**3GPP TSG- Meeting # *rev1***

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
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| *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 |
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| ***Work item code:*** |  |  | ***Date:*** |  |
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| ***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:*** | The chapter headings and definitions convey the impression clause 11.3 is a complete MnS. This is not the case, it is just the definition of a notification and the definition of the content of a performance metric file. |
|  |  |
| ***Summary of change:*** | It is clarified clause 11.3 is not a complete MnS. Some additional corrections and clarifications are provided as well. |
|  |  |
| ***Consequences if not approved:*** | Misleading chapter headings are confusing and lead to misunderstandings. |
|  |  |
| ***Clauses affected:*** | 11.3, 11.3.1.2 (void), 11.3.1.3 (new), 11.3.1.3.1 (new), 11.3.1.3.2 (new), 11.3.2 ( void), 11.3.3 (new), 11.3.3.1 (new), 11.3.3.2 (new), 12.3.1.2.3.2.1.3.1, 12.3.2.1, 12.3.2.2, 11.3.2.3.1, 12.3.2.3.2 (void) |
|  |  |
|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **First modification** |

## 11.3 Performance assurance

### 11.3.1 Operations and notifications

#### 11.3.1.1 Void

#### 11.3.1.2 Void

#### 11.3.1.3 Notification notifyThresholdCrossing

##### 11.3.1.3.1 Definition

A MnS producer sends this notification to subscribed MnS consumers when a "ThresholdMonitor" (3GPP TS 28.622 [11]) on that MnS producer detects the threshold crossing of a monitored performance metric.

##### 11.3.1.3.2 Notification information

| **Parameter Name** | **S** | **Information Type** | **Comment** |
| --- | --- | --- | --- |
| objectClass | M | ManagedEntity.objectClass | Class of the managed object, where the threshold crossing occurred. |
| objectInstance | M | ManagedEntity.objectInstance | Instance of the managed object, where the threshold crossing occurred. |
| notificationId | M | -- |  |
| notificationType | M | "notifyThresholdCrossing" |  |
| eventTime | M | -- | Time when the threshold crossing occurred. |
| systemDN | M | MnSAgent.objectInstance  |  |
| observedPerfMetricName | M | ThresholdMonitor.thresholdInfoList[x].\performanceMetrics[y] | Name of the performance metric that has crossed the threshold. |
| observedPerfMetricValue | M | -- | Value of the performance metric, that has crossed the threshold, when the threshold crossing was observed |
| observedPerfMetricDirection | M | -- | Direction ("UP" or "DOWN") of the performance metric, when the threshold crossing was observed |
| thresholdValue | M | ThresholdMonitor.thresholdInfoList[x].\thresholdvalue | Threshold value of the triggered threshold |
| hysteresis | M | ThresholdMonitor.thresholdInfoList[x].\hysteresis | Hysteresis of the triggered threshold |
| monitorGranularityPeriod | M | ThresholdMonitor.monitorGranularityPeriod | Granularity period of the threshold monitor |
| additionalText | O | -- | Vendor specific information |

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### 11.3.2 Void

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### 11.3.3 Performance data file

#### 11.3.3.1 Performance data file content description

Table 11.3.3.1-1 provides the content of a performance data file.

Table 11.3.3.1-1: 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 [x], 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 performance metric file (e.g. 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.

#### 11.3.3.2 Performance data file naming convention

This clause defines a rule that shall be applied for constructing names for files containing performance data.

<Type><Startdate>.<Starttime>-[<Enddate>.]<Endtime>[\_-<jobIdList>][\_<UniqueIdList>][\_-\_<RC>]

1) The "Type" field indicates if the file contains measurement results for single or multiple measured objects and/or granularity periods where:

- "A" means single measured object, single granularity period (this is used when granularity period is equal to reporting period);

- "B" indicates multiple measured objects, single granularity period (this is used when granularity period is equal to reporting period);

- "C" signifies single measured object, multiple granularity periods (this is used when reporting period is multiples of the granularity period and will contain multiple measurement reports);

- "D" stands for multiple measured objects, multiple granularity periods (this is used when reporting period is multiples of the granularity period and will contain multiple measurement reports).

