**3GPP TSG-SA5 Meeting #139-e *S5-215112***

**e-meeting, 11 - 20 October 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.536** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.0.0** |  |
|  |
| *For* [***HE******LP***](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:***  | Input to draftCR Add assurance report for closed control loop |
|  |  |
| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | eCOSLA |  | ***Date:*** | 2021-09-26 |
|  |  |  |  |  |
| ***Category:*** | **C** |  | ***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:*** | AssuranceGoal represents the subset of attributes (typically characteristics attributes) from an SLS, i.e. a ServiceProfile or a SliceProfile, that are subject to assurance requirements. It is used for the ACCL MnS consumer to input goals for the MnS producer. Assurance goal fulfilment status represents the status of the Assurance goal for the observationTime, i.e. AssuranceGoalStatusObserved and AssuranceGoalStatusPredicted in this release of specification. It is used for the ACCL MnS consumer to observe/monitor the status of the fulfilment of the AssuranceGoal and should be considered as report information of an ACCL. The AssuranceGoal should be used as input information for the MnS consumer. However, the Assurance goal fulfilment status is the information generated by the ACCL as output information for monitoring for the MnS consumer. Similar handling could be applied to AssuranceTargetStatusObserved and AssuranceTargetStatusPredicted |
|  |  |
| ***Summary of change:*** | Introduce AssuranceReport IOC to accommodate the Assurance goal fulfilment status and the Assurance target fulfilment status of a closed control loop. |
|  |  |
| ***Consequences if not approved:*** | From the ACCL MnS consumer perspective, the input information and output information of an ACCL was mixed up. It also lacks flexibility for future extention. |
|  |  |
| ***Clauses affected:*** | 4.1.2.2.1, 4.1.2.2.2, 4.1.2.3.1.1, 4.1.2.3.2.2, 4.1.2.3.l (new), 4.1.2.3.m (new), 4.1.2.3.x (new), 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:*** | This is input to the Rel-17 28.536 DraftCR for eCOSLA |
|  |  |
| ***This CR's revision history:*** |  |

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| **1st of changes** |

### 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 |

#### 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 attributes “networkSliceRef” or “networkSliceSubnetRef” and corresponding attributes “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.

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 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **Attributes related to role** |  |  |  |  |  |
| networkSliceRef | CM | T | T | F | T |
| networkSliceSubnetRef | CM | T | T | F | T |

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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.

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 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

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.l AssuranceGoalStatus <<dataType>>

4.1.2.3.l.1 Definition

This data type represents the observed and/or predicted AssuranceGoal fulfilment status.

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 targets are FULFILLED.

4.1.2.3.m.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
|  |  |  |  |  |  |
| assuranceGoalStatusId | M | T | F | F | T |
| assuranceGoalStatusObserved | O | T | F | F | T |
| assuranceGoalStatusPredicted | O | T | F | F | T |

4.1.2.3.l.3 Attribute constraints

No constraints have been defined for this document.

4.1.2.3.l.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.m AssuranceTargetStatus <<dataType>>

4.1.2.3.m.1 Definition

This data type represents the observed and/or predicted target fulfilment status.

To obtain the observed predicted status of the the target fulfilment information, the MnS consumer can query the attributes “AssuranceTargetStatusObserved” and “AssuranceTargetPredicted” from MnS producer. The attributes “AssuranceTargetStatusObserved” and “AssuranceTargetStatusPredicted” are 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 target fuilfilment is considered FULFILLED if all the constituent target are FULFILLED.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
|  |  |  |  |  |  |
| assuranceTargetStatusId | M | T | F | F | T |
| assuranceTargetStatusObserved | O | T | F | F | T |
| assuranceTargetStatusPredicted | O | T | F | F | T |

4.1.2.3.m.3 Attribute constraints

No constraints have been defined for this document.

4.1.2.3.m.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 AssuranceReport <<IOC>>

4.1.2.3.x.1 Definition

This class represents the attributes (typically characteristics attributes) of assurance report, e.g, the information about one or multiple AssuranceGoalStatus and one or multiple AssuranceTargetStatus.

The attribute “assuranceGoalStatusList” defines a list of AssuranceGoalStatus.The attribute “assuranceTargetStatusList” defines a list of AssuranceTargetStatus.

4.1.2.3.x.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | Support Qualifier | isReadable | isWritable | isInvariant | isNotifyable |
| assuranceGoalStatusList | O | T | F | F | T |
| assuranceTargetStatusList | O | T | F | 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 subclause 4.1.2.5 are valid for this IOC, without exceptions or additions.

#### 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 |
|  |  |  |
| assuranceGoalStatusId | The indication of the AssuranceGoalStatus. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
|  |  |  |
| assuranceTargetStatusId | The indication of the AssuranceTargetStatus. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| assuranceGoalStatusList | This is an attribute containing a list of assuranceGoalStatus | type: AssuranceGoalStatusmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| assuranceTargetStatusList | This is an attribute containing a list of assuranceTargetStatus | type: AssuranceTargetStatusmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| NOTE 1: VoidNOTE 2: Void |

##### 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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|  |

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| --- |
| **End of changes** |