ETSI TS 104 232 V4.1.0 (2026-02)

TECHNICAL SPECIFICATION

Publicly Available Specification(PAS); O-RAN Type Definitions for R1 Services (O-RAN.WG2.TS R1TD-R004-v04.01)

CAUTION

The present document has been submitted to ETSI as a PAS produced by O-RAN Alliance and approved by the ETSI Technical Committee Mobile Standards Group (MSG).

Reference
DTS/MSG-001176

Keywords
interface, PAS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Contents

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI IPR online database.

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™**, **LTE™** and **5G™** logo are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM®** and the GSM logo are trademarks registered and owned by the GSM Association.

Foreword

This Technical Specification (TS) has been produced by O-RAN Alliance and approved by ETSI Technical Committee Mobile Standards Group (MSG).

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document specifies the Type Definitions for R1 Services. It is part of a TS-family covering the R1 interface specifications.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found in the ETSI docbox.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 104 231: Publicly Available Specification (PAS); "Publicly Available Specification (PAS); O-RAN R1 interface Application Protocols for R1 Services (O-RAN.WG2.TS.R1AP-R004-v08.00)", (O-RAN.WG2.TS.R1AP-R004-v08.00).

[2] O-RAN.WG2.TS.R1GAP-R004: "R1 interface: General Aspects and Principles" ("R1GAP").

[3] ETSI TS 104 230: Publicly Available Specification (PAS); "Publicly Available Specification (PAS); O-RAN R1 interface Use Cases and Requirements (O-RAN.WG2.TS.R1UCR-R004-v10.00)", (O-RAN.WG2.TS.R1UCR-R004-v10.00).

[4] Semver: "Semantic Versioning 2.0.0".

[5] json-schema 2020-12.

[6] W3C® Recommendation-xmlschema-1 (2001/05/02): "XML Schema Part 1: Structures".

[7] W3C® Recommendation -xmlschema-2 (2001/05/02): "XML Schema Part 2: Datatypes".

[8] W3C® Recommendation -xml-names (1999/01/14): "Namespaces in XML".

[9] ETSI TS 128 622: "Universal Mobile Telecommunications System (UMTS); LTE; 5G; Telecommunication management; Generic Network Resource Model (NRM) Integration Reference Point (IRP); Information Service (IS)".

[10] ETSI TS 128 532: "5G; Management and orchestration; Generic management services".

[11] IETF RFC 3339 (July 2002): "Data and Time on the Internet: Timestamps".

[12] ETSI TS 132 401: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Performance Management (PM); Concept and requirements".

[13] ETSI TS 132 300: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[14] O-RAN.WG5.O-CU-O1.0-R003: "O1 Interface Specification for O-CU-UP and O-CU-CP".

[15] O-RAN.WG5.O-DU-O1.2-R003: "O1 Interface Specification for O-DU".

[16] ETSI TS 132 422: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".

[17] ETSI TS 132 423: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Telecommunication management; Subscriber and equipment trace; Trace data definition and management".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents may be useful in implementing an ETSI deliverable or add to the reader's understanding, but are not required for conformance to the present document.

[i.1] W3C® Recommendation-xmlschema-0 (2001/05/02): "XML Schema Part 0: Primer".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in R1GAP [2], R1AP [1] and the following apply:

DME type: data type managed and exposed by the DME services and identified by a DME type identifier

NOTE: The present document defines O-RAN specific DME types and O-RAN re-uses 3GPP data types where applicable.

3.2 Symbols

Void.

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

API	Application Programming Interface
CP	Control Plane
DME	Data Management and Exposure
DN	Distinguished Name
JSON	JavaScript Object Notation
Non-RT RIC	Non-Real Time Intelligent Controller
OAM	Operation and maintenance
O-CU	O-RAN Central Unit
O-DU	O-RAN Distributed Unit
PM	Performance Measurement
RAN	Radio Access Network
RAT	Radio Access Technology
SMO	Service Management and orchestration
UP	User Plane
XML	Extensible Markup Language
XSD	XML Schema Definition

4 R1 Application data model

4.1 Introduction

The present document together with R1AP [1] defines the realization of the R1 procedures defined in R1GAP [2] and R1UCR [3].