2) The "Startdate" field indicates the date when the granularity period began if the "Type" field is set to A or B. If the "Type" field is either "C" or "D" then "Startdate" contains the date when the first granularity period of the measurement results contained in the file started. The "Startdate" field is of the form YYYYMMDD, where:

- YYYY is the year in four-digit notation;

- MM is the month in two digit notation (01 - 12);

- DD is the day in two-digit notation (01 - 31).

3) The "Starttime" field indicates the time when the granularity period began if the "Type" field is set to A or B. If the "Type" field is either "C" or "D" then "Starttime" contains the time when the first granularity period of the measurement results contained in the file began. The "Starttime" field is of the form HHMMshhmm, where:

- HH is the two-digit hour of the day (local time), based on 24-hour clock (00 - 23);

- MM is the two digit minute of the hour (local time), based on 60-minutes clock (00 - 59);

- s is the sign of the local time differential from UTC (+ or -), in case the time differential to UTC is 0 then the sign may be arbitrarily set to "+" or "-";

- hh is the two-digit number of hours of the local time differential from UTC (00-23);

- mm is the two digit number of minutes of the local time differential from UTC (00-59).

4) The "Enddate" field shall only be included if the "Type" field is set to "C" or "D", i.e. measurement results for multiple granularity periods are contained in the file. It identifies the date when the last granularity period of these measurements ended, and its structure corresponds to the "Startdate" field.

5) The "Endtime" field indicates the time when the granularity period ended if the "Type" field is set to A or B. If the "Type" field is either "C" or "D" then "Endtime" contains the time when the last granularity period of the measurement results contained in the file ended. Its structure corresponds to the "Starttime" field.

6) The "UniqueIdList" field indicates the DNs of the measured objects.

7) The "RC" field is a running count, starting with the value of "1", and shall be appended only if the filename is otherwise not unique, i.e. more than one file is generated and all other parameters of the file name are identical. Therefore it may only be used by the EM, since the described situation cannot occur with NE generated files. Note that the delimiter for this field, \_-\_, is an underscore character (\_), followed by a minus character (-), followed by an underscore character (\_).

8) The "jobIdList" indicates the measurement job id(s) that the performance data file is associated with.

Some examples describing file-naming convention:

1) file name: A20000626.2315+0200-2330+0200\_gNBId,
meaning: file produced for gNB <gNBId> on June 26, 2000, granularity period 15 minutes from 23:15 local to 23:30 local, with a time differential of +2 hours against UTC.

2) file name: B20021224.1700-1130-1705-1130\_-job10\_S-NSSAI,
meaning: file containing results for multiple measured objects, generated for measurement job job10, produced for NSI <S-NSSAI> on December 24, 2002, granularity period 5 minutes from 17:00 local to 17:05 local, with a time differential of –11:30 hours against UTC.

3) file name: D20050907.1030+0000-20050909.1500+0000\_SubnetworkId\_-\_2,
meaning: file containing results subnetwork <SubnetworkId>, start of first granularity period 07 September 2005, 10:30 local, end of last granularity period 09 September 2005, 15:00 local, with a time differential of 0 against UTC. This is the second file for this subnetwork/granularity period combination.

4) file name: C20050907.1030+0000-20050909.1500+0000\_gNBId,
meaning: file produced for the gNB <gNBId>, start of first granularity period 07 September 2005, 10:30 local, end of last granularity period 09 September 2005, 15:00 local, with a time differential of 0 against UTC.

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| **Next modification** |

## 12.3 Generic performance assurance management service

### 12.3.1 RESTful HTTP-based solution set

#### 12.3.1.1 Void

#### 12.3.1.2 Performance threshold monitoring service

##### 12.3.1.2.1 Mapping of operations

None.

