**3GPP TSG- Meeting #**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **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:***  |  |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** | SA5 |
|  |  |
| ***Work item code:*** |  |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *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:*** | References for TS 32.404 and RFC 6901 are missing. |
|  |  |
| ***Summary of change:*** | Add the missing references |
|  |  |
| ***Consequences if not approved:*** | Missing references are an error in the specification. |
|  |  |
| ***Clauses affected:*** | 2, 11.3.2.1.2, 12.1.1.4.1a.4 |
|  |  |
|  | **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 modification** |

# 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 28.526: "Telecommunication management; Life Cycle Management (LCM) for mobile networks that include virtualized network functions; Procedures".

[3] 3GPP TS 28.541: "Management and orchestration ; 5G Network Resource Model (NRM); Stage 2 and stage3".

[4] ITU-T Recommendation X.733 (02/92): "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".

[5] 3GPP TS 28.531: "Management and orchestration ; Provisioning; ".

[6] 3GPP TS 28.554: "Management and orchestration ; 5G end to end Key Performance Indicators (KPI)".

[7] 3GPP TS 22.261: "Technical Specification Group Services and System Aspects; Service requirements for the 5G system; Stage 1".

[8] 3GPP TS 23.501: "Technical Specification Group Services and System Aspects; System Architecture for the 5G System; Stage 2".

[9] 3GPP TS 23.003: "Technical Specification Group Core Network and Terminals; Numbering, addressing and identification".

[10] ETSI GS NFV-IFA 013 V2.4.1 (2018-02) "Network Function Virtualization (NFV); Management and Orchestration; Os-Ma-nfvo Reference Point - Interface and Information Model Specification".

[11] 3GPP TS 28.622: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[12] ETSI GS NFV-IFA 015 (V2.4.1): "Network Function Virtualisation (NFV); Management and Orchestration; Report on NFV Information Model".

[13] 3GPP TS 28.533: "Management and orchestration; Architecture framework"

[14] ITU-T Recommendation X.734 (1992): "Information technology - Open Systems Interconnection - Systems management: Event report management function".

[15] 3GPP TS 32.158: "Management and orchestration; Design rules for REpresentational State Transfer (REST) Solution Sets (SS)".

[16] 3GPP TS 32.302: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP); Information Service (IS)".

[17] 3GPP TS 32.401: "Telecommunication management; Performance Management (PM); Concept and requirements".

[18] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[19] 3GPP TS 32.401: "Telecommunication management; Perfomance Measurement (PM); Concept and requirements".

[20] ISO 8601:2004: "Data elements and interchange formats – Information interchange – Representation of dates and times".

[21] Void.

[22] Void.

[23] Void.

[24] Void.

[25] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects ".

[26] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".

[27] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".

[28] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".

[29] W3C REC-xml-names-19990114: "Namespaces in XML".

[30] Void.

[31] 3GPP TS 32.111-2: " Telecommunication management; Fault Management; Part 2: Alarm Integration Reference Point (IRP): Information Service (IS)".

[32] IETF RFC 6241 "Network Configuration Protocol (NETCONF)".

[33] 3GPP TS 32.160 " Management and orchestration; Management service template ".

[34] IETF RFC 7950 "The YANG 1.1 Data Modeling Language".

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

[36] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".

[37] IETF RFC 7396: "JSON Merge Patch".

[38] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[39] 3GPP TS 32.423: "Telecommunication management; Subscriber and equipment trace; Trace data definition and management".

[40] IETF RFC 6455: "The WebSocket Protocol".

[41] IETF RFC 793: "Transmission Control Protocol".

[42] 3GPP TS 28.550: "Management and orchestration; Performance assurance".

[43] ITU-T Recommendation X.733 (02/92): "Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function".

[44] 3GPP TS 28.623: "Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Solution Set (SS) definitions".

[45] Text Attribution: Creator: ONAP, under Creative Commons Attribution 4.0 International License, https://creativecommons.org/licenses/by/4.0/, URI to access the text: <https://github.com/onap/vnfrqts-requirements/blob/05f26fac2b941513a7d0e856b99fd8c61d688299/docs/Chapter8/ves7_1spec.rst#resource-structure>.

[46] 3GPP SA5 FORGE OpenAPI definitions: <https://forge.3gpp.org/rep/sa5/MnS/tree/Rel-16/OpenAPI>.

[47] 3GPP TS 32.404: "Performance Management (PM); Performance measurements; Definitions and template".

[48] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".

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| **Next modification** |

##### 11.3.2.1.2 Performance data file content description

Table 11.3.2.1.2-1 provides the content definition of a performance data file.