R1AP [1] contains the service description, service operations, resource definition and the API definition (including the Open API document) for the R1 services. The present document contains the data model and the definitions of the schema-based objects transported in the procedures defined for the R1 services.

The data types defined in the present document are API-independent and are lifecycle independently from the APIs defined in R1AP [1].

4.2 Version conventions for the present document

The version number of the present document follows the "xx.yy" versioning scheme. There could be implications for the compatibility between implementations that uses DME types defined in different versions of the present document.

An incremented "xx" version field of the present document could indicate that a new major feature (e.g. a new DME type) has been added, removed or that an incompatible change has been made to one or more DME types. An incremented "yy" version field could indicate that an optional feature has been added, a technical issue has been fixed, or that clarifications or editorial corrections have been made.

The compatibility of rApps and R1 service API implementations in SMO/Non-RT RIC framework depends on the R1 service APIs and data types that are implemented. The present document handles the versions for protocol-agnostic data types used by the R1 services while the R1 service API versioning aspects are handled in R1AP [1].

5 Data type definitions for Data Management and Exposure services

5.1 Common definitions

5.1.1 Introduction

This clause provides common definitions applicable to multiple DME types.

5.1.2 Identifiers and Metadata

5.1.2.1 DME type identifier

A DME type is identified by an identifier defined as dmeTypeId in R1AP [1], clause B.4.2. The DME type identifier consists of a namespace, name and a version.

5.1.2.2 Data category

A DME type shall be assigned to at least one data category. Assigned data category values can be used as query parameter when searching for available DME types as specified in R1AP [1].

5.1.3 Versioning of DME types

When updating a DME type, the version in the DME type identifier (see clause 5.1.2.1) is updated according to SemVer [4] to reflect its compatibility with other DME types that have the same namespace and name.

Two DME types with the same namespace and name are incompatible if the major version digit in the version is different.

Two DME types are only considered to be identical if all three of their attribute's namespace, name and version are identical.

The version in the DME type identifier includes a pre-release version (e.g. "-alpha.1") if the definition of a DME type is under development.

5.1.4 Schemas for DME types

5.1.4.1 General

The definition of a DME type is based on two schemas, a data production schema and a data delivery schema.

5.1.4.2 Data production schema

The data production schema defines the structure for how to formulate parameters for the production of data instances of a DME type by a data job or a data offer. A data production schema can be based on data types defined in other specifications.

Table 5.1.4.2-1 defines the attributes of the data production schema.

Table 5.1.4.2-1: Definition of attributes for the data production schema

Attribute Name	Data Type Name	P	Cardinality	Description
dataSelector	DataSelector	M	1	Selects the data to be included in the data instance to be produced. See note 1.
targetSelector	TargetSelector	M	1	This property selects the geographical area, or the entities, for which the data instance is to be produced. See note 1.
timing	Timing	M	1	This property defines the time-related parameters for the production of the data instances. See note1.
NOTE 1: Every DME type shall define these types as part of defining the data production schema. NOTE 2: Additional attributes may be included in a data production schema.				

5.1.4.3 Data delivery schema

The data delivery schema defines the structure of the delivered content resulting from the related data job or data offer. A data delivery schema can be based on data types defined in other specifications The data delivery schema type is defined in R1AP [1].

A DME type can be defined with one or more data delivery schemas each based on different schema technologies such as for example JSON schema [5], and XSD [6], [7], [8] and [i.1].

5.1.5 Common data type definitions

5.1.5.1 Structured Data Types

5.1.5.1.1 Data type: CollectionWindow

This data type allows selecting the window for data collection and contains the attributes defined in table 5.1.5.1.1-1.

Table 5.1.5.1.1-1: Definition of data type CollectionWindow

Attribute Name	Data Type	P	Cardinality	Description
startTime	TimeOfDay	M	1	This attribute specifies the start of the collection period. See clause 5.1.2.2.
stopTime	TimeOfDay	O	0..1	This attribute specifies the end of the collection period. If not provided, the time period is indefinite. See clause 5.1.2.2.

5.1.5.2 Simple data types

Table 5.1.5.2-1: Definition of simple data types

Type Name	Type Definition	Description	Applicability
GranularityPeriod	integer	Granularity period simple data type is defined in ETSI 132 401 [12], clause 5.4.1.4.	
TimeOfDay	string	String with format as defined in IETF RFC 3339 [11], clause 5.6.	

