**3GPP TSG SA WG5 Meeting #142e S5-222101**

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**Source: Samsung, Ericsson**

**Title: Rel-17 InputToDraftCR 28.622 ManagementDataCollectio.docx**

**Document for: Approval**

**Agenda Item: 6.6.2**

# 1 Decision/action requested

***The group is asked to discuss and approve the proposals.***

# 2 References

None

# 3 Rationale

This is the updated proposal of 215100rev1

Since the consumer of MADCOL is considered to be not aware of network details it would be beneficial to provide a functionality using which the consumer can reduce and target the number of selected object instance from where the data is to be collected. The target managed object instances can be selected based on the following criteria.

* A geographical area or a tracking area: In a very big network, it makes more senses to mention a particular location that the NF or measurements belongs. It will keep measurements reporting swift and efficient.
* The domain e.g RAN, CN: In case of recurrent issues, a consumer may want to have understanding of a particular provider’s products for further actions. Further, a consumer might only specializes in analysing and understanding a particular domain performance like RAN or Core. In such scenario, it should be possible to indicate the domain from where consumer wants measurements for its usage.
* The traffic type e.g user plane or control plane: 5G brings clear separation (CUPS) of user plane and control plane NFs in a network, a consumer may leverage it to identify target nodes to have measurements from. For example, the measurement report may be expected from user plane nodes only.
* The slice type e.g eMBB, URLLC: Consumer may mention a particular slice type (eMBB, URLLC, mIoT, V2X, HMTC) as the filteration criteria. It may help in narrowing down the target NF(s), which are part of provided slice type(s).

Introducing the new collection job for managemet data collection.

If not agreed, the main objective of MADCOL will not be fulfilled i.e an easy-to-use collection mechanism for consumer not aware of the network details (NRM)

|  |
| --- |
| **First modification** |



Figure 4.2.1-7: ManagementDataCollection control NRM fragment

|  |
| --- |
| **Second modification** |



Figure 4.2.2-7: ManagementDataSubscription control NRM fragment

|  |
| --- |
| **Third modification** |

4.3.A ManagementDataCollection

4.3.A.1 Definition

This IOC represents a management data collection request. The attribute managementDataType defines the category of data which shall be reported. This may include coverage, capacity, service experience, trace, mobility, energy efficiency, accessibilityetc. The mapping of exact measurement with the requested category will be done at the producer and is implementation specific.

The targetNodeFilter attribute can be used to target object instance(s) producing the required management data. It is assumed that the consumer may not have detail knowledge of the network and hence may not identify the exact object instance producing the required management data. In this case consumer can request management data, specified by 3GPP, produced by certain network function(s) based on a particular location, the domain (CN or RAN) of the network function, and the handled traffic (CP or UP) of the network function.

The MnS producer will derive multiple jobs (PrefMetricJob, Tracejob) from a single ManagementDataCollection job for collecting the required management data. Once it receives the measurement from multiple sources, it consolidate the data into a set of management data for reporting.

The attribute collectionTimePeriod specifies the duration for which the management data should be reported.

The attribute reportingCtrl specifies the method and associated control parameters for reporting the produced management data to MnS consumers. Three methods are available: file-based reporting with selection of the file location by the MnS producer, file-based reporting with selection of the file location by the MnS consumer and stream-based reporting.

The attribute dataScope configures, whether the management data should be reported per S-NSSAI or per 5QI, if applicable.

4.3.A.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute Name** | **S** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| managementDataType | M | T | T | T | N/A |
| targetNodeFilter | M | T | T | T | N/A |
| collectionTimePeriod | M | T | T | T | N/A |
| reportingCtrl | M | T | T | T | N/A |
| dataScope | O | T | T | T | N/A |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

4.3.A.3 Attribute constraints

None.

4.3.A.4 Notifications

The common notifications defined in clause 4.5 are valid for this IOC. In addition, the following set of notifications is also valid.

| **Name** | **S** | **Notes** |
| --- | --- | --- |
| notifyFileReady | M | -- |
| notifyFilePreparationError | M | -- |

4.3.C CollectionDuration <<dataType>>

4.3.D.1 Definition

This data type defines a collection time duration for which the management data should be reported.

4.3.D.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **S** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| startTime | M | T | T | T | T |
| endTime | M | T | T | T | T |

4.3.D.3 Attribute constraints

None.

4.3.D.4 Notifications

The subclause 4.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

4.3.C NodeFilter <<dataType>>

4.3.B.1 Definition

This data type defines several selection criteria for the target node i.e the node producing the requested management data.

Note: If it is not possible to select the target node(s) (based on a particular selection criteria) deterministically, the selection criteria should not be used.

4.3.B.2 Attributes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Attribute name** | **S** | **isReadable** | **isWritable** | **isInvariant** | **isNotifyable** |
| areaOfInterest | O | T | T | T | N/A |
| networkDomain | O | T | T | T | N/A |
| cpUpType | O | T | T | T | N/A |
| sst | O | T | T | T | N/A |

4.3.B.3 Attribute constraints

None.

4.3.B.4 Notifications

The subclause 4.5 of the <<IOC>> using this <<dataType>> as one of its attributes, shall be applicable.

***Next change***

4.4.1 Attribute properties

The following table defines the properties of attributes specified in the present document.