Table 11.3.2.1.2-1: Performance data file content description

| File content item | Description |
| --- | --- |
| measDataFile | Top-level tag indicating the file contains performance metrics. Each file includes a header ("measFileHeader"), a collection of information elements with produced performance metrics and associated meta data ("measData") and a footer ("measFileFooter"). |
| measFileHeader | File header including the file format version, information about the sending node (DN, type and vendor) and a time stamp indicating the begin of the first granularity period contained in the file ("collectionBeginTime"). |
| measData | Information element containing the DN of the common root of the measured object instances ("measObjRootDn ") included in that information element, followed by a list of information elements containing the produced performance metrics and associated meta data ("measInfo"). A "MeasDataFile" contains zero, one or more "measData" elements. |
| measFileFooter | File footer with a time stamp indicating the end of the last granularity period contained in the file ("collectionEndTime"). |
| fileFormatVersion | File format version applied by the sender as indicated by the specific format version identifier provided for each version. |
| senderName | DN of the entity, that generated and sent the file. The entity is either a managed element represented by a "ManagedElement" or a management node represented by a "ManagementNode" |
| senderType | Type of the entity, that generated and sent the file, as defined in 3GPP TS 28.620 [y]. The type of a management node is "MANAGEMENT\_NODE". |
| vendorName | Vendor of the the entity, that generated and sent the file. |
| collectionBeginTime | Time stamp indicating the begin of the first granularity period for which performance metrics are stored in the file. |
| measObjRootDn | DN of the measured object root. The measured object root is the first common object name-containing all objects that the metrics in one "measData" element are related to. When the metrics are produced by a managed element, the root object is the "ManagedElement" representing this managed element. When (aggregated) metrics are produced by a management node (based on input metrics from managed elements), such as metrics for sub-networks or network slices, the root object is the root "SubNetwork" of this management node. |
| measObjRootUserLabel | User label of the measured object root. |
| measObjRootSwVersion | Software version of the measured object root, allowing post-processing systems to take care of vendor specific performance metrics. It is either the software version of a managed element or of a management node. |
| measInfo | Information element added to "measData" for each expired granularity period, containing information on the produced performance metrics, starting with a time stamp ("measTimeStamp"), the granularity period ("granularityPeriod") and reporting period ("reportingPeriod") that are associated to the following performance metrics ("measValues"), for which is indicated the performance metric name, the measured or computed performance metric value and the object instance to which the performance metric is related to. |
| measInfoId | Identifier of a "measInfo".  |
| jobId | Job identifier of the related "PerfMetricJob" in this "measInfo". |
| reportingPeriod | Period used for performance metric reporting in this "measInfo". Unit is seconds |
| granularityPeriod | Period used for performance metric production in a "measInfo". Unit is seconds. |
| measTimeStamp | End time of the granularity period in a "measInfo".  |
| measTypes | Performance metric names in a "measInfo" |
| measValues | Performance metric values in a "measInfo". Each item in this list includes the LDN of the object the metrics are related to ("measObjLdn"), the measured or computed values of the metrics ("measResults") and a flag that indicates whether the metrics are reliable ("suspectFlag"). |
| measObjLdn | Local distinguished name (LDN) of the object the performance metrics are related to (measured object) within the scope defined by the "measObjRootDn". The concatenation of the "measObjRootDn" and the "measObjLdn" is the DN of the measured object. The "measObjLdn" is therefore empty if the "measObjRootDn" already specifies completely the DN of the measured object, which is the case for metrics associated to "ManagedElement" or the root "SubNetwork".For example, if the measured object is a "ManagedElement" representing RNC "RNC-Gbg-1", then the "measObjRootDn" may look like "DC=a1.operatorNN.com,SubNetwork=CountryNN,ManagedElement=RNC-Gbg-1"and the "measObjLdn" is empty. However, if the measured object is an "UtranCell" representing cell "Gbg-997" managed by that RNC, then the "measObjRootDn" is the same as above, i.e. "DC=a1.companyNN.com,SubNetwork=CountryNN,ManagedElement=RNC-Gbg-1"and the "measObjLdn" is "RncFunction=RF-1,UtranCell=Gbg-997".The class of the measured object is defined in item f) of measurement definitions (3GPP TS 32.404 [47], TS 28.552 [18]) and in item d) of KPI definitions (TS 28.554 [6]). |
| measResults | List of result values for the observed or computed performance metrics. The "measResults" sequence shall have the same number of elements and follow the same order as the "measTypes" sequence. The NULL value is reserved to indicate that the performance metric is not applicable or could not be produced for the object instance. |
| suspectFlag | Reliability of the performance metrics. FALSE means the metrics are reliable, TRUE means they are not reliable. The default value is "FALSE". |
| collectionEndTime | Time stamp indicating the end of the last granularity period for which performance metrics are stored in the file. |

The representation of all timestamps in PM files shall follow the representations allowed by the ISO 8601 [20].
The precise format for timestamp representation shall be determined by the technology used for encoding the PM file (e.g. ASN.1, XML DTD, and XML Schema). The choice of technology should ensure that this representation is derived from ISO 8601 [20]. Based on the representation used, the timestamp shall refer to either UTC time or local time or local time with offset from UTC.

