**3GPP TSG-SA5 Meeting #139-e *S5-215652***

**Online, , 11th Oct 2021 - 20th Oct 2021**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.536** | **CR** | **0035** | **rev** | **-** | **Current version:** | **17.0.0** |  |
|  |
| *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:***  | Rel-17 CR 28.536 Focused ACCL |
|  |  |
| ***Source to WG:*** | Samsung Research America |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | eCOSLA |  | ***Date:*** | 2021-09-30 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***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 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:*** | This contribution provides the solution for use case of “Targeted Assurance Closed Control Loop” present in S5-213674 (Approved DraftCR for 28.535). The following requirement will be taken care of with this contribution.**REQ-CSA-CON-XX3** The 3GPP Management System shall have the ability to provide SLS assurance within a particular location. |
|  |  |
| ***Summary of change:*** | Introducing the new <<dataType>> called assuranceFocus providing the targated location for the ACCL. |
|  |  |
| ***Consequences if not approved:*** | Incomplete solution. |
|  |  |
| ***Clauses affected:*** | 4.1.2.3.2.2, 4.1.2.3.x (new section), 4.1.2.4.1 |
|  |  |
|  | **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:*** | Forge Link: https://forge.3gpp.org/rep/sa5/MnS/commits/S5-215096\_Rel-17\_CR\_28.536\_Focused\_ACCL |
|  |  |
| ***This CR's revision history:*** |  |

|  |
| --- |
| **First modification** |

# 4 Communication service assurance service

## 4.1 Stage 2

### 4.1.1 Void

### 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 |

##### 4.1.2.1.2 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 28.541 [6], attribute, serviceProfileId | serviceProfileId |
| TS 28.541 [6], attribute, sliceProfileId | sliceProfileId |
| TS 28.541 [6], attribute, taiList | taiList |

#### 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.



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 class represents the information for controlling and monitoring an assurance closed control loop associated with a NetworkSlice or NetworkSliceSubnet. It can be name-contained by SubNetwork or ManagedElement.

To express the assurance closed control loop requirements, the MnS consumer needs to request MnS producer to create an AssuranceClosedControlLoop on the MnS producer. The MnS producer may trigger to create the AssuranceClosedControlLoop as well, for example, when an instance of NetworkSlice or NetworkSliceSubnet is created, MnS producer may create an instance of AssuranceClosedControlLoop associated to the instance of NetworkSlice or NetworkSliceSubnet to assure the target described in ServiceProfile or SliceProfile. For ultimate deletion of assurance closed control loop, the MnS consumer needs to request the MnS producer to delete the AssuranceClosedControlLoop to free up resources on the MnS producer. MnS producer also can trigger to delete AssuranceClosedControlLoop to free up resources by itself.

For temporary deactivation of assurance closed control loop, the MnS consumer can manipulate the value of the administrative state attribute to “LOCKED”. The MnS producer may disable assurance closed control loop as well, for example in conflict situations. This situation is indicated by the MnS producer with setting the operational state attribute to “disabled”. When closed control loop is enabled by the MnS producer the operational state is set again to “enabled”. For activation of assurance closed control loop, the MnS consumer can manipulate the value of the administrative state attribute to “UNLOCKED”.

An AssuranceClosedControlLoop can name-contain multiple instances of AssuranceGoal which represents the assurance goal and corresponding observed or predicted goal fulfilment information (see clause 4.1.2.3.2).

The attribute “controlLoopLifeCyclePhase” is used to keep track of the lifecycle of an AssuranceClosedControlLoop

4.1.2.3.1.2 Attributes

The AssuranceClosedControlLoop IOC includes attributes inherited from Top IOC (defined TS 28.622[5]) and the following 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 IOC represents assurance goal and corresponding observed or predicted goal fulfilment information.

To express a new assurance goal for the assurance closed control loop, the MnS consumer needs to request the MnS producer to create an instance of AssuranceGoal. MnS producer can also trigger the creation of an instance of AssuranceGoal. For example, when a new instance NetworkSLice or NetworkSliceSubnet is created on the MnS producer and the corresponding SLS needs to be assured, a new instance of AssuranceGoal needs to be created and associated to the new instance NetworkSLice or NetworkSliceSubnet by configuring the attribute “networkSliceRef” or “networkSliceSubnetRef” and corresponding attribute “serviceProfileId” and “sliceProfileId“.

