletion of NSSI  -- or –  CM operation deletes NSSI |

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| **End of changes** |