**3GPP TSG-SA5 Meeting #133-e *S5-205244***

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

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.536** | **CR** | **0012** | **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 | | | | | | | | | |
| ***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:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **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".

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| **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, SubNetwork | SubNetwork |
| TS 28.541 [6], IOC, NetworkSlice | NetworkSlice |
| TS 28.541 [6], IOC, NetworkSliceSubnet | NetworkSliceSubnet |
| TS 28.541 [6], dataType, ServiceProfile | ServiceProfile |
| TS 28.541 [6], dataType, SliceProfile | SliceProfile |

#### 4.1.2.2 Class diagram

#### 4.1.2.2.1 Relationships

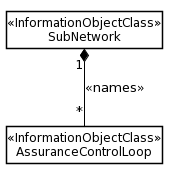


Figure 4.1.2.2.1.1: Assurance management NRM fragment

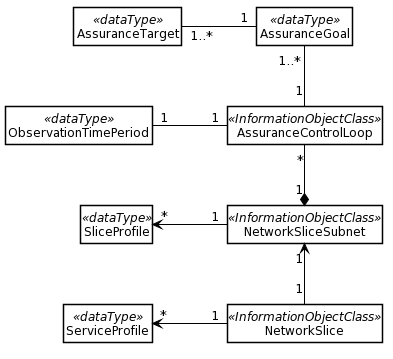


Figure 4.1.2.2.1.1: Assurance management for NetworkSlice and NetworkSliceSubnet NRM fragment

#### 4.1.2.2.2 Inheritance

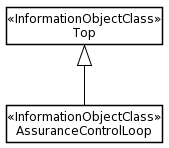


Figure 4.1.2.2.2.1: Assurance management inheritance relationships

#### 4.1.2.3 Class definitions

##### 4.1.2.3.1 AssuranceControlLoop

4.1.2.3.1.1 Definition

This IOC represents the capabilities of a control loop, these include:

- to automatically adjust the resources associated with a NetworkSlice or NetworkSliceSubnet to meet the objectives described in AssuranceGoal

- state management of an AssuranceControlLoop

- to keep track of the lifecycle of an AssuranceControlLoop

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 |
| observationTimePeriod | M | T | T | F | T |
| assuranceGoalList | M | T | F | F | T |
| Attribute related to role |  |  |  |  |  |
| networkSliceSubnetRef | M | T | F | 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 <<dataType>>

4.1.2.3.2.1 Definition

This data type 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 this data type represents a list of assurance targets.

4.1.2.3.2.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| assuranceGoalId | M | T | F | T | T |
| assuranceTargetList | M | T | F | F | T |
|  |  |  |  |  |  |
| **Attribute related to role** |  |  |  |  |  |
| sliceProfileIdRef | CM | T | F | F | T |
| serviceProfileIdRef | CM | T | F | F | T |

.

4.1.2.3.2.3 Attribute constraints

|  |  |
| --- | --- |
| Name | Definition |
| sliceProfileIdRef | Condition: the AssuranceGoal applies to a NetworkSliceSubNet |
| serviceProfileIdRef | 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>> using this <<dataType>> as one of its attributes, shall be applicable.

##### 4.1.2.3.3 AssuranceTarget <<dataType>>

4.1.2.3.3.1 Definition

This data type represents a single attribute and its value that are included in an AssuranceGoal.

4.1.2.3.3.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| assuranceTargetName | M | T | F | F | T |
| assuranceTargetValue | M | T | F | F | T |

4.1.2.3.3.3 Attribute constraints

No constraints have been defined for this document.4.1.2.3.3.4 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.

##### 4.1.2.3.4 ObservationTimePeriod <<dataType>>

4.1.2.3.4.1 Definition

This datatype represents the time interval that the achievement of the goal’s objective is observed which can be specified in seconds, minutes, hours or days..

4.1.2.3.4.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| observationTime | M | T | T | F | T |
| timeUnit | M | T | T | F | T |

4.1.2.3.3.3 Attribute constraints

No constraints have been defined for this document.

4.1.2.3.3.4 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: None  isNullable: False |
| assuranceTargetName | The name of the attribute which is part of a key-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 key-value-pair in the AssuranceGoal | type: Number  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: Target  multiplicity: 1..\*  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
| assuranceGoalId | A unique identifier of the assurance goal that should be supported by the AssuranceControlLoop. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: True |
|  |  |  |
| observationTime | It indicates the observation time expressed in number of timeUnits. | type: Integer  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| timeUnit | It indicates the unit of time used to express the observationTime  AllowedValues: second, minute, hour, day | type: ENUM  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| sliceProfileIdRef | This holds a reference to a SliceProfile subject to assurance requirements relating to the NetworkSliceSubnet instance. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| serviceProfileIdRef | This holds a reference to a ServiceProfile subject to assurance requirements relating to the NetworkSliceSubnet instance. | type: String  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: None  isNullable: False |
| assuranceGoalList | It is an attribute of an AssuranceControlLoop containing a list of AssuranceGoals. | type: AssuranceGoal  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: None  allowedValues: N/A  isNullable: False |
| administrativeState | It indicates the administrative state of the assurance control. 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: None  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.

##### 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.

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| **Second change** |

# B.2 Solution Set (SS) definitions

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

openapi: 3.0.3

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:

anyOf:

- type: string

enum:

- PREPARATION

- COMMISSIONING

- OPERATION

- DECOMMISSIONING

OperationalState:

anyOf:

- type: string

enum:

- ENABLED

- DISABLED

AdministrativeState:

anyOf:

- type: string

enum:

- LOCKED

- UNLOCKED

ObservationTimePeriod:

allOf:

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

- type: object

properties:

observationTime:

type: integer

timeUnit:

anyOf:

- type: string

enum:

- SECOND

- MINUTE

- HOUR

- DAY

AssuranceGoalList:

type: array

items:

type: object

properties:

assuranceGoalId:

type: string

assuranceTargetList:

type: array

items:

type: object

properties:

assuranceTargetName:

type: string

assuranceTargetValue:

type: number

serviceProfileRef:

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

sliceProfileRef:

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

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

AssuranceControlLoop:

allOf:

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

- type: object

properties:

operationalState:

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

administrativeState:

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

controlLoopLifeCyclePhase:

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

observationTimePeriod:

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

assuranceGoalList:

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

networkSliceSubnetRef:

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

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

resources-coslaNrm:

oneOf:

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