| **Attribute Name** | **Documentation and Allowed Values** | **Properties** |
| --- | --- | --- |
| heartbeatNtfPeriod | Periodicity of the heartbeat notification emission. The value of zero has the special meaning of stopping the heartbeat notification emission.Unit is in seconds.AllowedValues: non-negative integers | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: 0isNullable: False |
| triggerHeartbeatNtf | Setting this attribute to TRUE triggers an immediate additional heartbeat notification emission. Setting the value to FALSE has no observable result.The periodicity of notifyHeartbeat emission is not changed.AllowedValues: TRUE, FALSE | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FALSE isNullable: False |
| notificationRecipientAddress | Address of the notification recipient.allowedValues: N/A | type: String multiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| notificationTypes | Notification types of notifications that are candidates for being forwarding to the notification recipient. If this attribute is absent, notifications of all types are candidates for being forwarding to the notification recipient.If the notificationFilter attribute is absent, all candidate notifications are forwarded to the notification recipient, otherwise the candidate notifications are discriminated by the filter specified by the notificationFilter attribute.AllowedValues: - notifyMOICreation- notifyMOIDeletion- notifyMOIAttributeValueChanges- notifyMOIChanges- notifyEvent- notifyNewAlarm- notifyChangedAlarm- notifyAckStateChanged- notifyComments- notifyCorrelatedNotificationChanged- notifyChangedAlarmGeneral- notifyAlarmListRebuilt- notifyPotentialFaultyAlarmList- notifyFileReady- notifyFilePreparationError- notifyThresholdCrossing | type: ENUMmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| notificationFilter | Filter to be applied to candidate notifications identified by the notificationTypes attribute. Only notifications that pass the filter criteria are forwarded to the notification recipient. All other notifications are discarded.The filter can be applied to any field of a notification.allowedValues: N/A | type: String multiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| scope | Scopes the managed object instances included in the notification subscription. If this attribute is absent, all objects below and including the base object are scoped.allowedValues: N/A | type: Scopemultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| scopeType | If the optional scopeLevel attribute is not supported or absent, allowed values of scopeType are BASE\_ONLY and BASE\_ALL.The value BASE\_ONLY indicates only the base object is selected.The value BASE\_ALL indicates the base object and all of its subordinate objects (incl. the leaf objects) are selected.If the scopeLevel attribute is supported and present, allowed values of scopeType are BASE\_NTH\_LEVEL and BASE\_SUBTREE.The value BASE\_NTH\_LEVEL indicates all objects on the level, which is specified by the scopeLevel attribute, below the base object are selected. The base object is at scopeLevel zero.The value BASE\_SUBTREE indicates the base object and all subordinate objects down to and including the objects on the level, which is specified by the scopeLevel attribute, are selected. The base object is at scopeLevel zero.allowedValues: N/A | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| scopeLevel | See definition of scopeType attribute.allowedValues: N/A | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| farEndEntity | The value of this attribute shall be the Distinguished Name of the far end network entity to which the reference point is related.As an example, with EP\_Iucs, if the instance of EP\_Iucs is contained by one RncFunction instance, the farEndEntity is the Distinguished Name of the MscServerFunction instance to which this Iucs reference point is related. allowedValues: N/A | type: DNmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| linkType | This attribute defines the type of the link. allowedValues: Signalling, Bearer, OAM&P, Other or multiple combinations of this type. | type: Stringmultiplicity: 0..\*isOrdered: FalseisUnique: TruedefaultValue: No isNullable: False |
| locationName | The physical location of this entity (e.g. an address). allowedValues: N/A | type: Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: False |
| monitorGranularityPeriod | Granularity period used to monitor measurements for threshold crossings. The period is defined in seconds.See Note 5allowedValues: Integer with a minimum value of 1 | type: Integermultiplicity: 1isOrdered: FalseisUnique: TruedefaultValue: None isNullable: False |
| monitorGranularityPeriods | Granularity periods supported for the monitoring of associated measurement types for thresholds. The period is defined in seconds.allowedValues: Integer with a minimum value of 1 | type: Integermultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| thresholdInfoList | List of threshold infos. | type: ThresholdInfomultiplicity: 1..\*isOrdered: FalseisUnique: TruedefaultValue: NoneisNullable: False |
| thresholdValue | Value against which the monitored performance metric is compared at a threshold level in case the hysteresis is zero.allowedValues: float or integer | type: Unionmultiplicity: 1isOrdered: NAisUnique: NAdefaultValue: NoneisNullable: False |
| hysteresis | Hysteresis of a threshold. If this attribute is present the monitored performance metric is not compared against the threshold value as specified by the thresholdValue attribute but against a high and low threshold value given byhighThresholdValue- = thresholdValue + hysteresislowThresholdValue = thresholdValue - hysteresisWhen going up, the threshold is triggered when the performance metric reaches or crosses the high threshold value. When going down, the threshold is triggered when the performance metric reaches or crosses the low threshold value.A hysteresis may be present only when the monitored performance metric is not of type counter that can go up only. If present for a performance metric of type counter, it shall be ignored.allowedValues: non-negative float or integer | type: Unionmultiplicity: 0..1isOrdered: NAisUnique: NAdefaultValue: NoneisNullable: False |
| thresholdDirection | Direction of a threshold indicating the direction for which a threshold crossing triggers a threshold.When the threshold direction is configured to "UP", the associated treshold is triggered only when the performance metric value is going up upon reaching or crossing the threshold value. The treshold is not triggered, when the performance metric is going down upon reaching or crossing the threshold value.Vice versa, when the threshold direction is configured to "DOWN", the associated treshold is triggered only when the performance metric is going down upon reaching or crossing the threshold value. The treshold is not triggered, when the performance metric is going up upon reaching or crossing the threshold value.When the threshold direction is set to "UP\_AND\_DOWN" the treshold is active in both direcions.In case a threshold with hysteresis is configured, the threshold direction attribute shall be set to "UP\_AND\_DOWN".allowedValues:- UP- DOWN- UP\_AND\_DOWN | type: ENUMmultiplicity: 1isOrdered: NAisUnique: NAdefaultValue: NoneisNullable: False |
| objectClass | Class of a managed object instance.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| objectInstance | Managed object instance identified by its DN.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| objectInstances | List of managed object instances. Each object instance is identified by its DN.allowedValues: N/A | type: Dnmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| peeParametersList | This attribute contains the parameter list for the control and monitoring of power, energy and environmental parameters of ManagedFunction instance(s). This list contains the following parameters:- siteIdentification- siteLatitude (optional)- siteLongitude (optional)- siteDescription - equipmentType- environmentType- powerInterface siteIdentification: The identification of the site where the ManagedFunction resides.allowedValues: N/AsiteLatitude: The latitude of the site where the ManagedFunction instance resides, based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to the northern hemisphere. This attribute is optional in case of BTSFunction and RNCFunction instance(s).allowedValues: -90.0000 to +90.0000siteLongitude: The longitude of the site where the ManagedFunction instance resides, based on World Geodetic System (1984 version) global reference frame (WGS 84). Positive values correspond to degrees east of 0 degrees longitude. This attribute is optional in case of BTSFunction and RNCFunction instance(s).allowedValues: -180.0000 to +180.0000siteDescription: An operator defined description of the site where the ManagedFunction instance resides.allowedValues: N/A equipmentType: The type of equipment where the managedFunction instance resides. allowedValues: see clause 4.4.1 of ETSI ES 202 336-12 [18].environmentType: The type of environment where the managedFunction instance resides. allowedValues: see clause 4.4.1 of ETSI ES 202 336-12 [18].powerInterface: The type of power.allowedValues: see clause 4.4.1 of ETSI ES 202 336-12 [18]. | type: Stringmultiplicity: 0..\*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: True |
| priorityLabel | This is a label that consumer would assign a value on a concrete instance of the managed object. The management system takes the value of this attribute into account. The effect of this attribute value to the subject managed entity is not standardized | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| protocolVersion | Versions(s) and additional descriptive information for the protocol(s) used for the associated communication link. Syntax and semantic is not specified.allowedValues: N/A | type: Stringmultiplicity: \*isOrdered: FalseisUnique: TruedefaultValue: NoneisNullable: False |
| setOfMcc | Set of Mobile Country Code (MCC). The MCC uniquely identifies the country of domicile of the mobile subscriber. MCC is part of the IMSI (TS 23.003 [5])This list contains all the MCC values in subordinate object instances to this SubNetwork instance.allowedValues: See clause 2.3 of TS 23.003 [5] for MCC allocation principles. | type: Integermultiplicity: 1..\*isOrdered: FalseisUnique: TruedefaultValue: No default valueisNullable: False |
| swVersion | The software version of the ManagementNode or ManagedElement (this is used for determining which version of the vendor specific information is valid for the ManagementNode or ManagedElement).allowedValues: N/A | type: Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| systemDN | The Distinguished Name (DN) of IRPAgent (or consumer). Defined in 3GPP TS 32.300.allowedValues: N/A | type: DNmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| userDefinedState | An operator defined state for operator specific usage.allowedValues: N/A | type: Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| userLabel | A user-friendly (and user assignable) name of this object.allowedValues: N/A | type: Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| vendorName | The name of the vendor.allowedValues: N/A | type: Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| vnfParametersList | This attribute contains the parameter set of the VNF instance(s) corresponding to an NE. Each entry in the list contains:- vnfInstanceId- vnfdId (optional)- flavourId (optional) - autoScalable vnfInstanceId: VNF instance identifier (vnfInstanceId, see section 9.4.2 of [16] and section B2.4.2.1.2.3 of [17]).See Note 1.vnfdId: Identifier of the VNFD on which the VNF instance is based, see section 9.4.2 of [16]. This attribute is optional.Note: the value of this attribute is identical to that of the same attribute in clause 9.4.2 of ETSI GS NFV-IFA 008 [16].flavourId: Identifier of the VNF Deployment Flavour applied to this VNF instance, see section 9.4.3 of [16]. This attribute is optional.Note: the value of this attribute is identical to that of the same attribute in clause 9.4.3 of ETSI GS NFV-IFA 008 [16].autoScalable: Indicator of whether the auto-scaling of this VNF instance is enabled or disabled. The type is Boolean.See Note2.The presence of this attribute indicates that the ManagedFunction represented by the MOI is a virtualized function. See Note 3.allowedValues: N/AA string length of zero for vnfInstanceId means the VNF instance(s) corresponding to the MOI does not exist (e.g. has not been instantiated yet, has already been terminated). | type: Stringmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: True |
| vsData | Vendor specific attributes of the type vsDataType. The attribute definitions including constraints (value ranges, data types, etc.) are specified in a vendor specific data format file. allowedValues: -- | type: --multiplicity: --isOrdered: --isUnique: --defaultValue: --isNullable: False |
| vsDataFormatVersion | Name of the data format file, including version.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| vsDataType | Type of vendor specific data contained by this instance, e.g. relation specific algorithm parameters, cell specific parameters for power control or re-selection or a timer. The type itself is also vendor specific.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| supportedPerfMetricGroups | A set of performance metric groups. When this attribute is contained in a managed object it may define performance metrics for this object and all descendant objects.allowedValues: N/A | type: SupportedPerfMetricGroupmultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneallowedValues: N/AisNullable: False |
| performanceMetrics | List of performance metrics.Performance metrics include measurements defined in TS 28.552 [20] and KPIs defined in TS 28.554 [28]. Performance metrics can also be those specified by other SDOs or vendor specific metrics. Performance metrics are identified with their names. A name can als identify a vendor specific group of performance metrics.For measurements defined in TS 28.552 [20] the name is constructed as follows:- "family.measurementName.subcounter" for measurement types with subcounters- "family.measurementName" for measurement types without subcounters- "family" for measurement familiesFor KPIs defined in TS 28.554 [28] the name is defined in the KPI definitions template as the component designated with e).allowedValues: N/A | type: Stringmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| rootObjectInstances | List of object instances. Each object instance is identified by its DN and designates the root of a subtree that contains the root object and all descendant objects. | Type: Dnmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| reportingMethods | List of reporting methods for performance metricsallowedValues:  - "FILE\_BASED\_LOC\_SET\_BY\_PRODUCER", - "FILE\_BASED\_LOC\_SET\_BY\_CONSUMER", - "STREAM\_BASED" | Type: ENUMmultiplicity: \*isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| nFServiceType | The parameter defines the type of the managed NF service instanceallowedValues: See clause 7.2 of TS 23.501[22] | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: NoneisNullable: False |
| operations | This parameter defines set of operations supported by the managed NF service instance.allowedValues: See TS 23.502[23] for supporting operations | type: Operationmultiplicity: 1..\*isOrdered: FalseisUnique: FalsedefaultValue: No default valueisNullable: False |
| Operation.name | This parameter defines the name of the operation of the managed NF service instance.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: FalseisUnique: FalsedefaultValue: NoneisNullable: True |
| allowedNFTypes | This parameter identifies the type of network functions allowed to access the operation of the managed NF service instance.allowedValues: See TS 23.501[22] for NF types | type: ENUMmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| operationSemantics | This paramerter identifies the semantics type of the operation. See TS 23.502[23]allowedValues: “Request/Response”, “Subscribe/Notify”.  | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| sAP | This parameter specifies the service access point of the managed NF service instance.allowedValues: N/A | type: SAPmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| host | This parameter specifies the host address of the managed NF service instance. It can be FQDN (See TS 23.003 [5]) or an IPv4 address (See RFC 791 [24]) or an IPv6 address (See RFC 2373 [25]).allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: FalseisUnique: N/AdefaultValue: NoneisNullable: False |
| port | This parameter specifies the transport port of the managed NF service instance.allowedValues: 1 - 65535 | type: Integermultiplicity: 1isOrdered: FalseisUnique: FalsedefaultValue: NoneisNullable: False |
