**3GPP TSG-SA5 Meeting #154 *S5-242205***

Changsha, China, 15 – 19 April 2024

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** | **1** | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** | Rel-19 CR TS 32.160 Fix the template for NRM to avoid confusion | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | China Telecom Corporation Ltd.,Nokia, Nokia Shanghai Bell, Ericsson, Deutsche Telekom | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI19 | | | | |  | ***Date:*** | | | 2024-04-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **C** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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 management service template has been used for a few releases and from feedback received from users of this document some small updates and improvements are proposed. As discussed at last meeting, the discription and example for NRM attribute constraints table in TS 32.160 may cause confusion.  When applicable, the CM/CO constraints information has been specified in attribute table, hence there is no need to repeat it in the attribute constraints table with the same information. So the template needs to be fixed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | W4.2.1 in practice not all datatypes are always shown in the UML class diagram. This is reflected in the text.  W4.3.a.1 this table is optional and in practice it is not used, the tabel and associated text is removed.  W4.3.a.3 the support qualifier information is duplicated from the attribute table potentially leading to conflicts and it removed. The description is extended to state that the definition of a constratint shall include information whether the condition is evaluated at design-time or at deployment time,  W4.3.a.4 and W4.6.2 the 32.302 is an IRP specification and the information described is also described in 28.532 which is MnS specification, therefore the better reference is 28.532.  2 the reference to 32.302 becomes obsolete as it is proposed to be changed to 28.532 (2 instances). | | | | | | | | |
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| ***Consequences if not approved:*** | | Potential for incompatible implementation if guidelines are not clear. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 5.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

**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] 3GPP TS 28.533: "Management and orchestration; Architecture framework".

[3] 3GPP TS 32.156: "Telecommunication management; Fixed Mobile Convergence (FMC) Model Repertoire"

[4] ITU-T Recommendation M.3020 (07/2017): "Management interface specification methodology".

[5] 3GPP TR 21.801: "Specification drafting rules".

[6] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[7] 3GPP TS 28.541: "Management and orchestration; 5G Network Resource Model (NRM); Stage 2 and stage 3".

[8] Void

[9] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[10] ITU-T Recommendation M.3020 (07/2011): "Management interface specification methodology" – Annex E "Information type definitions – type repertoire".

[11] IETF RFC 8407: "Guidelines for Authors and Reviewers of Documents Containing YANG Data Models, October 2018".

[12] 3GPP TS 28.532: " Management and orchestration; Generic management services"

[13] IETF RFC 8528: "YANG Schema mount "

[14] OpenAPI: "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.1.md>.

[15] draft-wright-json-schema-01 (October 2017): "JSON Schema: A Media Type for Describing JSON Documents".

[16] draft-wright-json-schema-validation-01 (October 2017: "JSON Schema Validation: A Vocabulary for Structural Validation of JSON".

[17] draft-wright-json-schema-hyperschema-01 (October 2017): "JSON Hyper-Schema: A Vocabulary for Hypermedia Annotation of JSON.

[18] IETF RFC 7950: "The YANG 1.1 Data Modeling Language, August 2016".

[19] [IETF RFC 8525](https://www.rfc-editor.org/rfc/rfc8525): " YANG Library".

[20] 3GPP TS 28.623: “Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions”

**First change**

## 5.2 Template for NRM

W4 Model

W4.1 Imported and associated information entities

W4.1.1 Imported information entities and local labels

*This clause identifies a list of information entities (e.g. information object class, datatype, interface, attribute) that have been defined in other specifications and that are imported in the present (target) specification. All imported entities shall be treated as if they are defined locally in the target specification. One usage of import is for inheritance purpose.*

*Each element of this list is a pair (label reference, local label). The label reference contains the name of the original specification where the information entity is defined, the information entity type and its name. The local label contains the name of the information entity that appears in the target specification, and the entity name in the local label shall be kept identical to the name defined in the original specification. The local label may then be used throughout the target specification instead of that which appears in the label reference.*

*This information is provided in a table. An example of such a table is given here below:*

|  |  |
| --- | --- |
| Label reference | Local label |
| TS 28.622 [6], information object class, Top | Top |
| TS 28.541 [7] information object class NSI | NSI |

W4.1.2 Associated information entities and local labels

*This clause identifies a list of information entities (e.g. information object class, interface, attribute) that have been defined in other specifications and that are associated with the information entities defined in the present (target) specification. For the associated information entity, only its properties (e.g., DN (see TS 32.156 [3]), attribute (see TS 32.156 [3]) of an instance of the associated information entity) used as associated information needs to be supported locally in the target specification.*