##### 12.3.1.2.2 Mapping of notifications

###### 12.3.1.2.2.1 Introduction

The IS notifications are mapped to SS equivalents according to table 12.3.1.2.2.1-1.

**Table 12.3.1.2.2.1-1: Mapping of IS notifications to SS equivalents**

|  |  |  |  |
| --- | --- | --- | --- |
| **IS notifications** | **HTTP Method** | **Resource URI** | **S** |
| notifyThresholdCrossing | POST | /notificationSink | M |

###### 12.3.1.2.2.2 Notification notifyThresholdCrossing

The IS notification parameters are mapped to SS equivalents according to table 12.3.1.2.2.2-1.

Table 12.3.1.2.2.2-1: Mapping of IS notification input parameters to SS equivalents (HTTP POST)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IS parameter name** | **SS parameter location** | **SS parameter name** | **SS parameter type** | **S** |
| objectClass | request body | href | Uri | M |
| objectInstance |
| notificationId | request body | notificationId | NotificationId | M |
| notificationType | request body | notificationType | NotificationType | M |
| eventTime | request body | eventTime | DateTime | M |
| systemDN | Request body | systemDN | SystemDN | M |
| observedPerfMetricName | request body | observedPerfMetricName | string | M |
| observedPerfMetricValue | request body | observedPerfMetricValue | PerfMetricValue | M |
| observedPerfMetricDirection | request body | observedPerfMetricDirection | PerfMetricDirection | M |
| thresholdValue | request body | thresholdValue | PerfMetricValue | M |
| hysteresis | request body | hysteresis | PerfMetricValue) | M |
| monitorGranularityPeriod | request body | monitorGranularityPeriod | integer | M |
| additionalText | request body | additionalText | string | O |

##### 12.3.1.2.3 Resources

###### 12.3.1.2.3.1 Resource structure

Table 12.3.1.2.3.1-1 provides an overview of the resources and applicable HTTP methods.

Table 12.3.1.2.3.1-1: Resources and methods overview

|  |  |  |  |
| --- | --- | --- | --- |
| Resource name | Resource URI | HTTP method | Description |
| notificationSink | /notificationSink | POST | Send notifications |

###### 12.3.1.2.3.2 Resource definitions

12.3.1.2.3.2.1 Resource "/notificationSink"

12.3.1.2.3.2.1.1 Description

This resource represents a resource on a MnS consumer to which notifications are sent to.

12.3.1.2.3.2.1.2 URI

The resource URI is provided by the notification subscription.

12.3.1.2.3.2.1.3 HTTP methods

12.3.1.2.3.2.1.3.1 POST

This method shall support the URI query parameters specified in table 12.3.1.2.3.2.1.3.1-1.

Table 12.3.1.2.3.2.1.3.1-1: URI query parameters supported by the POST method on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Data type | Description | Qualifier |
| n/a | n/a | n/a | n/a |

This method shall support the request data structures specified in table 12.3.1.2.3.2.1.3.1-2 and the response data structures and response codes specified in table 12.3.1.2.3.2.1.3.1-3.

Table 12.3.1.2.3.2.1.3.1-2: Data structures supported by the POST Request Body on this resource

|  |  |  |
| --- | --- | --- |
| Data type | Description | SQ |
| NotifyThresholdCrossing | Type in case a notifyThresholdCrossing notification is sent | M |

Table 12.3.1.2.3.2.1.3.1-3: Data structures supported by the POST Response Body on this resource

|  |  |  |  |
| --- | --- | --- | --- |
| Data type | Responsecodes | Description | SQ |
| n/a | 204 No Content | In case of success no message body is returned | M |
| ErrorResponse | 4xx/5xx | In case of failure the error object is returned. | M |

