**3GPP TSG-SA5 Meeting #157 *S5-246194***

Hyderabad, India, 14 - 18 October 2024

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| *CR-Form-v12.3* |
| **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:***  | Update Forge link and a few miscellaneous corrections |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | SA5 |
|  |  |
| ***Work item code:*** | TEI18 |  | ***Date:*** | 2024-10-03 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** | Rel-18 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | 1. A few reference issues observed.

> reference to TS 32.161.1. The Forge link shall be updated to latest SA meeting number.
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| ***Summary of change:*** | Update reference accordinglyUpdate Forge link |
|  |  |
| ***Consequences if not approved:*** | Incorrect reference leads to confusion or wrong implementation. |
|  |  |
| ***Clauses affected:*** | 2, E.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:*** | No forge change |
|  |  |
| ***This CR's revision history:*** | Revision of S5-245475 |

***Start of 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 TS 32.101: "Telecommunication management; Principles and high level requirements".

[2] 3GPP TS 32.102: "Telecommunication management; Architecture".

[3] 3GPP TS 32.600: "Telecommunication management; Configuration Management (CM); Concept and high-level requirements".

[4] 3GPP TS 28.622: “Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)”.

[5] Void

[6] Void

[7] Void

[8] Void

[9] Void.

[10] Void

[11] Void

[12] Void

[13] Void

[14] 3GPP TS 32.160: "Management and orchestration; Management Service Template".

[15] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[16] IETF RFC 8528: "YANG Schema Mount".

[17] Management and Orchestration APIs Stage 3 Repository <https://forge.3gpp.org/rep/sa5/MnS/-/tree/Tag_Rel18_SA106/>

[18] RFC 8525: "YANG Library"

[19] RFC 6022: "YANG Module for NETCONF Monitoring"

[20] 3GPP TS 28.533: "Management and orchestration; Architecture framework".

[X] 3GPP TS 32.161: "Management and orchestration; JSON expressions (Jex)".

***Next change***

# E.1 RESTful HTTP-based solution set

**MnS producer specific schema definitions**

The NRM properties supported by a specific MnS producer are specified by MnS producer specific versions of the standardized OpenAPI definition files. These definitions reflect exactly what is supported. The OpenAPI definitions for unsupported properties are removed.

For example, the schema of the Generic NRM as published by 3GPP allows both a "SubNetwork" of type "SubNetwork-Multiple" and a "MangedElement" of type "ManagedElement-Multiple" as roots. A concrete MnS producer has only one root class. Therefore, the schema definitions need to be modified accordingly in the file describing the NRM properties of a concrete MnS producer.

Furthermore, the standardized definition of "SubNetwork-Single" and "ManagedElement-Single" includes all possible name-contained objects. A concrete MnS producer supports in most cases only a subset of those. Unsupported name-containments need to be removed. For example, if "SubNetwork-Single" does not support the Intent NRM, then the following line "$ref: 'TS28312\_IntentNrm.yaml#/components/schemas/SubNetwork-ncO-IntentNrm" needs to be deleted.

When objects, attributes or attribute fields are unsupported, its schema definitions need to be removed.

The MnS producer specific schema of the Generic NRM is always the root schema, that includes references to child schemas in other files, that in turn may reference other schemas, and so forth. It is recommended to locate the root schema at a URI that is composed by appending the path component "/schemas" to the URI specified in "mnsAddress":

<mnsAddress>/schemas

To obtain all NRM properties supported by a MnS producer it is necessary to inspect the root schema and all its descendant schemas.

References in a file may contain a relative path or an absolute path. When a reference has a relative path, the processor shall assume that the referenced file is located at the same address as the file referencing it.

Examples:

The following example shows an excerpt of a file specifying a NRM, that supports the complete Generic NRM and the complete NR NRM. The root class is "SubNetwork".