| usageStae | Usage state of a managed object instance. It describes whether the resource is actively in use at a specific instant, and if so, whether or not it has spare capacity for additional users at that instant. allowedValues: "IDLE", "ACTIVE", "BUSY".The meaning of these values is as defined in 3GPP TS 28.625 [21] and ITU-T X.731 [19]. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| registrationState | This parameter defines the registration status of the managed NF service instance.allowedValues: "Registered", "Deregistered". | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: DeregisteredisNullable: False |
| jobId | Id for a PerfMetricJob job. | type: Stringmultiplicity: 0..1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| granularityPeriod | Granularity period used to produce measurements. The period is defined in seconds.See Note 4.allowedValues: Integer with a minimum value of 1 | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| granularityPeriods | Granularity periods supported for the production of associated measurement types. The period is defined in seconds.allowedValues: Integer with a minimum value of 1 | type: Integermultiplicity: \*isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| reportingCtrl | Selecting the reporting method and defining associated control parameters. | type: ReportingCtrlmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| fileReportingPeriod | For the file-based reporting method this is the time window during which collected measurements are stored into the same file before the file is closed and a new file is opened. The period is defined in minutes.allowedValues: Multiples of granularityPeriod | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| fileLocation | File location allowedValues: Not applicable. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: True |
| streamTarget | The stream target for the stream-based reporting method.allowedValues: N/A | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: None isNullable: True |
| administrativeState | Administrative state of a managed object instance. The administrative state describes the permission to use or prohibition against using the object instance. The adminstrative state is set by the MnS consumer.allowedValues: LOCKED, UNLOCKED.  | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: LOCKEDisNullable: False |
| operationalState | Operational state of manged object instance. The operational state describes if an object instance is operable ("ENABLED") or inoperable ("DISABLED"). This state is set by the object instance or the MnS producer and is hence READ-ONLY.allowedValues: ENABLED, DISABLED. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: DISABLEDisNullable: False |
| alarmRecords | List of alarm recordsallowedValues: N/A | type: AlarmRecordmultiplicity: \*isOrdered: N/AisUnique: Truedefault value: NoneisNullable: True |
| numOfAlarmRecords | Number of alarm records in the AlarmList.allowedValues: 0 to x where x is vendor specific. | type: integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| lastModification | Time an alarm record was modified the last timeallowedValues: N/A | type: DateTimemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NoneisNullable: False |
| tjJobType | It specifies the MDT mode and it specifies also whether the TraceJob represents only MDT, Logged MBSFN MDT, Trace or a combined Trace and MDT job. The attribute is applicable for Trace, MDT, RCEF and RLF reporting.See the clause 5.9a of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: TRACE\_ONLYisNullable: False |
| tjListOfInterfaces | It specifies the interfaces that need to be traced in the given ManagedEntityFunction.The attribute is applicable only for Trace. In case this attribute is not used, it carries a null semantic.See the clause 5.5 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoisNullable: True |
| tjListOfNeTypes | It specifies in which type of ManagedFunction the trace should be activated. The attribute is applicable only for Trace with Signalling Based Trace activation. In case this attribute is not used, it carries a null semantic.See the clause 5.4 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoisNullable: True |
| tjPLMNTarget | It specifies which PLMN that the subscriber of the session to be recorded uses as selected PLMN. PLMN Target might differ from the PLMN specified in the Trace Reference.See the clause 5.9b of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: No isNullable: True |
| tjStreamingTraceConsumerURI | It specifies the URI of the Streaming Trace data reporting MnS consumer (a.k.a. streaming target).See the clause 5.9 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjTraceCollectionEntityAddress | It specifies the address of the Trace Collection Entity when the attribute tjTraceReportingFormat is configured for the file-based reporting. The attribute is applicable for both Trace and MDT.See the clause 5.9 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjTraceDepth | It specifies the trace depth. The attribute is applicable only for Trace. In case this attribute is not used, it carries a null semantic.See the clause 5.3 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: MAXIMUM isNullable: True |
| tjTraceReference | A globally unique identifier, which uniquely identifies the Trace Session that is created by the TraceJob. In case of shared network, it is the MCC and MNC of the Participating Operator that request the trace session that shall be provided.The attribute is applicable for both Trace and MDT.See the clause 5.6 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Integermultiplicity: 1isOrdered: N/AisUnique: TruedefaultValue: None isNullable: False |
| tjTraceReportingFormat | It specifies the trace reporting format - streaming trace reporting or file-based trace reporting.See the clause 5.11 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: FILE isNullable: False |
| tjTraceTarget | It specifies the target object of the Trace and MDT. The attribute is applicable for both Trace and MDT. This attribute includes the ID type of the target as an enumeration and the ID value.See the 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjTriggeringEvent | It specifies the triggering event parameter of the trace session. The attribute is applicable only for Trace. In case this attribute is not used, it carries a null semantic.See the clause 5.1 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTAnonymizationOfData | It specifies the level of anonymization for management based MDT.See the clause 5.10.12 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: NO\_IDENTITY isNullable: True |
| tjMDTAreaConfigurationForNeighCell | It specifies the area for which UE is requested to perform measurement logging for neighbour cells which have list of frequencies. If it is not configured, the UE shall perform measurement logging for all the neighbour cells.Applicable only to NR Logged MDT.See the clause 5.10.26 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTAreaScope | It specifies MDT area scope when activates an MDT job. For RLF and RCEF reporting it specifies the eNB or list of eNBs where the RLF or RCEF reports should be collected.List of cells/TA/LA/RA for signaling based MDT or management based Logged MDT.List of cells for management based Immediate MDT.Cell, TA, LA, RA are mutually exclusive.One or list of eNBs for RLF and RCEFreportingSee the clause 5.10.2 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTCollectionPeriodRrmLte | It specifies the collection period for collecting RRM configured measurement samples for M2, M3 in LTE. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.20 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTCollectionPeriodRrmUmts | It specifies the collection period for collecting RRM configured measurement samples for M3, M4, M5 in UMTS. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.21 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTEventListForTriggeredMeasurement | It specifies event types for event triggered measurement in the case of logged NR MDT. Each trace session may configure at most one event. The UE shall perform logging of measurements only upon certain condition being fulfilled:- Out of coverage.- A2 event.See the clause 5.10.28 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTEventThreshold | It specifies the threshold which should trigger the reporting in case A2 event reporting in LTE or 1F/1l event in UMTS. The attribute is applicable only for Immediate MDT and when reportingTrigger is configured for A2 event in LTE or 1F event or 1l event in UMTS. In case this attribute is not used, it carries a null semantic.See the clauses 5.10.7 and 5.10.7a of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTListOfMeasurements | It specifies the UE measurements that shall be collected in an Immediate MDT job. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.3 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTLoggingDuration | It specifies how long the MDT configuration is valid at the UE in case of Logged MDT. The attribute is applicable only for Logged MDT and Logged MBSFN MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.9 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTLoggingInterval | It specifies the periodicty for Logged MDT. The attribute is applicable only for Logged MDT and Logged MBSFN MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.8 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTMBSFNAreaList | The MBSFN Area consists of a MBSFN Area ID and Carrier Frequency (EARFCN). The target MBSFN area List can have up to 8 entries. This parameter is applicable only if the job type is Logged MBSFN MDT.See the clause 5.10.25 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Stringmultiplicity: 1..8isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTMeasurementPeriodLTE | It specifies the measurement period for the Data Volume and Scheduled IP throughput measurements for MDT taken by the eNB. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.23 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTMeasurementPeriodUMTS | It specifies the measurement period for the Data Volume and Throughput measurements for MDT taken by RNC. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.22 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTCollectionPeriodRrmNR | It specifies the collection period for collecting RRM configured measurement samples for M4, M5 in NR. The attribute is applicable only for Immediate MDT. In case this attribute is not used, it carries a null semantic.See the clause 5.10.30 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTMeasurementQuantity | It specifies the measurements that are collected in an MDT job for a UMTS MDT configured for event triggered reporting.See the clause 5.10.15 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTPLMList | It indicates the PLMNs where measurement collection, status indication and log reporting is allowed.See the clause 5.10.24 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: PLMNmultiplicity: 1..16isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTPositioningMethod | It specifies what positioning method should be used in the MDT job.See the clause 5.10.19 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTReportAmount | It specifies the number of measurement reports that shall be taken for periodic reporting while the UE is in connected. The attribute is applicable only for Immediate MDT and when tjMDTReportingTrigger is configured for periodical measurements. In case this attribute is not used, it carries a null semantic.See the clause 5.10.6 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTReportingTrigger | It specifies whether periodic or event based measurements should be collected. The attribute is applicable only for Immediate MDT and when the tjMDTListOfMeasurements is configured for M1 (for both UMTS and LTE) or M2 (only for UMTS). In case this attribute is not used, it carries a null semantic.See the clause 5.10.4 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTReportInterval | It specifies the interval between the periodical measurements that shall be taken when the UE is in connected mode. The attribute is applicable only for Immediate MDT and when tjMDTReportingTrigger is configured for periodical measurements. In case this attribute is not used, it carries a null semantic.See the clause 5.10.5 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTReportType | It specifies report type for logged NR MDT as:- periodical.- event triggered.See the clause 5.10.27 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTSensorInformation | It specifies which sensor information shall be included in logged NR MDT and immediate NR MDT measurement if they are available. The following sensor measurement can be included or excluded for the UE: - Barometric pressure.- UE speed.- UE orientation.See the clause 5.10.29 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: ENUMmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| tjMDTTraceCollectionEntityID | It specifies the TCE Id which is sent to the UE in Logged MDT.See the clause 5.10.11 of 3GPP TS 32.422 [30] for additional details on the allowed values. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: No isNullable: True |
| managementDataType | This attributes defines the type of management data that are requested. Allowed values: COVERAGE, CAPACITY, SERVICE EXPERIENCE, TRACE, ENERGY EFFICIENCY, MOBILITY, ACCESSIBILITY Note: The above values can be further extended by the implementations, as appropriate | type: ENUMmultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoisNullable: True |
| targetNodeFilter | Set of information to target the Object Instance to collect the measurements from. | type: NodeFiltermultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoisNullable: True |
| areaOfInterest | It specifies a location(s) from where the management data shall be collected. It is defined in terms of TAI(s). | type: Taimultiplicity: 1..\*isOrdered: N/AisUnique: N/AdefaultValue: NoisNullable: True |
| networkDomain | It specifies the network domain of the target node. This will also result in collecting appropriate management data from the nodes belonging to the specified domain.Allowed Values: CN, RAN | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: N/AisNullable: True |
| cpUpType | It specifies the traffic type of the target node. This will also result in collecting appropriate management data from the nodes handling the specified traffic (e.g AMF for CP and UPF for UP).Allowed Values: CP, UP | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: N/AisNullable: True |
| sst | It specifies the slice service type (SST) of which the slice subnet should be targeted. Please refer to [22]. | type: Integermultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: N/AisNullable: True |
| collectionTimePeriod | Collection time duration for which the management data should be reported. | type: CollectionDurationmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: N/AisNullable: True |
| startTime | It specifies the start of collection period | type: DateTimemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: N/AisNullable: True |
| endTime | It specifies the end of collection period | type: DateTimemultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: N/AisNullable: True |
| dataScope | It specifies whether the required data is reported per S-NSSAI or per 5QI.Allowed Value: SNSSAI, 5QI | type: ENUMmultiplicity: 1isOrdered: N/AisUnique: N/AdefaultValue: N/AisNullable: True |
|  |  |  |
|  |  |  |
|  |  |  |
| NOTE 1: The value of this attribute is identical to that of the same attribute in clause 9.4.2 of ETSI GS NFV-IFA 008 [16].NOTE 2: The value of this attribute is identical to that of the same attribute included in vnfConfigurableProperty in clause 9.4.2 of ETSI GS NFV-IFA 008 [16].NOTE 3: The presence of the attribute vnfParametersList, whose vnfInstanceId with a string length of zero, in createMO operation can trigger the instantiation of the related VNF/VNFC instances.NOTE 4: The GP defines the measurement data production rate. The supported rates are dependent on the capacity of the producer involved (e.g. the processing power of the producer, the complexity of the measurement type involved etc) and therefore, it cannot be standardized for all producers involved. The supported GPs reflects the agreement between producer and the consumer involved.NOTE 5: The monitoring granularity period defines the measurements monitoring period. The supported monitoring periods are dependent on the capacity of the producer involved (e.g. the processing power of the producer, the complexity of the measurement type involved etc) and therefore, it cannot be standardized for all producers involved. The supported monitoring GPs reflect the agreement between producer and the consumer involved.NOTE 6: The supported threshold levels are dependent on the capacity of the producer involved (e.g. the processing power of the producer, number of measurements being measured by the producer at the time, the complexity of the measurement type involved etc) and therefore, it cannot be standardized for all producers involved. The supported levels can only reflect the negotiated agreement between producer and the consumer involved. |