##### 12.3.1.2.4 Data type definitions

###### 12.3.1.2.4.1 General

Table 12.3.1.2.4.1-1: Data types defined in this specification

|  |  |  |
| --- | --- | --- |
| **Data type** | **Reference** | **Description** |
| NotifyThresholdCrossing | 12.3.1.2.4.2.1 | Used in the request body of HTTP POST for the notification type notifyThresholdCrossing |
| PerfNotificationTypes | 12.3.1.2.4.6.4 | Performance notification types (notifyThresholdCrossing) |

Table 12.3.1.1.4.1-2: Data types imported

|  |  |  |
| --- | --- | --- |
| **Data type** | **Reference** | **Description** |
| DateTime | TS 28.623 [44] | Date and time |
| Float | TS 28.623 [44] | Float type |
| Uri | TS 28.623 [44] | URI type |
| SystemDN | TS 28.623 [44] | systemDN type |
| NotificationId | TS 28.623 [44] | Notification identifier as defined in ITU-T Rec. X. 733 [4] |
| NotificationHeader | TS 28.623 [44] | Notification header |
| ErrorResponse | TS 28.623 [44] | Used in the response body of multiple HTTP methods in case of error |

###### 12.3.1.2.4.2 Structured data types

12.3.1.2.4.2.1 Type NotifyThresholdCrossing

Table 12.3.1.2.4.2.1-1: Definition of NotifyThresholdCrossing

|  |  |  |  |
| --- | --- | --- | --- |
| **Attribute name** | **Data type** | **Description** | **S** |
| href | Uri | URI of the resource where the event (threshold crossing) occurred | M |
| notificationId | NotificationId | Notification identifier as defined in ITU-T Rec. X. 733 [4] | M |
| notificationType | NotificationType | Notification type (notifyThresholdCrossing) | M |
| eventTime | DateTime | Event (threshold crossing) occurrence time | M |
| systemDN | SystemDN | System DN | M |
| observedPerfMetricName | string | Name of the performance metric that has crossed the threshold | M |
| observedPerfMetricValue | PerfMetricValue | Value of the performance metric, that has crossed the threshold, when the threshold crossing was observed | M |
| observedPerfMetricDirection | PerfMetricDirection | Direction ("UP" or "DOWN") of the performance metric, when the threshold crossing was observed | M |
| thresholdValue | PerfMetricValue | Threshold value of the triggered threshold | M |
| hysteresis | PerfMetricValue | Hysteresis of the triggered threshold |  |
| monitorGranularityPeriod | integer | Granularity period of the threshold monitor | M |
| additionalText | string | Vendor specific information | O |

12.3.1.2.4.3 Void

###### 12.3.1.2.4.4 Void

###### 12.3.1.2.4.5 Void

###### 12.3.1.2.4.6 Simple data types and enumerations

12.3.1.2.4.6.1 General

This clause defines simple data types and enumerations that are used by the data structures defined in the previous clauses.

12.3.1.2.4.6.2 Simple data types

Table 12.3.1.2.4.6.2-1: Simple data types

|  |  |  |
| --- | --- | --- |
| Type name | Type definition | Description |
| PerfMetricValue | Union(integer, Float) | The type of a performance metric is either integer or Float |

12.3.1.2.4.6.3 Enumeration PerfNotificationTypes

Table 12.3.1.2.4.6.3-1: Enumeration PerfNotificationTypes-Type

|  |  |
| --- | --- |
| Enumeration value | Description |
| notifyThresholdCrossing | Notification type is notifyThresholdCrossing |

12.3.1.2.4.6.4 Enumeration PerfMetricDirection

Table 12.3.1.2.4.6.4-1: Enumeration PerfMetricDirection

|  |  |
| --- | --- |
| Enumeration value | Description |
| UP | Performance metric values are going up |
| DOWN | Performance metric values are going down |

### 12.3.2 Performance data XML file format definition

#### 12.3.2.1 Introduction

This clause describes the format of performance data files. The XML file format definition is based on XML schema ([26], [27], [28] and [29]).

