**3GPP TSG-SA5 Meeting #133-e *S5-206333***

**Online, , 12th Oct 2020 - 21st Oct 2020**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.536** | **CR** |  | **rev** |  | **Current version:** | **16.1.0** |  |
|  | | | | | | | | |
| *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:*** | Implement Assurance Closed Loop model changes | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson LM, Deutsche Telekom, NEC, Huawei | | | | | | | | | |
| ***Source to TSG:*** | SA5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | COSLA | | | | |  | ***Date:*** | | | 2020-10-02 |
|  |  | | | |  | |  | | |  |
| ***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 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 following issues where identified in discussion paper XXX  - The association relationship between SubNetwork and AssuranceControlLoop.  - The relationship between the AssuranceControlLoop and Managed Entities  - The difference between AssuranceGoalStatus and AssuranceGoal  - attribute definitions for operationalState and administrativeState are missing | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | - added association relationship between SubNetwork and AssuranceControlLoop  - added assicioation between NetworkSlice and AssuranceControlLoop  - removed AssuranceGoalStatus and added new description for AssuranceGoal  - updated attribute definitions accordingly  - added attribute definitions for operationalState and administrativeState | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The model is ambiguous and open to misinterpretation leading to potentially faulty implementations | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 4.1.2.1.1, 4.1.2.2.1, 4.1.2.2.1, 4.1.2.3.1.1,  4.1.2.3.2, 4.1.2.3.2.1, 4.1.2.3.2.2, 4.1.2.3.2.3, 4.1.2.3.2.4  4.1.2.3.3, 4.1.2.3.3.1, 4.1.2.3.3.2, 4.1.2.3.3.3, 4.1.2.3.3.4  4.1.2.3.4, 4.1.2.3.4.1, 4.1.2.3.4.4  4.1.2.4.1, B.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | <https://forge.3gpp.org/rep/sa5/MnS/tree/S5-206049_-_COSLA_-_draf_CR_Implement_assurance_closed_loop_model_changes> | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | S5-205244rev4 converted to draftCR as input to CR for #134e  S5-206049rev5  S5-206333 input to draftCR for #134e | | | | | | | | |

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| **First change** |

# 2 References

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

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

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

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

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] ETSI GS ZSM 002 (V1.1.1) (2019-08): "Zero-touch network and Service Management (ZSM); Reference Architecture".

[3] 3GPP TS 28.550: "Management and orchestration; Performance assurance".

[4] 3GPP TS 28.545: "Management and orchestration; Fault Supervision (FS)".

[5] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[6] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[7] 3GPP TS 28.532: "Management and orchestration; Generic management services".

[8] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP); Information Service (IS)".

[9] 3GPP TS 28.531: "Management and orchestration; Provisioning".

[10] 3GPP TS 32.160: "Management and orchestration; Management service template".

[11] 3GPP TS 29.520: "5G System; Network Data Analytics Services; Stage 3".

[12] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[13] 3GPP TS 28.554: "Management and orchestration; 5G end to end Key Performance Indicators (KPI)".

[x] 3GPP TS 28.625: "State Management Data Definition Integration Reference Point (IRP); Information Service (IS)".

[y] ITU-T Recommendation X.731: "Information technology - Open Systems Interconnection - Systems Management: State management function".

[z] 3GPP TS 28.623: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS)".

|  |
| --- |
| **Second change** |

### 4.1.2 Model

#### 4.1.2.1 Imported and associated information entities

##### 4.1.2.1.1 Imported information entities and local labels

|  |  |
| --- | --- |
| Label reference | Local label |
| TS 28.622 [5], IOC, Top | Top |

##### 4.1.2.1.1 Associated information entities and local labels

|  |  |
| --- | --- |
| Label reference | Local label |
| TS 28.622 [5], IOC, SubNetwork | SubNetwork |
| TS 28.541 [6], IOC, NetWorkSlice | NetworkSlice |
| TS 28.541 [6], IOC, NetWorkSliceSubnet | NetworkSliceSubnet |
| TS 28.622 [5], IOC, ManagedElement | ManagedElement |
| TS 28.623 [z], datatype, AttributeNameValuePairSet | AttributeNameValuePairSet |
| TS 28.541 [6], dataType, ServiceProfile | ServiceProfile |
| TS 28.541 [6], dataType, SliceProfile | SliceProfile |
| TS 28.541 [6], attribute, serviceProfileId | serviceProfileId |
| TS 28.541 [6], attribute, sliceProfileId | sliceProfileId |
| TS 28.623 [z], attribute, operationalState | operationalState |
| TS 28.623 [z], attribute, administrativeState | administrativeState |

#### 4.1.2.2 Class diagram

#### 4.1.2.2.1 Relationships

This clause depicts the set of classes that encapsulates the information relevant for this MnS. This clause provides an overview of the relationships between relevant classes in UML.