The schema definition published by 3GPP specifies the allowed root classes.

|  |
| --- |
| NrmRoot: oneOf: - type: object properties: SubNetwork: $ref: '#/components/schemas/SubNetwork-Multiple' - type: object properties: ManagedElement: $ref: '#/components/schemas/ManagedElement-Multiple' |

This definition needs to be modified to produce the following schema definition that allows only "SubNetwork" as root class.

|  |
| --- |
| NrmRoot: type: object properties: SubNetwork: $ref: '#/components/schemas/SubNetwork-Multiple' |

Furthermore, all objects name-contained by "SubNetwork" and "ManagedElement" that are not defined by the NR NRM need to be removed. The excerpt of the schema published by 3GPP may look as follows.

|  |
| --- |
| SubNetwork-Single: allOf: - $ref: '#/components/schemas/Top'  - $ref: '#/components/schemas/SubNetwork-Attr' - $ref: '#/components/schemas/SubNetwork-ncO' - $ref: 'TS28104\_MdaNrm.yaml#/components/schemas/SubNetwork-ncO-MdaNrm' - $ref: 'TS28105\_AiMlNrm.yaml#/components/schemas/SubNetwork-ncO-AiMlNrm' - $ref: 'TS28312\_IntentNrm.yaml#/components/schemas/SubNetwork-ncO-IntentNrm' - $ref: 'TS28317\_RanScNrm.yaml#/components/schemas/SubNetwork-ncO-RanScNrm' - $ref: 'TS28536\_CoslaNrm.yaml#/components/schemas/SubNetwork-ncO-CoslaNrm' - $ref: 'TS28538\_EdgeNrm.yaml#/components/schemas/SubNetwork-ncO-EdgeNrm' - $ref: 'TS28541\_SliceNrm.yaml#/components/schemas/SubNetwork-ncO-SliceNrm' - $ref: 'TS28541\_NrNrm.yaml#/components/schemas/SubNetwork-ncO-NrNrm' - $ref: 'TS28541\_5GcNrm.yaml#/components/schemas/SubNetwork-ncO-5GcNrm'ManagedElement-Single: allOf: - $ref: '#/components/schemas/Top' - $ref: '#/components/schemas/ManagedElement-Attr' - $ref: '#/components/schemas/ManagedElement-ncO' - $ref: 'TS28104\_MdaNrm.yaml#/components/schemas/ManagedElement-ncO-MdaNrm' - $ref: 'TS28105\_AiMlNrm.yaml#/components/schemas/ManagedElement-ncO-AiMlNrm' - $ref: 'TS28536\_CoslaNrm.yaml#/components/schemas/ManagedElement-ncO-CoslaNrm' - $ref: 'TS28541\_NrNrm.yaml#/components/schemas/ManagedElement-ncO-NrNrm' - $ref: 'TS28541\_5GcNrm.yaml#/components/schemas/ManagedElement-ncO-5GcNrm' |

The schema describing the example NRM includes only name-containments from the NR NRM.

|  |
| --- |
| SubNetwork-Single: allOf: - $ref: '#/components/schemas/Top' - $ref: '#/components/schemas/SubNetwork-Attr' - $ref: '#/components/schemas/SubNetwork-ncO' - $ref: 'TS28541\_NrNrm.yaml#/components/schemas/SubNetwork-ncO-NrNrm'ManagedElement-Single: allOf: - $ref: '#/components/schemas/Top' - $ref: '#/components/schemas/ManagedElement-Attr' - $ref: '#/components/schemas/ManagedElement-ncO' - $ref: 'TS28541\_NrNrm.yaml#/components/schemas/ManagedElement-ncO-NrNrm' |

The next example demonstrates how to deal with attributes whose support qualifier is optional and that are not supported by a MnS producer. The "FileDownLoadJob" is a case that has as one optional attribute, the " notificationRecipientAddress". The schema published by 3GPP includes its attribute definition.

|  |
| --- |
| FileDownloadJob-Single: allOf: - $ref: 'TS28623\_GenericNrm.yaml#/components/schemas/Top' - type: object properties: attributes: type: object properties: fileLocation: type: string notificationRecipientAddress: $ref: 'TS28623\_ComDefs.yaml#/components/schemas/Uri' cancelJob: type: string enum: - TRUE - FALSE jobMonitor: $ref: '#/components/schemas/FileDownloadJobProcessMonitor' |

The schema describing what is supported on the MnS producer does not include it.