*Each element of this list is a pair (label reference, local label). The label reference contains the name of the original specification where the information entity is defined, the information entity type and its name. The local label contains the name of the information entity that appears in the target specification. The local label may then be used throughout the target specification instead of that which appears in the label reference.*

*This information is provided in a table. An example of such a table is given here below:*

|  |  |
| --- | --- |
| Label reference | Local label |
| TS 28.541 [7], IOC, GNBDUFunction | GNBDUFunction |

W4.2 Class diagram

W4.2.1 Relationships

*This first set of diagrams represents all classes and datatypes defined with all their relationships, including relationships with imported information entities (if any). These diagrams shall contain class cardinalities (for associations as well as containment relationships) and may also contain role names. These shall be UML compliant class diagrams (see also TS 32.156 [3]).*

*Characteristics (attributes, relationships) of imported information entities need not to be repeated in the diagrams. Allowable classes are specified in TS 32.156 [3].*

*Use this as the first paragraph: "*This clause depicts the set of classes (e.g. IOCs) that encapsulates the information relevant for this MnS. This clause provides an overview of the relationships between relevant classes in UML. Subsequent clauses provide more detailed specification of various aspects of these classes."

W4.2.2 Inheritance

*This second set of diagrams represents the inheritance hierarchy of all classes defined in this specification. These diagrams do not need to contain the complete inheritance hierarchy but shall at least contain the parent classes of all classes defined in the present document. By default, a class inherits from the class "top".*

*Characteristics (attributes, relationships) of imported classes need not to be repeated in the diagrams.*

*NOTE: some inheritance relationships presented in clause W4.2.2 may be repeated in clause W4.2.1 to enhance readability.*

*Use "*This subclause depicts the inheritance relationships." *as the first paragraph.*

W4.3 Class definitions

*Each class, with its stereotype name, is defined using the following structure.*

*Inherited items (attributes etc.) shall not be shown, as they are defined in the parent class(es) and thus valid for the subclass.*

W4.3.a ClassName <<StereotypeName>>

*StereotypeName is mandatory to be included in the clause header, except for the stereotype Information Object Class, for which it shall not be included in the clause header.*

*An example of a Class is Subnetwork of stereotype Information Object Class. The heading of sub-clause W4.3.a for SubNetwork would look as follows:*

*W4.3.a SubNetwork*

*An example of a Class is SliceProfile of stereotype data type. The heading of W4.3.a for SliceProfile would look as follows:*

*W4.3.a SliceProfile <<dataType>>*

*The various stereotypes can be found in TS 32.156 [3].*

*The "a" represents a number, starting at 1 and increasing by 1 with each new definition of a class.*

W4.3.a.1 Definition

*This clause is written in natural language. The <definition> clause refers to the class itself.*

*Classes (and datatypes) have a lifecycleStatus property as defined by [3] clause 5.2.A. If and only if the lifecycleStatus is not current (its default value), that shall be indicated in this clause.*

*Optionally, information on traceability back to one or more requirements supported by this class may be defined here, in the following form:*

|  |  |  |
| --- | --- | --- |
| Referenced TS | Requirement label | Comment |
| TS 28.xyz [xy] | REQ-SM-CON-23 | *Optional clarification* |
| TS 28.xyz [xy] | REQ-SM-FUN-11 | *Optional clarification* |

W4.3.a.2 Attributes

*This clause presents the list of attributes, which are the manageable properties of the class. Each attribute is characterised by some of the attribute properties (see TS 32.156 [3]), i.e. supportQualifier (abbreviated by S), isReadable, isWritable, isInvariant and isNotifyable.*

*The legal values and their semantics for attribute properties are defined in TS 32.156 [3].*

*This information is provided in a table.*

*An example below indicates*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| eNodeBId | M | T | F | T | T |

*Another example below indicates that the attribute password1 is not readable, is writable, is not an invariant and no notifyAttributeValueChange will be emitted when the attribute value is changed.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| password1 | O | F | T | F | F |

*Another example below indicates that the attribute password2 and password1 (in example above) have the same qualifiers for the shown properties except that of isReadable. In the case of password1, the standard specification determines the qualifier to be M, i.e. it is readable. In the case of password2, the standard specification does not make a determination. The vendor would make the determination if the attribute is readable or not readable.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| password2 | O | O | T | F | F |