#### 12.3.2.2 Mapping table

Table 12.3.2.2-1 maps the file content items in the clause 11.3.2.1.2 to those used in the XML schema based file format definitions. XML attributes are useful where data values bind tightly to its parent XML element. They have been used where appropriate.

Table 12.3.2.2-1: Mapping of File Content Items to XML tags

| File Content Item | XML schema based XML tag | Description |
| --- | --- | --- |
| measDataFile | XML element: measDataFile | Document element |
| measFileHeader | XML element: fileHeader |  |
| measData | XML element: measData |  |
| measFileFooter | XML element: fileFooter |  |
| fileFormatVersion | XML element: fileHeaderXML attribute: fileFormatVersion |  |
| senderName | XML element: fileHeaderXML attribute: dnPrefixXML element: fileHeader:fileSenderXML attribute: senderName | The DN of the sender is split into the DN prefix contained in "dnPrefix" and the Local DN (LDN) contained in "senderName". |
| senderType | XML element fileHeader:fileSenderXML attribute: senderType |  |
| vendorName | XML element fileHeaderXML attribute vendorName |  |
| collectionBeginTime | XML element: fileHeader:measDataXML attribute beginTime |  |
| measObjRootDn | XML element fileHeaderXML attribute dnPrefixXML element measData:measEntityXML attribute localDn | The DN of the root object is split into the DN prefix contained in "dnPrefix" and the Local DN (LDN) contained in "localDn". |
| measObjRootUserLabel | XML element: measData:measEntityXML attribute: userLabel |  |
| measObjRootSwVersion | XML element: measData:measEntityXML attribute: swVersion |  |
| measInfo | XML element measInfo | An instance of this XML element is added for each expired granularity period. |
| measInfoId | XML element measData:measInfoXML attribute measInfoId |  |
| jobId | XML element measData:measInfo:jobXML attribute jobId |  |
| reportingPeriod | XML element measData:measInfo:repPeriodXML attribute duration | The XML attribute "duration" shall use the truncated representation for duration "PT*n*S" (see [28]). |
| granularityPeriod | XML element measData:measInfo:granPeriodXML attribute duration | The XML attribute "duration" shall use the truncated representation for duration "PT*n*S" (see [28]). |
| measTimeStamp | XML element measData:measInfo:granPeriodXML attribute endTime |  |
| measTypes | XML element measData:measInfo:measTypes orXML element measData:measInfo:measTypeXML attribute p | Depending on sender's choice for optional positioning presence, either XML element "measTypes" or XML elements "measType" will be used. |
| measValues | XML element measData:measInfo:measValue |  |
| measObjLdn | XML element measData:measInfo:measValueXML attribute measObjLdn |  |
| measResults | XML element measData:measInfo:measValue:measResults or, when the positioning option is used,measData:measInfo:measValue:r | Depending on sender's choice for optional positioning, either XML element "measResults" or XML elements "r" is used. |
| suspectFlag | XML element measData:measInfo:measValue:suspect |  |
| collectionEndTime | XML element fileFooter:measDataXML attribute endTime |  |
| There is no corresponding File Content Item. | XML element measTypeXML attribute p | Only for the positioning option: XML attribute "p" of XML element "measType", used to link the performance metric type specified in "measType" to the result value. Its value is a positive integer (excl. zero) and shall be unique for each instance of "measType" in a file. |
| There is no corresponding File Content Item. | XML element rXML attribute p | Only for the positioning option: XML attribute "p" of the XML element "r", used to link the result value in "r" to its performance metric type in "measType". The value of "p" shall match the value of the XML attribute "p" in the corresponding XML element "measType". |

|  |  |  |
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#### 12.3.2.3 XML schema

This clause specifies the XML schema that shall be used for XML files containing performance data.