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| **Next modification** |

###### 12.1.1.4.1a.4 Type MoiChange

Table 12.1.1.4.1a.4 -1: Definition of type MoiChange

|  |  |  |  |
| --- | --- | --- | --- |
| Attribute name | Data type | Description | S |
| notificationId | NotificationId | Notification identifier as defined in ITU-T Rec. X. 733 [4] | M |
| correlatedNotifications | array(CorrelatedNotification) | Set of all notifications to which this notification is considered to be correlated as defined in ITU-T Rec. X. 733 [4] | O |
| additionalText | string | Allows a free form text description to be reported as defined in ITU-T Rec. X. 733 [4] | O |
| sourceIndicator | SourceIndicator | Indicates the source of the operation that led to the generation of this notification. | O |
| path | Uri | URI specifying the created, deleted or updated resource | M |
| operation | Operation | Operation associated to the reported change ("CREATE", "DELETE", "REPLACE") | M |
| value | oneOf(AttributeNameValuePairSet, AttributeValueChangeSet) | For reporting resource creation or deletion, the optional resource representation (MOC attributes only). In this case, the data type of value is "AttributeNameValuePairSet".For reporting attribute value changes, the (mandatory) new values and (optional) old values. In this case, the data type of value is "AttributeValueChangeSet". | M |

For a "CREATE" or "DELETE" operation only the host and path components are present in the URI carried by the "path" attribute of "MoiChange". They identify the created or deleted resource. The "value" attribute of "MoiChange" may optionally carry the MOC attribute name value pairs of the created or deleted resource in the format of a map. The keys of the map are equal to the MOC attribute names, and the values are equal to the MOC attribute values.

For a "REPLACE" operation, two cases need to be distinguished.

In the first case, one or more value changes of complete MOC attributes are reported. Only the host and path components are present in the URI carried by the "path" attribute of "MoiChanges". They identify the resource, where attribute value changes occured. The "value" attribute is an array of minimum one and maximum two items. If only one array item is present, it carries the MOC attribute names that changed value and their new values. If the optional second array item is present as well, it carries the MOC attribute names that changed value and their old values. The order of items in the array carries semantics and shall therefore not be reversed.

In the second case, a single value change of an attribute part (sub-attribute) is reported. Here the URI needs to carry, besides the host and path components, also the fragment component. The host and path components identify the resource, where the attribute part value change occured. The fragment component identifies the attribute part inside the resource. The URI fragment is specified using JSON pointer in the URI fragment identifier representation as defined in clause 6 of of RFC 6901 [48]. The context for JSON pointer is the updated resource. The "value" is an array of minimum one and maximum two items. If only one item is present, it carries the name of the attribute part that changed value and its new value. If the optional second array item is present as well, it carries the name of the attribute part that changed value and its old value. Hence also in this case, the order of items in the array carries semantics and shall not be reversed.

For example, the following instance of a "moiChanges" array item reports an object creation

notificationId: 123456789

path: 'https://example.com/3GPP/ClassA=1'

operation: CREATE

value:

 attrA:

 subAttrA1: ABC

 subAttrA2: 56

 attrB: XYZ

 attrC: 123

or, when omitting the optional attribute name vale pairs of the created object, the instance looks like

notificationId: 123456789

path: 'https://nokia.com/3GPP/ClassA=1'

operation: CREATE

The following instance reports a change of the attributes "attrA" and " attrC" with new and old values

notificationId: 123456789

path: 'https://example.com/3GPP/ClassA=1'

operation: REPLACE

value:

 - attrA:

 subAttrA1: ABC

 subAttrA2: 56

 attrC: 123

 - attrA:

 subAttrA1: DEF

 subAttrA2: 67

 attrC: 345

and the following with new values only

notificationId: 123456789

path: 'https://example.com/3GPP/ClassA=1'

operation: REPLACE

value:

 - attrA:

 subAttrA1: ABC

 subAttrA2: 56

 attrC: 123

When a change of the attribute part "attrA:subAttrA1" shall be reported, the instance looks like

notificationId: 123456789

path: 'https://example.com/3GPP/ClassA=1?attributes/attrA/subAttrA1'

operation: REPLACE

value:

 - subAttrA1: ABC

 - subAttrA1: DEF

or, with the new value only, like

notificationId: 123456789

path: 'https://example.com/3GPP/ClassA=1?attributes/attrA/subAttrA1'

operation: REPLACE

value:

 - subAttrA1: ABC

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| **End of modifications** |