*In case there is one or more attributes related to role (see clause 5.2.9 of TS 32.156 [3]), the attributes related to role shall be specified at the bottom of the table with a divider "Attribute related to role", as shown in the following example:*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute name | S | isReadable | isWritable | isInvariant | isNotifyable |
| aTMChannelTerminationPointid | M | T | F | T | T |
| **…** |  |  |  |  |  |
| **…** |  |  |  |  |  |
| **Attribute related to role** |  |  |  |  |  |
| theATMPathTerminationPoint | M | T | F | F | T |
| theIubLink | M | T | F | F | T |

*This clause shall state "None." when there is no attribute to define.*

W4.3.a.3 Attribute constraints

*This clause presents constraints for the attributes.*

*NOTE: The constraints in this clause are evaluated at product design-time. Attribute usage guidelines described per attribute in the attributes definition clause are evaluated at run-time.*

*This information is provided in a table. An example of such a table is given here below:*

|  |  |
| --- | --- |
| Name | Definition |
| configuredMaxTxPower | Condition: The sector-carrier has a downlink [4]. |
| sNSSAIList | Condition: Network slicing feature is supported [4].  LifecycleStatus of attribute: Deprecated. |

*Attributes have a lifecycleStatus property as defined by [3] clause 5.2.A. If and only if the lifecycleStatus is not current (its default value), that shall be indicated in this table.*

*This clause shall state "None." when there is no attribute constraint to define.*

W4.3.a.4 Notifications

*This clause, for this class, presents one of the following options:*

a) The cla*ss defines (and independent from those inherited) the support of a set of notifications that is identical to that defined in clause W4.5. In such case, use "The common notifications defined in clause W4.5 are valid for this class, without exceptions or additions." as the lone sentence of this clause.*

*b) The class defines (and independent from those inherited) the support of a set of notifications that is a superset of that defined in clause W4.5. In such case, use "The common notifications defined in clause W4.5 are valid for this IOC. In addition, the following set of notification is also valid." as the lone paragraph of this clause. Then, define the ‘additional’ notifications in a table. See clause W4.5 for the notification table format.*

*c) The class defines (and independent from those inherited) the support of a set of notifications that is not identical to, nor a superset of, that defined in clause W4.5. In such case, use "The common notifications defined in clause W4.5 are not valid for this IOC. The set of notifications defined in the following table is valid." as the lone paragraph of this clause. Specify the set of notifications in a table. See clause W4.5 for the notification table format.*

*d) The class does not define (and independent from those inherited) the support of any notification. In such case, use "There is n*o notification defined." as the lone sentence of this clause.

*The notifications identified (i.e. option-a, option-b and option-c above) in this clause are notifications that may be emitted by the MnS producer, where the "object class" and "object instance" parameters of the notification header (see note 2) of these notifications identifies an instance of the class (or its direct or indirect derived class) defined by the encapsulating clause (i.e. clause W4.3.a).*

*The notifications identified (i.e. option-a and option-b above) in this clause, may originate from implementation object(s) whose identifier may or may not be the same as that carried in the notification parameters "object class" and "object instance". Hence the identification of notifications in this clause does not imply nor identify those notifications as being originated from an instance of the class (or its direct or indirect derived class) defined by the encapsulating clause (i.e. clause W4.3.a).*

*This clause shall state "This class does not support any notification." (see option-c) when there is no notification defined for this class. (Note that if its parent class has defined some notifications, the implementation of this class is capable of emitting those inherited defined notifications.)*

*The notification header is defined in TS 28.532 [12].*

*The qualifier of a notification, specified in Notification Table, indicates if an implementation may generate a notification carrying the DN of the subject class.*

*An MnS consumer may receive notification-XYZ that carries DN (the "object class" and "object instance") of class-ABC instance if and only if:*

a) The class-ABC Notification Table defines the notification-XYZ and

b) The class-ABC instance implementation supports this notification-XYZ and

c) An MnS defines the notification-XYZ and

d) The MnS implementation supports this notification-XYZ.

W4.3.a.5 State diagram

*This subclause contains state diagrams. A state diagram of an information object class defines permitted states of this information object class and the transitions between those states. A state is expressed in terms of individual attribute values or a combination of attribute values or involvement in relationships of the information object class being defined. This shall be a UML compliant state diagram.*

*This subclause shall state "None." when there is no State diagram defined.*

W4.5 Attribute definitions

W4.5.1 Attribute properties

*It has a lone paragraph* "The following table defines the properties of attributes that are specified in the present document. ".