4.4.2 Constraints

None

***Next change***

## C.4.3 OpenAPI document "genericNrm.yaml"

openapi: 3.0.1

info:

 title: Generic NRM

 version: 16.8.0

 description: >-

 OAS 3.0.1 definition of the Generic NRM

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externalDocs:

 description: 3GPP TS 28.623; Generic NRM

 url: http://www.3gpp.org/ftp/Specs/archive/28\_series/28.623/

paths: {}

components:

 schemas:

#-------- Definition of types-----------------------------------------------------

 RegistrationState:

 type: string

 enum:

 - REGISTERED

 - DEREGISTERED

 VnfParameter:

 type: object

 properties:

 vnfInstanceId:

 type: string

 vnfdId:

 type: string

 flavourId:

 type: string

 autoScalable:

 type: boolean

 PeeParameter:

 type: object

 properties:

 siteIdentification:

 type: string

 siteDescription:

 type: string

 siteLatitude:

 $ref: 'comDefs.yaml#/components/schemas/Latitude'

 siteLongitude:

 $ref: 'comDefs.yaml#/components/schemas/Longitude'

 equipmentType:

 type: string

 environmentType:

 type: string

 powerInterface:

 type: string

 ThresholdInfo:

 type: object

 properties:

 thresholdDirection:

 type: string

 enum:

 - UP

 - DOWN

 - UP\_AND\_DOWN

 thresholdValue:

 oneOf:

 - type: integer

 - $ref: 'comDefs.yaml#/components/schemas/Float'

 hysteresis:

 oneOf:

 - type: integer

 minimum: 0

 - type: number

 format: float

 minimum: 0

 Operation:

 type: object

 properties:

 name:

 type: string

 allowedNFTypes:

 $ref: '#/components/schemas/NFType'

 operationSemantics:

 $ref: '#/components/schemas/OperationSemantics'

 NFType:

 type: string

 description: ' NF name defined in TS 23.501'

 enum:

 - NRF

 - UDM

 - AMF

 - SMF

 - AUSF

 - NEF

 - PCF

 - SMSF

 - NSSF

 - UDR

 - LMF

 - GMLC

 - 5G\_EIR

 - SEPP

 - UPF

 - N3IWF

 - AF

 - UDSF

 - DN

 OperationSemantics:

 type: string

 enum:

 - REQUEST\_RESPONSE

 - SUBSCRIBE\_NOTIFY

 SAP:

 type: object

 properties:

 host:

 $ref: 'comDefs.yaml#/components/schemas/HostAddr'

 port:

 type: integer

 NFServiceType:

 type: string

 enum:

 - Namf\_Communication

 - Namf\_EventExposure

 - Namf\_MT

 - Namf\_Location

 - Nsmf\_PDUSession

 - Nsmf\_EventExposure

 - Others

 TransportProtocol:

 anyOf:

 - type: string

 enum:

 - TCP

 - type: string

 SupportedPerfMetricGroup:

 type: object

 properties:

 performanceMetrics:

 type: array

 items:

 type: string

 granularityPeriods:

 type: array

 items:

 type: integer

 minimum: 1

 reportingMethods:

 type: array

 items:

 type: string

 enum:

 - FILE\_BASED\_LOC\_SET\_BY\_PRODUCER

 - FILE\_BASED\_LOC\_SET\_BY\_CONSUMER

 - STREAM\_BASED

 monitorGranularityPeriods:

 type: array

 items:

 type: integer

 minimum: 1

 ReportingCtrl:

 oneOf:

 - type: object

 properties:

 fileReportingPeriod:

 type: integer

 - type: object

 properties:

 fileReportingPeriod:

 type: integer

 fileLocation:

 $ref: 'comDefs.yaml#/components/schemas/Uri'

 - type: object

 properties:

 streamTarget:

 $ref: 'comDefs.yaml#/components/schemas/Uri'

 Scope:

 type: object

 properties:

 scopeType:

 type: string

 enum:

 - BASE\_ONLY

 - BASE\_ALL

 - BASE\_NTH\_LEVEL

 - BASE\_SUBTREE

 scopeLevel:

 type: integer

 AreaScope:

 oneOf:

 - type: array

 items:

 $ref: '#/components/schemas/EutraCellId'

 - type: array

 items:

 $ref: '#/components/schemas/NrCellId'

 - type: array

 items:

 $ref: '#/components/schemas/Tac'

 - type: array

 items:

 $ref: '#/components/schemas/Tai'

 Tai:

 type: object

 properties:

 mcc:

 $ref: 'comDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'comDefs.yaml#/components/schemas/Mnc'

 tac:

 $ref: '#/components/schemas/Tac'

 AreaConfig:

 type: object

 properties:

 freqInfo:

 $ref: '#/components/schemas/FreqInfo'

 pciList:

 type: array

 items:

 type: integer

 FreqInfo:

 description: specifies the carrier frequency and bands used in a cell.

 type: object

 properties:

 arfcn:

 type: integer

 freqBands:

 type: array

 items:

 type: integer

 MbsfnArea:

 type: object

 properties:

 mbsfnAreaId:

 type: integer

 minimum: 1

 earfcn:

 type: integer

 minimum: 1

 Tac:

 type: string

 pattern: '(^[A-Fa-f0-9]{4}$)|(^[A-Fa-f0-9]{6}$)'

 EutraCellId:

 type: string

 pattern: '^[A-Fa-f0-9]{7}$'

 NrCellId:

 type: string

 pattern: '^[A-Fa-f0-9]{9}$'

 IpAddr:

 oneOf:

 - $ref: 'comDefs.yaml#/components/schemas/Ipv4Addr'

 - $ref: 'comDefs.yaml#/components/schemas/Ipv6Addr'

#-------- Definition of types used in Trace control NRM fragment------------------

 tjJobType-Type:

 type: string

 description: Specifies whether the TraceJob represents only MDT, Logged MBSFN MDT, Trace or a combined Trace and MDT job. Applicable for Trace, MDT, RCEF and RLF reporting. See 3GPP TS 32.422 clause 5.9a for additional details.

 enum:

 - IMMEDIATE\_MDT\_ONLY

 - LOGGED\_MDT\_ONLY

 - TRACE\_ONLY

 - IMMEDIATE\_MDT AND TRACE

 - RLF\_REPORT\_ONLY

 - RCEF\_REPORT\_ONLY

 - LOGGED\_MBSFN\_MDT

 tjListOfInterfaces-Type:

 description: The interfaces to be recorded in the Network Element. See 3GPP TS 32.422 clause 5.5 for additional details.

 type: object

 properties:

 MSCServerInterfaces:

 type: array

 items:

 type: string

 enum:

 - A

 - Iu-CS

 - Mc

 - MAP-G

 - MAP-B

 - MAP-E

 - MAP-F

 - MAP-D

 - MAP-C

 - CAP

 MGWInterfaces:

 type: array

 items:

 type: string

 enum:

 - Mc

 - Nb-UP

 - Iu-UP

 RNCInterfaces:

 type: array

 items:

 type: string

 enum:

 - Iu-CS

 - Iu-PS

 - Iur

 - Iub

 - Uu

 SGSNInterfaces:

 type: array

 items:

 type: string

 enum:

 - Gb

 - Iu-PS

 - Gn

 - MAP-Gr

 - MAP-Gd

 - MAP-Gf

 - Ge

 - Gs

 - S6d

 - S4

 - S3

 - S13

 GGSNInterfaces:

 type: array

 items:

 type: string

 enum:

 - Gn

 - Gi

 - Gmb

 S-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - Mw

 - Mg

 - Mr

 - Mi

 P-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - Gm

 - Mw

 I-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - Cx

 - Dx

 - Mg

 - Mw

 MRFCInterfaces:

 type: array

 items:

 type: string

 enum:

 - Mp

 - Mr

 MGCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - Mg

 - Mj

 - Mn

 IBCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - Ix

 - Mx

 E-CSCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - Mw

 - Ml

 - Mm

 - Mi/Mg

 BGCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - Mi

 - Mj

 - Mk

 ASInterfaces:

 type: array

 items:

 type: string

 enum:

 - Dh

 - Sh

 - ISC

 - Ut

 HSSInterfaces:

 type: array

 items:

 type: string

 enum:

 - MAP-C

 - MAP-D

 - Gc

 - Gr

 - Cx

 - S6d

 - S6a

 - Sh

 EIRInterfaces:

 type: array

 items:

 type: string

 enum:

 - MAP-F

 - S13

 - MAP-Gf

 BM-SCInterfaces:

 type: array

 items:

 type: string

 enum:

 - Gmb

 MMEInterfaces:

 type: array

 items:

 type: string

 enum:

 - S1-MME

 - S3

 - S6a

 - S10

 - S11

 - S13

 SGWInterfaces:

 type: array

 items:

 type: string

 enum:

 - S4

 - S5

 - S8

 - S11

 - Gxc

 PDN\_GWInterfaces:

 type: array

 items:

 type: string

 enum:

 - S2a

 - S2b

 - S2c

 - S5

 - S6b

 - Gx

 - S8

 - SGi

 eNBInterfaces:

 type: array

 items:

 type: string

 enum:

 - S1-MME

 - X2

 en-gNBInterfaces:

 type: array

 items:

 type: string

 enum:

 - S1-MME

 - X2

 - Uu

 - F1-C

 - E1

 AMFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N1

 - N2

 - N8

 - N11

 - N12

 - N14

 - N15

 - N20

 - N22

 - N26

 AUSFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N12

 - N13

 NEFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N29

 - N30

 - N33

 NRFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N27

 NSSFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N22

 - N31

 PCFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N5

 - N7

 - N15

 SMFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N4

 - N7

 - N10

 - N11

 - S5-C

 SMSFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N20

 - N21

 UDMInterfaces:

 type: array

 items:

 type: string

 enum:

 - N8

 - N10

 - N13

 - N21

 UPFInterfaces:

 type: array

 items:

 type: string

 enum:

 - N4

 ng-eNBInterfaces:

 type: array

 items:

 type: string

 enum:

 - NG-C

 - Xn-C

 - Uu

 gNB-CU-CPInterfaces:

 type: array

 items:

 type: string

 enum:

 - NG-C

 - Xn-C

 - Uu

 - F1-C

 - E1

 - X2-C

 gNB-CU-UPInterfaces:

 type: array

 items:

 type: string

 enum:

 - E1

 gNB-DUInterfaces:

 type: array

 items:

 type: string

 enum:

 - F1-C

 tjListOfNeTypes-Type:

 description: The Network Element types where Trace Session activation is needed. See 3GPP TS 32.422 clause 5.4 for additional details.

 type: array

 items:

 type: string

 enum:

 - MSC\_SERVER

 - SGSN

 - MGW

 - GGSN

 - RNC

 - BM\_SC

 - MME

 - SGW

 - PGW

 - ENB

 - EN\_GNB

 - GNB\_CU\_CP

 - GNB\_CU\_UP

 - GNB\_DU

 - AMF

 - PCF

 - SMF

 - UPF

 - AUSF

 - SMSF

 tjPLMNTaget-Type:

 type: object

 description: The PLMN for which sessions shall be selected in the Trace Session in case of management based activation when several PLMNs are supported in the RAN (this means that shared cells and not shared cells are allowed for the specified PLMN. Note that the PLMN Target might differ from the PLMN specified in the Trace Reference, as that specifies the PLMN that is containing the management system requesting the Trace Session from the NE. See 3GPP TS 32.422 clause 5.9b for additional details.

 properties:

 mcc:

 $ref: 'comDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'comDefs.yaml#/components/schemas/Mnc'

 required:

 - mcc

 - mnc

 tjTraceDepth-Type:

 description: Specifies how detailed information should be recorded in the Network Element. The Trace Depth is a paremeter for Trace Session level, i.e., the Trace Depth is the same for all of the NEs to be traced in the same Trace Session. See 3GPP TS 32.422 clause 5.3 for additional details.

 type: string

 enum:

 - MINIMUM

 - MEDIUM

 - MAXIMUM

 - VENDORMINIMUM

 - VENDORMEDIUM

 - VENDORMAXIMUM

 tjTraceReference-Type:

 type: object

 description: The Trace Reference parameter shall be globally unique, therefore the Trace Reference shall compose as follows - MCC+MNC+Trace ID, where the MCC and MNC are coming with the Trace activation request from the management system to identify one PLMN containing the management system, and Trace ID is a 3 byte Octet String. See 3GPP TS 32.422 clause 5.6 for additional details.

 properties:

 mcc:

 $ref: 'comDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'comDefs.yaml#/components/schemas/Mnc'

 traceId:

 type: string

 required:

 - mcc

 - mnc

 - traceId

 tjTraceReportingFormat-Type:

 type: string

 description: Specifies whether file-based or streaming reporting shall be used for this Trace Session. See 3GPP TS 32.422 clause 5.11 for additional details.

 enum:

 - FILE-BASED

 - STREAMING

 tjTraceTarget-Type:

 type: object

 description: Trace target conveying both the type and value of the target ID. For additional details see 3GPP TS 32.422

 properties:

 TargetIdType:

 type: string

 enum:

 - IMSI

 - IMEI

 - IMEISV

 - PUBLIC\_ID

 - UTRAN\_CELL

 - E-UTRAN\_CELL

 - NG-RAN\_CELL

 - eNB

 - RNC

 - gNB

 - SUPI

 TargetIdValue:

 type: string

 required:

 - TargetIdType

 - TargetIdValue

 tjTriggeringEvent-Type:

 type: object

 description: Specifies when to start a Trace Recording Session and which message shall be recorded first, when to stop a Trace Recording Session and which message shall be recorded last respectively. See 3GPP TS 32.422 clause 5.1 for additional detials.

 properties:

 NetworkElement:

 type: string

 enum:

 - MSC\_SERVER

 - SGSN

 - MGW

 - GGSN

 - BM\_SC

 - MME

 - SGW

 - PGW

 - AMF

 - SMF

 - PCF

 - UPF

 - AUSF

 - NEF

 - NRF

 - NSSF

 - SMSF

 - UDM

 EventBitmap:

 type: integer

 required:

 - NetworkElement

 - EventBitmap

 tjMDTAnonymizationOfData-Type:

 description: Specifies level of MDT anonymization. For additional details see 3GPP TS 32.422 clause 5.10.12.

 type: string

 enum:

 - NO\_IDENTITY

 - TAC\_OF\_IMEI

 tjMDTCollectionPeriodRrmLte-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.20.

 type: string

 enum:

 - 100ms

 - 1000ms

 - 1024ms

 - 1280ms

 - 2048ms

 - 2560ms

 - 5120ms

 - 10000ms

 - 10240ms

 - 60000ms

 tjMDTCollectionPeriodM6Lte-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.32.

 type: string

 enum:

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 tjMDTCollectionPeriodM7Lte-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.33.

 type: integer

 minimum: 1

 maximum: 60

 tjMDTCollectionPeriodRrmUmts-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.21.

 type: string

 enum:

 - 250ms

 - 500ms

 - 1000ms

 - 2000ms

 - 3000ms

 - 4000ms

 - 6000ms

 - 8000ms

 - 12000ms

 - 16000ms

 - 20000ms

 - 24000ms

 - 28000ms

 - 32000ms

 - 64000ms

 tjMDTCollectionPeriodRrmNR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.30.

 type: string

 enum:

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 60000ms

 tjMDTCollectionPeriodM6NR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.34.

 type: string

 enum:

 - 120ms

 - 240ms

 - 480ms

 - 640ms

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 20480ms

 - 40960ms

 - 1min

 - 6min

 - 12min

 - 30min

 tjMDTCollectionPeriodM7NR-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.35.

 type: integer

 minimum: 1

 maximum: 60

 tjMDTEventListForTriggeredMeasurement-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.28.

 type: string

 enum:

 - OUT\_OF\_COVERAGE

 - A2\_EVENT

 tjMDTEventThreshold-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.7, 5.10.7a, 5.10.13 and 5.10.14.

 type: object

 properties:

 EventThresholdRSRP:

 oneOf:

 - type: integer

 minimum: 0

 maximum: 97

 - type: integer

 minimum: 0

 maximum: 127

 EventThresholdRSRQ:

 oneOf:

 - type: integer

 minimum: 0

 maximum: 34

 - type: integer

 minimum: 0

 maximum: 127

 EventThreshold1F:

 type: object

 properties:

 CPICH\_RSCP:

 type: integer

 minimum: -120

 maximum: 25

 CPICH\_EcNo:

 type: integer

 minimum: -24

 maximum: 0

 PathLoss:

 type: integer

 minimum: 30

 maximum: 165

 EventThreshold1I:

 type: integer

 minimum: -120

 maximum: 25

 tjMDTListOfMeasurements-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.3 for details.

 type: object

 properties:

 UMTS:

 type: array

 items:

 type: string

 enum:

 - M1

 - M2

 - M3

 - M4

 - M5

 - M6\_DL

 - M6\_UL

 - M7\_DL

 - M7\_UL

 LTE:

 type: array

 items:

 type: string

 enum:

 - M1

 - M2

 - M3

 - M4

 - M5

 - M1\_EVENT\_TRIGGERED

 - M6

 - M7

 - M8

 - M9

 NR:

 type: array

 items:

 type: string

 enum:

 - M1

 - M2

 - M3

 - M4

 - M5

 - M6

 - M7

 - M1\_EVENT\_TRIGGERED

 - M8

 - M9

 tjMDTLoggingDuration-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.9.

 type: string

 enum:

 - 600s

 - 1200s

 - 2400s

 - 3600s

 - 5400s

 - 7200s

 tjMDTLoggingInterval-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.8.

 type: object

 properties:

 UMTS:

 type: array

 items:

 type: string

 enum:

 - 1.28s

 - 2.56s

 - 5.12s

 - 10.24s

 - 20.48s

 - 30.72s

 - 40.96s

 - 61.44s

 LTE:

 type: array

 items:

 type: string

 enum:

 - 1.28s

 - 2.56s

 - 5.12s

 - 10.24s

 - 20.48s

 - 30.72s

 - 40.96s

 - 61.44s

 NR:

 type: array

 items:

 type: string

 enum:

 - 0.32s

 - 0.64s

 - 1.28s

 - 2.56s

 - 5.12s

 - 10.24s

 - 20.48s

 - 30.72s

 - 40.96s

 - 61.44s

 - INFINITY

 tjMDTMeasurementPeriodLTE-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.23.

 type: string

 enum:

 - 1024ms

 - 1280ms

 - 2048ms

 - 2560ms

 - 5120ms

 - 10240ms

 - 1min

 tjMDTMeasurementPeriodUMTS-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.22.

 type: string

 enum:

 - 250ms

 - 500ms

 - 1000ms

 - 2000ms

 - 3000ms

 - 4000ms

 - 6000ms

 - 8000ms

 - 12000ms

 - 16000ms

 - 20000ms

 - 24000ms

 - 28000ms

 - 32000ms

 - 64000ms

 tjMDTMeasurementQuantity-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.15.

 type: string

 enum:

 - CPICH\_EcNo

 - CPICH\_RSCP

 - PathLoss

 tjMDTPLMList-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.24.

 type: array

 items:

 type: object

 properties:

 mcc:

 $ref: 'comDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'comDefs.yaml#/components/schemas/Mnc'

 required:

 - mcc

 - mnc

 maxItems: 16

 NodeFilter:

 type: array

 items:

 type: object

 properties:

 areaOfInterest:

 $ref: '#/components/schemas/Tai'

 networkDomain:

 type: string

 cPUPType:

 type: string

 sst:

 type: integer

 CollectionDuration:

 type: array

 items:

 type: object

 properties:

 startTime:

 type: date

 endTime:

 type: date

 tjMDTPositioningMethod-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.19.

 type: string

 enum:

 - GNSS

 - E-CELL\_ID

 managementDataType:

 enum:

 - COVERAGE

 - CAPACITY

 - SERVICE EXPERIENCE

 - TRACE

 - ENERGY EFFICIENCY

 - MOBILITY

 - ACCESSIBILITY

 tjMDTReportAmount-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.6.

 type: string

 enum:

 - 1

 - 2

 - 4

 - 8

 - 16

 - 32

 - 64

 - INFINITY

 tjMDTReportingTrigger-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.4.

 type: array

 items:

 type: string

 enum:

 - PERIODICAL

 - A2\_FOR\_LTE\_NR

 - 1F\_FOR\_UMTS

 - 1I\_FOR\_UMTS\_MCPS\_TDD

 - A2\_TRIGGERED\_PERIODIC\_FOR\_LTE\_NR

 - ALL\_CONFIGURED\_RRM\_FOR\_LTE\_NR

 - ALL\_CONFIGURED\_RRM\_FOR\_UMTS

 tjMDTReportInterval-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.5.