Name: measData.xsd

Version: 2.0.0

Identifier: measData.xsd-v2.0.0

<?xml version="1.0" encoding="UTF-8"?>

<!--

 3GPP TS 28.532 Performance data XML file format definition

 measData.xsd-v2.0.0

-->

<schema

 xmlns="http://www.w3.org/2001/XMLSchema"

 xmlns:md="http://www.3gpp.org/ftp/specs/archive/28\_series/28.532#measData"

 targetNamespace="http://www.3gpp.org/ftp/specs/archive/28\_series/28.532#measData"

 elementFormDefault="qualified">

 <element name="measDataFile">

 <complexType>

 <sequence>

 <element name="fileHeader">

 <complexType>

 <sequence>

 <element name="fileSender">

 <complexType>

 <attribute name="senderName" type="string" use="optional"/>

 <attribute name="senderType" type="string" use="optional"/>

 </complexType>

 </element>

 <element name="measData">

 <complexType>

 <attribute name="beginTime" type="dateTime" use="required"/>

 </complexType>

 </element>

 </sequence>

 <attribute name="fileFormatVersion" type="string" use="required"/>

 <attribute name="vendorName" type="string" use="optional"/>

 <attribute name="dnPrefix" type="string" use="optional"/>

 </complexType>

 </element>

 <element name="measData" minOccurs="0" maxOccurs="unbounded">

 <complexType>

 <sequence>

 <element name="measEntity">

 <complexType>

 <attribute name="localDn" type="string" use="optional"/>

 <attribute name="userLabel" type="string" use="optional"/>

 <attribute name="swVersion" type="string" use="optional"/>

 </complexType>

 </element>

 <element name="measInfo" minOccurs="0" maxOccurs="unbounded">

 <complexType>

 <sequence>

 <element name="job" minOccurs="0">

 <complexType>

 <attribute name="jobId" type="string" use="required"/>

 </complexType>

 </element>

 <element name="granPeriod">

 <complexType>

 <attribute name="duration" type="duration" use="required"/>

 <attribute name="endTime" type="dateTime" use="required"/>

 </complexType>

 </element>

 <element name="repPeriod" minOccurs="0">

 <complexType>

 <attribute name="duration" type="duration" use="required"/>

 </complexType>

 </element>

 <choice>

 <element name="measTypes">

 <simpleType>

 <list itemType="Name"/>

 </simpleType>

 </element>

 <element name="measType" minOccurs="0" maxOccurs="unbounded">

 <complexType>

 <simpleContent>

 <extension base="Name">

 <attribute name="p" type="positiveInteger" use="required"/>

 </extension>

 </simpleContent>

 </complexType>

 </element>

 </choice>

 <element name="measValue" minOccurs="0" maxOccurs="unbounded">

 <complexType>

 <sequence>

 <choice>

 <element name="measResults">

 <simpleType>

 <list itemType="md:measResultType"/>

 </simpleType>

 </element>

 <element name="r" minOccurs="0" maxOccurs="unbounded">

 <complexType>

 <simpleContent>

 <extension base="md:measResultType">

 <attribute name="p" type="positiveInteger" use="required"/>

 </extension>

 </simpleContent>

 </complexType>

 </element>

 </choice>

 <element name="suspect" type="boolean" minOccurs="0"/>

 </sequence>

 <attribute name="measObjLdn" type="string" use="required"/>

 </complexType>

 </element>

 </sequence>

 <attribute name="measInfoId" type="string" use="optional"/>

 </complexType>

 </element>

 </sequence>

 </complexType>

 </element>

 <element name="fileFooter">

 <complexType>

 <sequence>

 <element name="measData">

 <complexType>

 <attribute name="endTime" type="dateTime" use="required"/>

 </complexType>

 </element>

 </sequence>

 </complexType>

 </element>

 </sequence>

 </complexType>

 </element>

 <simpleType name="measResultType">

 <union memberTypes="integer float">

 <simpleType>

 <restriction base="string">

 <enumeration value="NULL"/>

 </restriction>

 </simpleType>

 </union>

 </simpleType>

</schema>

##### 11.3.2.3.1 Void

##### 12.3.2.3.2 Void

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| --- |
| **End of modifications** |