The attribute “assuranceTargetList” defines a list of assurance targets (the subset of attributes (typically characteristics attributes) from an SLS, i.e. a ServiceProfile or a SliceProfile, that are subject to assurance requirements.) that should be assured by the AssuranceClosedControlLoop. The attribute “assuranceTargetList” is configured by MnS producer based on the specified ServiceProfile or SliceProfile.

To obtain the observed predicted status of the the goal fulfilment information, the MnS consumer can query the attribute “AssuranceGoalStatusObserved” and “AssuranceGoalStatusPredicted”from MnS producer. The attribute “AssuranceGoalStatusObserved” and “AssuranceGoalStatusPredicted” is configured by MnS producer at the end of an observation period. The observation period is assigned by MnS consumer through requsting the MnS producer to set attribute “observationTime”.. The status of the goal fuilfilment is considered FULFILLED if all the constituent target are FULFILLED.

NOTE: Multiple instances of AssuranceGoal can be created for a single instance of NetworkSlice or NetworkSliceSubnet.

4.1.2.3.2.2 Attributes

The AssuranceGoal IOC includes attributes inherited from Top IOC (defined TS 28.622[5]) and the following attributes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| assuranceTargetList | M | T | F | 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 |
| assuranceScope | O | T | F | F | T |
| **Attributes related to role** |  |  |  |  |  |
| networkSliceRef | CM | T | T | F | T |
| networkSliceSubnetRef | CM | T | T | 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 |
| networkSliceSubnetRef | Condition: the AssuranceGoal applies to a NetworkSliceSubNet |
| networkSliceRef | Condition: the AssuranceGoal applies to a NetworkSlice |

4.1.2.3.2.4 Notifications

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

##### 4.1.2.3.3 Void

##### 4.1.2.3.4 Void

##### 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. The AssuranceTarget include the status of the target fulfilment.

4.1.2.3.5.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| assuranceTargetName | M | T | F | F | T |
| assuranceTargetValue | M | T | F | F | T |
| AssuranceTargetStatusObserved | O | T | F | F | T |
| AssuranceTargetStatusPredicted | O | 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 clause 4.1.2.5 are valid for the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

##### 4.1.2.3.x AssuranceScope <<dataType>>

4.1.2.3.x.1 Definition

It indicates the target for assurance goal in terms of location. A particular ACCL can target for a particular location. The assurance goal status is ascertained based on the appropriately collected performance measurements as per the target location.

4.1.2.3.x.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| taiList | O | T | T | F | T |

4.1.2.3.x.3 Attribute constraints

No constraints have been defined for this document.