|  |
| --- |
| FileDownloadJob-Single: allOf: - $ref: 'TS28623\_GenericNrm.yaml#/components/schemas/Top' - type: object properties: attributes: type: object properties: fileLocation: type: string cancelJob: type: string enum: - TRUE - FALSE jobMonitor: $ref: '#/components/schemas/FileDownloadJobProcessMonitor' |

The following example shows possible URIs for accessing the MnS producer specific schema of the Generic NRM, the file that always needs to be retrieved first.

|  |
| --- |
| https://example.com/management/ProvMnS/1800/schemas/TS28623\_GenericNrm\_VS.yamlsftp://example.com/management/ProvMnS/1800/schemas/TS28623\_GenericNrm\_VS.yaml |

**NtfSubscriptionControl**

The format of the value of the attribute "dataNodeSelector" shall be a Jex expression that is compliant to either the Jex basic profile specified in clause 7.4 of TS 32.161 [X]) or to the Jex advanced profile specified in clause 7.5 of TS 32.161 [X]). The value of the attribute "notificationFilter" shall be a Jex expression that is compliant to the Jex conditions profile specified in clause 7.6 of TS 32.161 [X]). The accessible data nodes of the Jex expressions are equal to the nodes in the tree starting at the parent object of the "NtfSubscriptionControl" object.

Examples:

The following example demonstrates how an "NtfSubscriptionControl" object can be used for monitoring quality of service alarm notifications from all "YxzFunction" objects under all "ManagedElement" objects in a specific "SubNetwork".

|  |
| --- |
| PUT /3gpp-management/SubNetwork=SN1/NtfSubscriptionControl=NSC1 HTTP/1.1Host: example.orgContent-Type: application/json{ "notificationRecipientAddress": "example.org/3gpp-management/alarm-notification-sink", "notificationTypes": [ "notifyNewAlarm", "notifyChangedAlarmGeneral", "notifyClearedAlarm" ], "scope": { "dataNodeSelector": "/SubNetwork[id="SN1"]/ManagedElement/XyzFunction" }, "notificationFilter": "alarmType=\"QUALITY\_OF\_SERVICE\_ALARM\""} |

The next example shows how the operational state and administrative state attributes of all "YxzFunction" objects under all "ManagedElement" objects in a specific "SubNetwork" can be monitored.

|  |
| --- |
| PUT /3gpp-management/SubNetwork[id"=SN1"]/NtfSubscriptionControl=NSC1 HTTP/1.1Host: example.orgContent-Type: application/json{ "notificationRecipientAddress": "http://example.org/3gpp-management/cm-notification-sink", "notificationTypes": [ " notifyMOIChanges " ], "scope": { "dataNodeSelector": "/SubNetwork[id="SN"1/ManagedElement/XyzFunction/attributes\ (operationalState | administrativeState)" }} |

**ConditionMonitor**

The value of the attribute "conditions" shall be a Jex expression that is compliant to the Jex conditions profile specified in clause 7.6 of TS 32.161 [X]). The accessible data nodes of the Jex expressions are equal to the nodes in the tree starting at the parent object of the "ConditionMonitor" object.

Examples:

The following example demonstrates how the "ConditionMonitor" can be used for monitoring alarm lists. The condition below evaluates to true, when an alarm is raised on the object instance identified by "DN1".

|  |
| --- |
| "condition": \"/SubNetwork[id="SN1"]/AlarmList[id="AL1"]/attributes/alarmRecords/\*/objectInstance="DN1" |

The occurrence of this condition may for example switch on a "PerfMetricJob" to start collecting performance metrics on the alarmed object instance. To do so the "conditionMonitorRef" attribute of the "PerfMetricJob" must specify the DN of the "ConditionMonitor".

In the next example the condition in the example above is modified to include the status of a "Scheduler". The modified condition evaluates to true, when an alarm is raised on the object instance identified by "DN1", but only in the time periods specified in the "Scheduler".

|  |
| --- |
| "condition": \"/SubNetwork[id="SN1"]/AlarmList[id="AL1"]/attributes/alarmRecords/\*/objectInstance="DN1\ and /SubNetwork[id="SN1"]/Scheduler[id="S1"]/attributes/schedulerStatus=true" |

***End of change***