/ n tClass 
SubNetwork 
«nameë» 
{xor} 
/ n formation Objec tClass 
ManagedElement 
«names» 
/ n formation Objec tClass 
AssuranceGoal 
* «names» 1 
«l n tClass» 
AssuranceClosedControlLoop 
/ n formation Objec tClass 
NetworkSllce 
/ n formation Objec tClass 
NetworkSllceSubnet 

Figure 4.1.2.2.1.1: Assurance management NRM fragment

#### 4.1.2.2.2 Inheritance



Figure 4.1.2.2.2.1: Assurance management inheritance relationships

#### 4.1.2.3 Class definitions

##### 4.1.2.3.1 AssuranceClosedControlLoop

4.1.2.3.1.1 Definition

This IOC represents an assurance closed control loop,an assurance closed control loop monitors the adjustments of the resources associated with a NetworkSlice or NetworkSliceSubnet in order to meet the objectives described by one or more assurance goals. The capabilities include:to report the achievement of the goal fulfilment of an AssuranceClosedControlLoop

- state management of an AssuranceClosedControlLoop

- to keep track of the lifecycle of an AssuranceClosedControlLoop

A consumer can check the effectiveness of the assuranceControlLoop by consulting the performance measurements [12] and KPI’s [13] associated with the target and comparing values of the targets with the values of the characteristics related attributes reported by the performance assurance service.

4.1.2.3.1.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| operationalState | M | T | F | F | T |
| administrativeState | M | T | T | F | T |
| controlLoopLifeCyclePhase | M | T | T | F | T |

4.1.2.3.1.3 Constraints

No constraints have been defined for this document.

4.1.2.3.1.4 Notifications

The common notifications defined in clause 4.1.2.5 are valid for this IOC, without exceptions or additions.

##### 4.1.2.3.2 AssuranceGoal

4.1.2.3.2.1 Definition

This class represents the subset of attributes (typically characteristics attributes) from an SLS, i.e. a ServiceProfile or a SliceProfile, that are subject to assurance requirements. A single instance of AssuranceGoal represents a list of assurance targets. The assurance goal includes information about the time a goal should be observed and the status of the the goal fulfilment

NOTE: A NetworkSlice or NetworkSliceSubnet can support multiple instances of AssuranceGoal.

4.1.2.3.2.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| assuranceTargetList | M | T | F | F | T |
| networkSlice | CM | T | T | F | T |
| networkSliceSubnet | CM | T | T | F | T |
| sliceProfileId | CM | T | T | F | T |
| serviceProfileId | CM | T | T | F | T |
| observationTime | M | T | T | F | T |
| assuranceGoalStatusObserved | O | T | F | F | T |
| assuranceGoalStatusPredicted | O | T | F | F | T |

4.1.2.3.2.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| sliceProfileId | Condition: the AssuranceGoal applies to a NetworkSliceSubNet |
| serviceProfileId | Condition: the AssuranceGoal applies to a NetworkSlice |
| networkSliceSubnet | Condition: the AssuranceGoal applies to a NetworkSliceSubNet |
| networkSlice | Condition: the AssuranceGoal applies to a NetworkSlice |

4.1.2.2.3.4 Notifications

The common notifications defined in subclause 4.1.2.5 are valid for the <<IOC>>, without exceptions or additions.











##### 4.1.2.3.5 AssuranceTarget <<dataType>>

4.1.2.3.5.1 Definition

This data type represents a single attribute name-value-pair of which one or more are included in an AssuranceGoal.

4.1.2.3.5.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| assuranceTargetname-value-pair | M | T | F | F | T |

4.1.2.3.5.3 Attribute constraints

No constraints have been defined for this document.

