**3GPP TSG-SA5 Meeting #134eS5-206295**

**e-meeting, 16 – 25 November 2020**

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| *CR-Form-v11.4* |
| **CHANGE REQUEST** |
|  |
|  | **28.541** | **CR** | **0xxx** | **rev** | **-** | **Current version:** | **16.6.2** |  |
|  |
| *For* [***HELP***](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:***  | Fix containment relationship for EP\_Transport IOC |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | TEI16 |  | ***Date:*** | 2020-11-14 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)Rel-12 (Release 12)Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
|  |  |
| ***Reason for change:*** | In the existing NRM, EP\_Transport IOC is contained by NetworkSliceSubnet IOC. With this containment relationship, the EP\_Transport as underlaying resource cannot be shared or reused by other NetworkSliceSubnet instances. In addition, letting NetworkSliceSubnet “contain” resource instead of flexibly associate with resources breaks the use of NSS as generic grouping/collection and is not aligned with concept and purpose of network slice subnet as logic collection of resource. With current NRM, the EP\_Transport resource can only be created after creating the NetworkSliceSubnet instance and have to be deleted before terminating the NetworkSliceSubnet instance. It disables the flexibility and reusability.  |
|  |  |
| ***Summary of change:*** | Change containment relationship between EP\_Transport and NetworkSliceSubnet to association, and contain EP\_Transport by SubNetwork or ManagedElement. |
|  |  |
| ***Consequences if not approved:*** | The transport endpoints cannot be shared or reused by multiple network slice subnets. |
|  |  |
| ***Clauses affected:*** | 6.2.1, 6.3.2, J.4.3 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** | Forge branch for SS: S5-206295\_Rel-16\_28.541\_CR\_fix\_containment\_relationship\_for\_EP\_Transport\_IOC |

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| **Start of 1st modification** |

## 6.2 Class diagram

### 6.2.1 Relationships



Figure 6.2.1-1: Network slice NRM

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

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| **End of modification** |

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| **Start of 2nd modification** |

### 6.3.2 NetworkSliceSubnet

#### 6.3.2.1 Definition

This IOC represents the properties of a network slice subnet instance in a 5G network. For more information about the network slice subnet instance, see 3GPP TS 28.531 [26].

#### 6.3.2.2 Attributes

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| operationalState | M | T | F | F | T |
| administrativeState | M | T | T | F | T |
| nsInfo | CM | T | F | F | T |
| sliceProfileList | M | T | T | F | T |
| **Attribute related to role** |  |  |  |  |  |
| managedFunctionRef | M | T | F | F | T |
| networkSliceSubnetRef | M | T | F | F | T |
| epTransportRef | O | T | T | F | T |

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| **End of modification** |

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| **Start of 3rd modification** |

J.4.3 OpenAPI document "sliceNrm.yaml"

openapi: 3.0.1

info:

 title: Slice NRM

 version: 16.5.0

 description: >-

 OAS 3.0.1 specification of the Slice NRM

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externalDocs:

 description: 3GPP TS 28.541 V16.4.0; 5G NRM, Slice NRM

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

paths: {}

components:

 schemas:

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

 Float:

 type: number

 format: float

 MobilityLevel:

 type: string

 enum:

 - STATIONARY

 - NOMADIC

 - RESTRICTED MOBILITY

 - FULLY MOBILITY

 SharingLevel:

 type: string

 enum:

 - SHARED

 - NON-SHARED

 PerfReqEmbb:

 type: object

 properties:

 expDataRateDL:

 type: number

 expDataRateUL:

 type: number

 areaTrafficCapDL:

 type: number

 areaTrafficCapUL:

 type: number

 userDensity:

 type: number

 activityFactor:

 type: number

 PerfReqEmbbList:

 type: array

 items:

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

 PerfReqUrllc:

 type: object

 properties:

 cSAvailabilityTarget:

 type: number

 cSReliabilityMeanTime:

 type: string

 expDataRate:

 type: number

 msgSizeByte:

 type: string

 transferIntervalTarget:

 type: string

 survivalTime:

 type: string

 PerfReqUrllcList:

 type: array

 items:

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

 PerfReq:

 oneOf:

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

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

 Category:

 type: string

 enum:

 - CHARACTER

 - SCALABILITY

 Tagging:

 type: string

 enum:

 - PERFORMANCE

 - FUNCTION

 - OPERATION

 Exposure:

 type: string

 enum:

 - API

 - KPI

 ServAttrCom:

 type: object

 properties:

 category:

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

 tagging:

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

 exposure:

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

 Support:

 type: string

 enum:

 - NOT SUPPORTED

 - SUPPORTED

 DelayTolerance:

 type: object

 properties:

 servAttrCom:

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

 support:

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

 DeterministicComm:

 type: object

 properties:

 servAttrCom:

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

 availability:

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

 periodicityList:

 type: string

 DLThptPerSlice:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 DLThptPerUE:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 ULThptPerSlice:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 ULThptPerUE:

 type: object

 properties:

 servAttrCom:

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

 guaThpt:

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

 maxThpt:

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

 MaxPktSize:

 type: object

 properties:

 servAttrCom:

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

 maxsize:

 type: integer

 MaxNumberofConns:

 type: object

 properties:

 servAttrCom:

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

 nOofConn:

 type: integer

 KPIMonitoring:

 type: object

 properties:

 servAttrCom:

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

 kPIList:

 type: string

 UserMgmtOpen:

 type: object

 properties:

 servAttrCom:

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

 support:

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

 V2XCommModels:

 type: object

 properties:

 servAttrCom:

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

 v2XMode:

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

 TermDensity:

 type: object

 properties:

 servAttrCom:

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

 density:

 type: integer

 NsInfo:

 type: object

 properties:

 nsInstanceId:

 type: string

 nsName:

 type: string

 ServiceProfileList:

 type: object

 additionalProperties:

 type: object

 properties:

 snssaiList:

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

 plmnIdList:

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

 maxNumberofUEs:

 type: number

 latency:

 type: number

 uEMobilityLevel:

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

 sst:

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

 resourceSharingLevel:

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

 availability:

 type: number

 delayTolerance:

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

 deterministicComm:

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

 dLThptPerSlice:

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

 dLThptPerUE:

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

 uLThptPerSlice:

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

 uLThptPerUE:

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

 maxPktSize:

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

 maxNumberofConns:

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

 kPIMonitoring:

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

 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

 SliceProfileList:

 type: object

 additionalProperties:

 type: object

 properties:

 snssaiList:

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

 plmnIdList:

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

 perfReq:

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

 maxNumberofUEs:

 type: number

 coverageAreaTAList:

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

 latency:

 type: number

 uEMobilityLevel:

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

 resourceSharingLevel:

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

 IpAddress:

 oneOf:

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

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

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

 SubNetwork-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

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

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

 - type: object

 properties:

 SubNetwork:

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

 EP\_Transport:

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

 ManagedElement-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

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

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

 - type: object

 properties:

 EP\_Transport:

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

 NetworkSlice:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

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

 - type: object

 properties:

 networkSliceSubnetRef:

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

 operationalState:

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

 administrativeState:

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

 serviceProfileList:

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

 NetworkSliceSubnet:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

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

 - type: object

 properties:

 managedFunctionRefList:

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

 networkSliceSubnetRefList:

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

 operationalState:

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

 administrativeState:

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

 nsInfo:

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

 sliceProfileList:

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

 epTransportRefList:

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

 EP\_Transport-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 type: object

 properties:

 ipAddress:

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

 logicInterfaceId:

 type: string

 nextHopInfo:

 type: string

 qosProfile:

 type: string

 epApplicationRefs:

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

 SubNetwork-Multiple:

 type: array

 items:

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

 EP\_Transport-Multiple:

 type: array

 items:

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

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

 resources-sliceNrm:

 oneOf:

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

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

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

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

|  |
| --- |
| **End of modification** |