**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 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 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, 4.1.2.3.2.44.1.2.3.3, 4.1.2.3.3.1, 4.1.2.3.3.2, 4.1.2.3.3.3, 4.1.2.3.3.44.1.2.3.4, 4.1.2.3.4.1, 4.1.2.3.4.44.1.2.4.1, 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:*** |  |
|  |  |
| ***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



Figure 4.1.2.2.1.1: Assurance management for NetworkSliceSubnet

#### 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 monitor the adjustments of the resources associated with a NetworkSlice or NetworkSliceSubnet in order to meet the objectives described in AssuranceGoalList

- state management of an AssuranceControlLoop

- to keep track of the lifecycle of an AssuranceControlLoop

An AssuranceControlLoop includes the observationTimePeriod

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 |
| activeTimePeriod | M | T | T | F | T |
| assuranceGoalList | 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.

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 |
| 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 ActiveTimePeriod <<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. The ActiveTimePeriod is a characteristic of an AssuranceControlLoop. .

Editor’s Note: the use of other values expressing units larger than days or smaller than seconds (i.e. ms) is FFS

NOTE: The same ActiveTimePeriod applies to all AssuranceGoalLists associated with the same AssuranceGoal

4.1.2.3.4.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| activeTime | 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: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
|  |  |  |
| assuranceTargetName | The name of the attribute which is part of a key-value-pair in the AssuranceGoal | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| assuranceTargetValue | The value of the attribute which is part of a key-value-pair in the AssuranceGoal | type: Numbermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| assuranceTargetList | This is an attribute containing a list of key-value-pairs that are part of an AssuranceGoal | type: Targetmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| assuranceGoalId | A unique identifier of the assurance goal that should be supported by the AssuranceControlLoop. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
|  |  |  |
| activeTime | It indicates the observation time expressed in number of timeUnits.  | type: Integer multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| timeUnit | It indicates the unit of time used to express the activeTimeAllowedValues: second, minute, hour, dayEditor’s note: the use of other values expressing units larger than days or smaller than seconds (i.e. ms) is FFS | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| sliceProfileIdRef | This holds a reference to a SliceProfile subject to assurance requirements relating to the NetworkSliceSubnet instance. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| serviceProfileIdRef | This holds a reference to a ServiceProfile subject to assurance requirements relating to the NetworkSliceSubnet instance. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
|  |  |  |
|  |  |  |
| assuranceGoalList | It is an attribute of an AssuranceControlLoop containing a list of AssuranceGoals. | type: AssuranceGoal multiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: 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: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: 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: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: 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: 3.0.3

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

 ActiveTimePeriod:

 allOf:

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

 - type: object

 properties:

 activeTime:

 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'

 activeTimePeriod:

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

 assuranceGoalList:

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

 networkSliceSubnet:

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

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

 resources-coslaNrm:

 oneOf:

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