4.1.2.3.x.4 Notifications

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

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#### 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 AssuranceClosedControlLoop instance. AllowedValues: Preparation, Commissioning, Operation and Decommissioning.  | type: Enummultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NULL isNullable: False |
| assuranceTargetName | The name of the attribute which is part of AssuranceTarget.The assuranceTargetName shall be equal to the name of an attribute in the relevant ServiceProfile or SliceProfile. The relevant ServiceProfile or SliceProfile is identified by the attribute serviceProfileId or sliceProfileId in the AssuranceGoal. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| assuranceTargetValue | The value of the attribute which is part of AssuranceTarget | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| assuranceTargetList | This is an attribute containing a list of AssuranceTarget(s) that are part of an AssuranceGoal | type: AssuranceTargetmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| observationTime | It indicates the time duration over which an AssuranceGoal is observed. The observation time is expressed in seconds. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| assuranceGoalStatusObserved | It holds the status of the observed goal fulfilment to the assuranceGoal. The value is FULFILLED only if all the constituent assuranceTargetStatusObserved are FULFILLED.allowedValues: "FULFILLED", “NOT\_FULFILLED  | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| assuranceGoalStatusPredicted | It holds the status of the predicted future goal fulfilment to the assuranceGoal . The value is FULFILLED only if all the constituent assuranceTargetStatusPredicted are FULFILLED.allowedValues: "FULFILLED", “NOT\_FULFILLED" | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| assuranceTargetStatusObserved | It holds the status of the observed target fulfilment to the assuranceGoal. allowedValues: "FULFILLED", “NOT\_FULFILLED  | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| assuranceTargetStatusPredicted | It holds the status of the predicted future target fulfilment to the assuranceGoal allowedValues: "FULFILLED", “NOT\_FULFILLED" | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| networkSliceRef | It holds the reference to the NetworkSlice instance subject to assurance requirements | type: Dnmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| networkSliceSubnetRef | It holds the reference to the NetworkSliceSubnet instance subject to assurance requirements | type: Dnmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| operationalState | It indicates the operational state of the AssuranceClosedControlLoop instance. It describes whether the resource is installed and partially or fully operable (Enabled) or the resource is not installed or not operable (Disabled).Allowed values; Enabled/DisabledallowedValues: "ENABLED", "DISABLED".The meaning of these values is as defined in 3GPP TS 28.625 [14] and ITU-T X.731 [15]. | type: ENUM multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: DisabledallowedValues: Enabled, DisabledisNullable: False |
| administrativeState | It indicates the administrative state of the AssuranceClosedControlLoop instance. It describes the permission to use or the prohibition against using the AssuranceClosedControlLoop instance. The administrative state is set by the MnS consumer. Allowed values; Locked/UnlockedallowedValues: "LOCKED", "UNLOCKED".The meaning of these values is as defined in 3GPP TS 28.625 [14] and ITU-T X.731 [15]. | type: ENUM multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: LockedallowedValues: Locked, UnlockedisNullable: False |
| assuranceScope | It indicates the target for assurance goal in terms of a particular location.Allowed values: Not Applicable | type: AssuranceScope multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NAallowedValues: NAisNullable: False |
|  |  |  |
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|  |  |  |
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|  |  |  |
| NOTE 1: VoidNOTE 2: Void |

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| --- |
| **Second modification** |

# 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; Cosla 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:

 type: integer

 AssuranceGoalStatusObserved:

 type: string

 enum:

 - FULFILLED

 - NOT\_FULFILLED

 AssuranceGoalStatusPredicted:

 type: string

 enum:

 - FULFILLED

 - NOT\_FULFILLED

 AssuranceTargetStatusObserved:

 type: string

 enum:

 - FULFILLED

 - NOT\_FULFILLED

 AssuranceTargetStatusPredicted:

 type: string

 enum:

 - FULFILLED

 - NOT\_FULFILLED

 AssuranceTarget:

 type: object

 properties:

 assuranceTargetName:

 type: string

 assuranceTargetValue:

 type: string

 assuranceTargetStatusObserved:

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

 assuranceTargetStatusPredicted:

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

 AssuranceTargetList:

 type: array

 items:

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

 AssuranceScope:

 type: object

 properties:

 taiList:

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

#-------- 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:

 AssuranceClosedControlLoop:

 $ref: '#/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:

 AssuranceClosedControlLoop:

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

 AssuranceClosedControlLoop-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 type: object

 properties:

 operationalState:

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

 administrativeState:

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

 controlLoopLifeCyclePhase:

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

 AssuranceGoal:

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

 AssuranceGoal-Single:

 allOf:

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

 - type: object

 properties:

 attributes:

 allOf:

 - type: object

 properties:

 observationTime:

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

 assuranceTargetList:

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

 assuranceGoalStatusObserved:

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

 assuranceGoalStatusPredicted:

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

 assuranceScope:

 $ref: '#/components/schemas/AssuranceScope' serviceProfileId:

 type: string

 sliceProfileId:

 type: string

 networkSliceRef:

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

 networkSliceSubnetRef:

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

#-------- Definition of JSON arrays for name-contained IOCs ----------------------

 AssuranceClosedControlLoop-Multiple:

 type: array

 items:

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

 AssuranceGoal-Multiple:

 type: array

 items:

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

#------------ Definitions in TS 28.536 for TS 28.623 -----------------------------

 resources-coslaNrm:

 oneOf:

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

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

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

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

***End of changes***