4.1.2.3.5.4 Notifications

The common notifications defined in subclause 4.1.2.5 are valid for the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

#### 4.1.2.4 Attribute definitions

##### 4.1.2.4.1 Attribute properties

The following table defines the properties of attributes that are specified in the present document.

Table 4.1.2.4.1.1

| Attribute Name | Documentation and Allowed Values | Properties |
| --- | --- | --- |
| controlLoopLifeCyclePhase | It indicates the lifecycle phase of the AssuranceControlLoop instance.  AllowedValues: Preparation, Commissioning, Operation and Decommissioning. | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: NULL  isNullable: False |
| assuranceTargetName | The name of the attribute which is part of a name-value-pair in the AssuranceGoal | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| assuranceTargetValue | The value of the attribute which is part of a name-value-pair in the AssuranceGoal | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| assuranceTargetList | This is an attribute containing a list of key-value-pairs that are part of an AssuranceGoal | type: Attribute name/value pair  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| observationTime | It indicates the time duration over which a controlLoopGoal is observed. observation time expressed in seconds | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| operationalState | It indicates the operational state of the assurance control loop. It describes whether the resource is physically installed and working.  allowedValues: "ENABLED", "DISABLED".  The meaning of these values is as defined in 3GPP TS 28.625 [x] and ITU-T X.731 [y]. | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Disabled  allowedValues: N/A  isNullable: False |
| administrativeState | It indicates the administrative state of the assurance control loop. It describes the permission to use or prohibition against using the instance, imposed through the OAM services.  allowedValues: “LOCKED”, “UNLOCKED”,  The meaning of these values is as defined in 3GPP TS 28.625 [x] and ITU-T X.731 [y]. | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Locked  allowedValues: N/A  isNullable: False |
| assuranceGoalObserved | It holds the status of the observed goal fulfilment to the assuranceControlLoopGoals  allowedValues: "FULFILLED", “NOT\_FULFILLED" | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: N/A  allowedValues: N/A  isNullable: False |
| assuranceGoalPredicted | It holds the status of the predicted future goal fulfilment to the assuranceControlLoopGoals  allowedValues: "FULFILLED", “NOT\_FULFILLED" | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: Locked  allowedValues: N/A  isNullable: False |

##### 4.1.2.4.2 Constraints

No constraints have been identified for this document.

##### 4.1.2.4.3 Notifications

This subclause presents a list of notifications, defined in [7], that provisioning management service consumer can receive. The notification parameter objectClass/objectInstance, defined in [10], would capture the DN of an instance of an IOC defined in the present document.

#### 4.1.2.5 Common notifications

##### 4.1.2.5.1 Alarm notifications

This clause presents a list of notifications, defined in TS 28.532 [7], that an MnS consumer may receive. The notification header attribute objectClass/objectInstance, defined in TS 32.302 [8], shall capture the DN of an instance of a class defined in the present document.

| Name | Qualifier | Notes |
| --- | --- | --- |
| notifyNewAlarm | M | -- |
| notifyClearedAlarm | M | -- |
| notifyAckStateChanged | M | -- |
| notifyAlarmListRebuilt | M | -- |
| notifyChangedAlarm | O | -- |
| notifyCorrelatedNotificationChanged | O | -- |
| notifyChangedAlarmGeneral | O | -- |
| notifyComments | O | -- |
| notifyPotentialFaultyAlarmList | O | -- |

##### 4.1.2.5.2 Configuration notifications

This clause presents a list of notifications, defined in TS 28.532 [7], that an MnS consumer may receive. The notification header attribute objectClass/objectInstance, defined in TS 32.302 [8], shall capture the DN of an instance of a class defined in the present document.

| Name | Qualifier | Notes |
| --- | --- | --- |
| notifyMOICreation | O | -- |
| notifyMOIDeletion | O | -- |
| notifyMOIAttributeValueChanges | O | -- |
| notifyEvent | O | -- |

|  |
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| **Second change** |

# B.2 Solution Set (SS) definitions

## B.2.1 OpenAPI document "coslaNrm.yml"

openapi: 3.0.2

info:

title: coslaNrm

version: 16.4.0

description:

OAS 3.0.1 specification of the Cosla NRM

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externalDocs:

description: 3GPP TS 28.536 V16.4.0; 5G NRM, Slice NRM

url: http://www.3gpp.org/ftp/Specs/archive/28\_series/28.536/

paths: {}

components:

schemas:

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

ControlLoopLifeCyclePhase:

type: string

enum:

- PREPARATION

- COMMISSIONING

- OPERATION

- DECOMMISSIONING

ObservationTime:

allOf:

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

- type: object

properties:

observationTime:

type: integer

AssuranceGoalStatusObserved:

type: string

enum:

- FULFILLED

- NOT\_FULFILLED

AssuranceGoalStatusPredicted:

type: string

enum:

- FULFILLED

- NOT\_FULFILLED

AssuranceTarget:

type: array

items:

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

#-------- 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: 'genericNrm.yaml#/components/schemas/SubNetwork-Multiple'

ManagedElement:

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

ExternalAmfFunction:

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

ExternalNrfFunction:

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

ExternalNssfFunction:

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

AmfSet:

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

AmfRegion:

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

Configurable5QISet:

$ref: 'genericNrm.yaml#/components/schemas/Configurable5QISet-Multiple'

Dynamic5QISet:

$ref: 'genericNrm.yaml#/components/schemas/Dynamic5QISet-Multiple'

AssuranceClosedControlLoop:

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

ManagedElement-Single:

allOf:

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

- type: object

properties:

attributes:

allOf:

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

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

- type: object

properties:

AmfFunction:

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

SmfFunction:

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

UpfFunction:

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

N3iwfFunction:

$ref: 'genericNrm.yaml#/components/schemas/N3iwfFunction-Multiple'

PcfFunction:

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

AusfFunction:

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

UdmFunction:

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

UdrFunction:

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

UdsfFunction:

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

NrfFunction:

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

NssfFunction:

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

SmsfFunction:

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

LmfFunction:

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

NgeirFunction:

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

SeppFunction:

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

NwdafFunction:

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

ScpFunction:

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

NefFunction:

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

Configurable5QISet:

$ref: 'genericNrm.yaml#/components/schemas/Configurable5QISet-Multiple'

Dynamic5QISet:

$ref: 'genericNrm.yaml#/components/schemas/Dynamic5QISet-Multiple'

AssuranceClosedControlLoop:

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

SubNetwork-ncO:

type: object

properties:

ManagementNode:

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

MeContext:

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

PerfMetricJob:

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

ThresholdMonitor:

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

NtfSubscriptionControl:

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

TraceJob:

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

AlarmList:

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

AssuranceClosedControlLoop:

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

ManagedElement-ncO:

type: object

properties:

PerfMetricJob:

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

ThresholdMonitor:

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

NtfSubscriptionControl:

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

TraceJob:

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

AlarmList:

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

AssuranceClosedControlLoop:

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

AssuranceClosedControlLoop-Single:

allOf:

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

- type: object

properties:

attributes:

type: object

oneOf:

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

- type: object

properties:

operationalState:

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

administrativeState:

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

closedControlLoopLifeCyclePhase:

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

assuranceGoalList:

type: array

items:

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

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

- type: object

properties:

operationalState:

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

administrativeState:

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

closedControlLoopLifeCyclePhase:

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

assuranceGoalList:

type: array

items:

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

AssuranceClosedControlLoop-Multiple:

type: array

items:

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

AssuranceGoal:

allOf:

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

- type: object

properties:

attributes:

allOf:

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

- type: object

properties:

observationTime:

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

assuranceTargetList:

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

assuranceGoalStatusObserved:

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

assuranceGoalStatusPredicted:

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

serviceProfileId:

$ref: 'sliceNrm.yaml#/components/schemas/ServiceProfileId'

sliceProfileId:

$ref: 'sliceNrm.yaml#/components/schemas/SliceProfileId'

networkSlice:

$ref: 'sliceNrm.yaml#/components/schemas/NetworkSlice'

networkSliceSubnet:

$ref: 'sliceNrm.yaml#/components/schemas/NetworkSliceSubnet'

#------------ Definitions in TS 28.541 for TS 28.623 -----------------------------

resources-coslaNrm:

oneOf:

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

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