 type: object

 properties:

 UMTS:

 type: array

 items:

 type: string

 enum:

 - 250ms

 - 500ms

 - 1000ms

 - 2000ms

 - 3000ms

 - 4000ms

 - 6000ms

 - 8000ms

 - 12000ms

 - 16000ms

 - 20000ms

 - 24000ms

 - 28000ms

 - 32000ms

 - 64000ms

 LTE:

 type: array

 items:

 type: string

 enum:

 - 120ms

 - 240ms

 - 480ms

 - 640ms

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 60000ms

 - 360000ms

 - 720000ms

 - 1800000ms

 - 3600000ms

 NR:

 type: array

 items:

 type: string

 enum:

 - 120ms

 - 240ms

 - 480ms

 - 640ms

 - 1024ms

 - 2048ms

 - 5120ms

 - 10240ms

 - 60000ms

 - 360000ms

 - 720000ms

 - 1800000ms

 - 3600000ms

 tjMDTReportType-Type:

 description: Report type for logged NR MDT. See details in 3GPP TS 32.422 clause 5.10.27.

 type: string

 enum:

 - PERIODICAL

 - EVENT\_TRIGGERED

 tjMDTSensorInformation-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.29.

 type: array

 items:

 type: string

 enum:

 - BAROMETRIC\_PRESSURE

 - UE\_SPEED

 - UE\_ORIENTATION

 tjMDTTraceCollectionEntityID-Type:

 description: See details in 3GPP TS 32.422 clause 5.10.11. Only tceID value may be sent over the air to the UE being configured for Logged MDT.

 type: object

 properties:

 tceID:

 type: integer

 tcePLMN:

 type: object

 properties:

 mcc:

 $ref: 'comDefs.yaml#/components/schemas/Mcc'

 mnc:

 $ref: 'comDefs.yaml#/components/schemas/Mnc'

 required:

 - mcc

 - mnc

 tceAddress:

 oneOf:

 - $ref: '#/components/schemas/IpAddr'

 - $ref: 'comDefs.yaml#/components/schemas/Uri'

 required:

 - tceID

 - tcePLMN

 - tceAddress

#-------- end of Definition of types used in Trace control NRM fragment ----------

#-------- Definition of abstract IOC Top -----------------------------------------

 Top-Attr:

 # This definition will be deprecated, when all occurances of Top-Attr

 # are replaced by Top.

 type: object

 properties:

 id:

 type: string

 VsDataContainer:

 $ref: '#/components/schemas/VsDataContainer-Multiple'

 Top:

 type: object

 properties:

 id:

 type: string

 VsDataContainer:

 $ref: '#/components/schemas/VsDataContainer-Multiple'

#-------- Definition of IOCs with new name-containments defined in other TS ------

 SubNetwork-Attr:

 type: object

 properties:

 dnPrefix:

 type: string

 userLabel:

 type: string

 userDefinedNetworkType:

 type: string

 setOfMcc:

 type: array

 items:

 $ref: 'comDefs.yaml#/components/schemas/Mcc'

 priorityLabel:

 type: integer

 supportedPerfMetricGroups:

 type: array

 items:

 $ref: '#/components/schemas/SupportedPerfMetricGroup'

 ManagedElement-Attr:

 type: object

 properties:

 dnPrefix:

 type: string

 managedElementTypeList:

 type: array

 items:

 type: string

 userLabel:

 type: string

 locationName:

 type: string

 managedBy:

 $ref: 'comDefs.yaml#/components/schemas/DnList'

 vendorName:

 type: string

 userDefinedState:

 type: string

 swVersion:

 type: string

 priorityLabel:

 type: integer

 supportedPerfMetricGroups:

 type: array

 items:

 $ref: '#/components/schemas/SupportedPerfMetricGroup'

 SubNetwork-ncO:

 type: object

 properties:

 ManagementNode:

 $ref: '#/components/schemas/ManagementNode-Multiple'

 MnsAgent:

 $ref: '#/components/schemas/MnsAgent-Multiple'

 MeContext:

 $ref: '#/components/schemas/MeContext-Multiple'

 PerfMetricJob:

 $ref: '#/components/schemas/PerfMetricJob-Multiple'

 ThresholdMonitor:

 $ref: '#/components/schemas/ThresholdMonitor-Multiple'

 NtfSubscriptionControl:

 $ref: '#/components/schemas/NtfSubscriptionControl-Multiple'

 ManagementDataCollectionJob:

 $ref: '#/components/schemas/ ManagementDataCollectionJob -Multiple'

 TraceJob:

 $ref: '#/components/schemas/TraceJob-Multiple'

 AlarmList:

 $ref: '#/components/schemas/AlarmList-Single'

 ManagementDataCollectionJob:

 $ref: '#/components/schemas/ ManagementDataSubscription-Multiple'

 ManagedElement-ncO:

 type: object

 properties:

 MnsAgent:

 $ref: '#/components/schemas/MnsAgent-Multiple'

 PerfMetricJob:

 $ref: '#/components/schemas/PerfMetricJob-Multiple'

 ThresholdMonitor:

 $ref: '#/components/schemas/ThresholdMonitor-Multiple'

 NtfSubscriptionControl:

 $ref: '#/components/schemas/NtfSubscriptionControl-Multiple'

 ManagementDataCollectionJob:

 $ref: '#/components/schemas/ ManagementDataCollectionJob -Multiple'

 TraceJob:

 $ref: '#/components/schemas/TraceJob-Multiple'

 AlarmList:

 $ref: '#/components/schemas/AlarmList-Single'

 ManagementDataCollectionJob:

 $ref: '#/components/schemas/ ManagementDataSubscription-Multiple'

#-------- Definition of abstract IOCs --------------------------------------------

 ManagedFunction-Attr:

 type: object

 properties:

 userLabel:

 type: string

 vnfParametersList:

 type: array

 items:

 $ref: '#/components/schemas/VnfParameter'

 peeParametersList:

 type: array

 items:

 $ref: '#/components/schemas/PeeParameter'

 priorityLabel:

 type: integer

 supportedPerfMetricGroups:

 type: array

 items:

 $ref: '#/components/schemas/SupportedPerfMetricGroup'

 EP\_RP-Attr:

 type: object

 properties:

 userLabel:

 type: string

 farEndEntity:

 type: string

 supportedPerfMetricGroups:

 type: array

 items:

 $ref: '#/components/schemas/SupportedPerfMetricGroup'

 TraceJob-Attr:

 type: object

 description: abstract class used as a container of all TraceJob attributes

 properties:

 tjJobType:

 $ref: '#/components/schemas/tjJobType-Type'

 tjListOfInterfaces:

 $ref: '#/components/schemas/tjListOfInterfaces-Type'

 tjListOfNeTypes:

 $ref: '#/components/schemas/tjListOfNeTypes-Type'

 tjPLMNTarget:

 $ref: '#/components/schemas/tjPLMNTaget-Type'

 tjStreamingTraceConsumerURI:

 $ref: 'comDefs.yaml#/components/schemas/Uri'

 tjTraceCollectionEntityAddress:

 $ref: '#/components/schemas/IpAddr'

 tjTraceDepth:

 $ref: '#/components/schemas/tjTraceDepth-Type'

 tjTraceReference:

 $ref: '#/components/schemas/tjTraceReference-Type'

 tjTraceRecordSessionReference:

 type: string

 tjTraceReportingFormat:

 $ref: '#/components/schemas/tjTraceReportingFormat-Type'

 tjTraceTarget:

 $ref: '#/components/schemas/tjTraceTarget-Type'

 tjTriggeringEvent:

 $ref: '#/components/schemas/tjTriggeringEvent-Type'

 tjMDTAnonymizationOfData:

 $ref: '#/components/schemas/tjMDTAnonymizationOfData-Type'

 tjMDTAreaConfigurationForNeighCell:

 $ref: '#/components/schemas/AreaConfig'

 tjMDTAreaScope:

 type: array

 items:

 $ref: '#/components/schemas/AreaScope'

 tjMDTCollectionPeriodRrmLte:

 $ref: '#/components/schemas/tjMDTCollectionPeriodRrmLte-Type'

 tjMDTCollectionPeriodM6Lte:

 $ref: '#/components/schemas/tjMDTCollectionPeriodM6Lte-Type'

 tjMDTCollectionPeriodM7Lte:

 $ref: '#/components/schemas/tjMDTCollectionPeriodM7Lte-Type'

 tjMDTCollectionPeriodRrmUmts:

 $ref: '#/components/schemas/tjMDTCollectionPeriodRrmUmts-Type'

 tjMDTCollectionPeriodRrmNR:

 $ref: '#/components/schemas/tjMDTCollectionPeriodRrmNR-Type'

 tjMDTCollectionPeriodM6NR:

 $ref: '#/components/schemas/tjMDTCollectionPeriodM6NR-Type'

 tjMDTCollectionPeriodM7NR:

 $ref: '#/components/schemas/tjMDTCollectionPeriodM7NR-Type'

 tjMDTEventListForTriggeredMeasurement:

 $ref: '#/components/schemas/tjMDTEventListForTriggeredMeasurement-Type'

 tjMDTEventThreshold:

 $ref: '#/components/schemas/tjMDTEventThreshold-Type'

 tjMDTListOfMeasurements:

 $ref: '#/components/schemas/tjMDTListOfMeasurements-Type'

 tjMDTLoggingDuration:

 $ref: '#/components/schemas/tjMDTLoggingDuration-Type'

 tjMDTLoggingInterval:

 $ref: '#/components/schemas/tjMDTLoggingInterval-Type'

 tjMDTMBSFNAreaList:

 type: array

 items:

 $ref: '#/components/schemas/MbsfnArea'

 tjMDTMeasurementPeriodLTE:

 $ref: '#/components/schemas/tjMDTMeasurementPeriodLTE-Type'

 tjMDTMeasurementPeriodUMTS:

 $ref: '#/components/schemas/tjMDTMeasurementPeriodUMTS-Type'

 tjMDTMeasurementQuantity:

 $ref: '#/components/schemas/tjMDTMeasurementQuantity-Type'

 tjMDTPLMList:

 $ref: '#/components/schemas/tjMDTPLMList-Type'

 tjMDTPositioningMethod:

 $ref: '#/components/schemas/tjMDTPositioningMethod-Type'

 tjMDTReportAmount:

 $ref: '#/components/schemas/tjMDTReportAmount-Type'

 tjMDTReportingTrigger:

 $ref: '#/components/schemas/tjMDTReportingTrigger-Type'

 tjMDTReportInterval:

 $ref: '#/components/schemas/tjMDTReportInterval-Type'

 tjMDTReportType:

 $ref: '#/components/schemas/tjMDTReportType-Type'

 tjMDTSensorInformation:

 $ref: '#/components/schemas/tjMDTSensorInformation-Type'

 tjMDTTraceCollectionEntityID:

 $ref: '#/components/schemas/tjMDTTraceCollectionEntityID-Type'

 ManagedFunction-ncO:

 type: object

 properties:

 PerfMetricJob:

 $ref: '#/components/schemas/PerfMetricJob-Multiple'

 ThresholdMonitor:

 $ref: '#/components/schemas/ThresholdMonitor-Multiple'

 ManagedNFService:

 $ref: '#/components/schemas/ManagedNFService-Multiple'

 TraceJob:

 $ref: '#/components/schemas/TraceJob-Multiple'

#-------- Definition of concrete IOCs --------------------------------------------

 VsDataContainer-Single:

 type: object

 properties:

 id:

 type: string

 attributes:

 type: object

 properties:

 vsDataType:

 type: string

 vsDataFormatVersion:

 type: string

 vsData:

 nullable: true

 VsDataContainer:

 $ref: '#/components/schemas/VsDataContainer-Multiple'

 ManagedNFService-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 userLabel:

 type: string

 nFServiceType:

 $ref: '#/components/schemas/NFServiceType'

 sAP:

 $ref: '#/components/schemas/SAP'

 operations:

 type: array

 items:

 $ref: '#/components/schemas/Operation'

 administrativeState:

 $ref: 'comDefs.yaml#/components/schemas/AdministrativeState'

 operationalState:

 $ref: 'comDefs.yaml#/components/schemas/OperationalState'

 usageState:

 $ref: 'comDefs.yaml#/components/schemas/UsageState'

 registrationState:

 $ref: '#/components/schemas/RegistrationState'

 ManagementNode-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 userLabel:

 type: string

 managedElements:

 $ref: 'comDefs.yaml#/components/schemas/DnList'

 vendorName:

 type: string

 userDefinedState:

 type: string

 locationName:

 type: string

 swVersion:

 type: string

 MnsAgent:

 $ref: '#/components/schemas/MnsAgent-Multiple'

 MnsAgent-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 systemDN:

 $ref: 'comDefs.yaml#/components/schemas/Dn'

 MeContext-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 dnPrefix:

 type: string

 PerfMetricJob-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 administrativeState:

 $ref: 'comDefs.yaml#/components/schemas/AdministrativeState'

 operationalState:

 $ref: 'comDefs.yaml#/components/schemas/OperationalState'

 jobId:

 type: string

 performanceMetrics:

 type: array

 items:

 type: string

 granularityPeriod:

 type: integer

 minimum: 1

 objectInstances:

 $ref: 'comDefs.yaml#/components/schemas/DnList'

 rootObjectInstances:

 $ref: 'comDefs.yaml#/components/schemas/DnList'

 reportingCtrl:

 $ref: '#/components/schemas/ReportingCtrl'

 ThresholdMonitor-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 administrativeState:

 $ref: 'comDefs.yaml#/components/schemas/AdministrativeState'

 operationalState:

 $ref: 'comDefs.yaml#/components/schemas/OperationalState'

 performanceMetrics:

 type: array

 items:

 type: string

 thresholdInfoList:

 type: array

 items:

 $ref: '#/components/schemas/ThresholdInfo'

 monitorGranularityPeriod:

 type: integer

 minimum: 1

 objectInstances:

 $ref: 'comDefs.yaml#/components/schemas/DnList'

 rootObjectInstances:

 $ref: 'comDefs.yaml#/components/schemas/DnList'

 NtfSubscriptionControl-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 notificationRecipientAddress:

 $ref: 'comDefs.yaml#/components/schemas/Uri'

 notificationTypes:

 type: array

 items:

 $ref: 'comDefs.yaml#/components/schemas/NotificationType'

 scope:

 $ref: '#/components/schemas/Scope'

 notificationFilter:

 type: string

 HeartbeatControl:

 $ref: '#/components/schemas/HeartbeatControl-Single'

 ManagementDataCollectionJob-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 managementDataType:

 $ref: '#/components/schemas/ManagementDataType'

 targetNodeFilter:

 $ref: '#/components/schemas/Nodefilter'

 collectionTimePeriod:

 $ref: '#/components/schemas/CollectionDuration'

 reportingCtrl:

 type: string

 dataScope:

 type: string

 prefMetricJobRef:

 $ref: '#/components/schemas/PrefMetricJob'

 traceJobRef:

 $ref: '#/components/schemas/TraceJob'

 HeartbeatControl-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 heartbeatNtfPeriod:

 type: integer

 triggerHeartbeatNtf:

 type: boolean

 TraceJob-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 $ref: '#/components/schemas/TraceJob-Attr'

 AlarmList-Single:

 allOf:

 - $ref: '#/components/schemas/Top'

 - type: object

 properties:

 attributes:

 type: object

 properties:

 administrativeState:

 $ref: 'comDefs.yaml#/components/schemas/AdministrativeState'

 operationalState:

 $ref: 'comDefs.yaml#/components/schemas/OperationalState'

 numOfAlarmRecords:

 type: integer

 lastModification:

 $ref: 'comDefs.yaml#/components/schemas/DateTime'

 alarmRecords:

 description: >-

 This resource represents a map of alarm records.

 The alarmIds are used as keys in the map.

 type: object

 additionalProperties:

 $ref: 'faultMnS.yaml#/components/schemas/AlarmRecord'

#-------- Definition of YAML arrays for name-contained IOCs ----------------------

 VsDataContainer-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/VsDataContainer-Single'

 ManagedNFService-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/ManagedNFService-Single'

 ManagementNode-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/ManagementNode-Single'

 MnsAgent-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/MnsAgent-Single'

 MeContext-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/MeContext-Single'

 PerfMetricJob-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/PerfMetricJob-Single'

 ThresholdMonitor-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/ThresholdMonitor-Single'

 TraceJob-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/TraceJob-Single'

 NtfSubscriptionControl-Multiple:

 type: array

 items:

 $ref: '#/components/schemas/NtfSubscriptionControl-Single'

#-------- Definitions in TS 28.623 for TS 28.532 ---------------------------------

 resources-genericNrm:

 oneOf:

 - $ref: '#/components/schemas/VsDataContainer-Single'

 - $ref: '#/components/schemas/ManagementNode-Single'

 - $ref: '#/components/schemas/MnsAgent-Single'

 - $ref: '#/components/schemas/MeContext-Single'

 - $ref: '#/components/schemas/ManagedNFService-Single'

 - $ref: '#/components/schemas/PerfMetricJob-Single'

 - $ref: '#/components/schemas/ThresholdMonitor-Single'

 - $ref: '#/components/schemas/TraceJob-Single'

 - $ref: '#/components/schemas/NtfSubscriptionControl-Single'

 - $ref: '#/components/schemas/HeartbeatControl-Single'

 - $ref: '#/components/schemas/AlarmList-Single'

***End of changes***