*Each information attribute is defined using the following structure.*

*Inherited attributes shall not be shown, as they are defined in the parent class(es) and thus valid for this class.*

*An attribute has properties (see TS 32.156 [3]). Some properties of an attribute are defined in W4.3.a.2 (e.g. Support Qualifier). The remaining properties of an attribute (e.g. documentation, default value) are defined here.*

*The information is provided in a table. In case a) attributes of the same name are specified in more than one class and b) the attributes have different properties, then the attribute names (first column) should be prefixed with the class name followed by a period.*

*An example is given below:*

| Attribute Name | Documentation and Allowed Values | Properties |
| --- | --- | --- |
| xyzId | It identifies …  allowedValues: … | type: Integer  multiplicity: …  isOrdered: …  isUnique: …  defaultValue: …  isNullable: False |
| Abc.state | It indicates …    allowedValues:  "ON": the state is on;  "OFF": the state is off. | type: <<enumeration>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| Zyz.state | It indicates …    allowedValues:  "HIGH": the state is high;  "MEDIUM": the state is medium;  "LOW": the state is low. | type: <<enumeration>>  multiplicity: 1  isOrdered: N/A  isUnique: N/A  defaultValue: False  isNullable: False |
| abc | It defines…  allowedValues: … | type: …  multiplicity: …  isOrdered: …  isUnique: …  defaultValue: …  isNullable: … |

*In case there is one or more attributes related to role (see clause 5.2.9 of TS 32.156 [3]), the attributes related to role shall be specified at the bottom of the table with a divider "Attribute related to role". See example below.*

|  |  |  |
| --- | --- | --- |
| Attribute Name | Documentation and Allowed Values | Properties |
| abc | It defines…  allowedValues: … | type: PlmnId  multiplicity: …  isOrdered: …  isUnique: …  defaultValue: …  isNullable: … |
| **Attribute related to role** |  |  |
| aEnd | It defines…  allowedValues: Values to be conformant to TS 32.300 [9] … | type: DN  multiplicity: …  isOrdered: …  isUnique: …  defaultValue: …  isNullable: False |

*This clause shall state* "*None.*" *if there is no attribute to define.*

W4.5.2 Constraints

*This clause indicates whether there are any constraints affecting attributes. Each constraint is defined by a triplet (propertyName, affectedAttributes, propertyDefinition). PropertyDefinitions are expressed in natural language.*

*An example is given here below:*

|  |  |  |
| --- | --- | --- |
| Name | Affected attribute(s) | Definition |
| inv\_TimerConstraints | ntfTimeTickTimer | The ntfTimeTickTimer is lower than or equal to ntfTimeTick. |

*This clause shall state "None." if there is no constraint.*

W4.6 Common notifications

*This clause presents notifications that may be referred to by any class defined in the specification. This information is provided in tables.*

W4.6.1 Alarm notifications

*The following quoted text shall be copied as the only paragraph of this clause.*

"This clause presents a list of notifications, defined in TS 28.532 [12], that an MnS consumer may receive. The notification header attribute objectClass/objectInstance, defined in TS 28.541 [7], shall capture the DN of an instance of a class defined in the present document."

*The information is provided in a table. The following is an example.*

| Name | S | Notes |
| --- | --- | --- |
| notifyNewAlarm | M | -- |

W4.6.2 Configuration notifications

*The following quoted text shall be copied as the only paragraph of this clause.*

"This clause presents a list of notifications, defined in TS 28.532 [12], that an MnS consumer may receive. The notification header attribute objectClass/objectInstance, defined in TS 28.532 [12], shall capture the DN of an instance of a class defined in the present document."

*The information is provided in a table. The following is an example.*

| Name | S | Notes |
| --- | --- | --- |
| notifyMOIAttributeValueChange | O | -- |
| notifyMOICreation | O | -- |
| notifyMOIDeletion | O | -- |

W4.6.3 Threshold Crossing notifications

*The following quoted text shall be copied as the only paragraph of this clause.*

*"*This clause presents a list of notifications, defined in TS 28.532 [12], that an MnS consumer may receive. The notification header attribute objectClass/objectInstance, defined in TS 28.541 [7], shall capture the DN of an instance of a class defined in the present document."

*The information is provided in a table. The following is an example.*

| Name | S | Notes |
| --- | --- | --- |
| notifyThresholdCrossing | O |  |

**End of changes**