5.1.5.3 Enumerations

5.1.5.3.1 Enumeration: DataCategory

Table 5.1.5.3.1-1: Enumeration DataCategory

Enumeration Value	Description
PERFORMANCE_MANAGEMENT_DATA	Category for DME type definitions for performance management data.

5.2 Definition of individual DME types

5.2.1 Introduction

This clause defines DME types.

A DME type can be registered and discovered using the DME services. Data instances of a DME type can be produced by means of a data job or data offer.

The definition of a DME type follows a template that includes but is not limited to:

1) the declaration of a DME type identifier;

2) the assignment of a data category;

3) the definition of the data types needed for the data production schema (in terms of data selector, target selector, timing and optionally further types) and the data delivery schema or schemas;

4) the definition of the data production schema and data delivery schema or schemas.

5.2.2 DME type: RAN OAM PM data

5.2.2.1 DME type identifier

The definition of the DME type identifier is provided in clause 5.1.2.2. The DME type for RAN OAM PM data is identified as:

DmeTypeId: ORAN:RanOamPmData:1.0.0.

5.2.2.2 Data category

The definition of the data category is provided in clause 5.1.2.1. The DME type for RAN OAM PM data is categorized as:

DataCategory: PERFORMANCE_MANAGEMENT_DATA.

5.2.2.3 Data type definitions

5.2.2.3.1 Structured data types

5.2.2.3.1.1 Data type: DataSelector

This data type allows selecting the attributes of the data instance to be produced and contains the attributes defined in table 5.2.2.3.1.1-1.

Table 5.2.2.3.1.1-1: Definition of data type DataSelector

Attribute Name	Data Type	P	Cardinality	Description
managementData	ManagementData	M	1	The definition of the managementData attribute is aligned with the definition of the ManagementData class specified in ETSI TS 128 622 [9], clause 4.3.50 with the restriction that metrics defined in ETSI TS 132 422 [16] are not allowed. The managementData attribute can be used to address performance measurements, KPIs defined by 3GPP and O-RAN, as well as vendor-specific performance measurements and KPIs. Example of O-RAN defined performance measurement for RAN OAM is defined in O1 Interface Specification for O-CU-UP and O-CU-CP [14]and O1 Interface Specification for O-DU [15].

5.2.2.3.1.2 Data type: TargetSelector

This data type allows selecting the target for which data are to be produced and contains the following attributes defined in table 5.2.2.3.1.2-1.

Table 5.2.2.3.1.2-1: Definition of data type TargetSelector

Attribute Name	Data Type	P	Cardinality	Description
nodeFilter	NodeFilter	C	0..1	The NodeFilter type is defined in ETSI TS 128 622 [9], clause 4.3.49.
objectInstances	DnList	C	0..1	See clause 5.2.2.3.1.4
NOTE: Presence condition "C" means one and only one of these attributes shall be present when this data type is used.				

5.2.2.3.1.3 Data type: Timing

This data type allows selecting the timing for production of the data instance and contains the attributes defined in table 5.2.2.3.1.3-1.

Table 5.2.2.3.1.3-1: Definition of data type Timing

Attribute Name	Data Type	P	Cardinality	Description
collectionWindow	CollectionWindow	M	1	See clause 5.1.5.1.1
granularityPeriod	GranularityPeriod	M	1	See clause 5.1.4.2
reportingPeriod	integer	C	0..1	Reporting period as defined in ETSI TS 132 401 [12], clause 5.4.1.5. (See note)
NOTE: For subscribe data procedure as defined in R1AP [1], clause 7.3.4.1.2.2, this attribute shall be present if the data is delivered in the form of files and shall be absent if the data is streamed. For data request procedure as defined in R1AP [1], clause 7.3.4.1.2.1 this attribute shall be absent.				

5.2.2.3.1.4 Data type: DnList

This data type allows selecting list of DNs and contains the attributes defined in table 5.2.2.3.1.4-1.

Table 5.2.2.3.1.4-1: Definition of data type DnList

Attribute Name	Data Type	P	Cardinality	Description
DnList	array(Dn)	M	1..N	The Dn data type is defined in ETSI TS 132 300 [13], clause 7. Example of DN in a string representation is defined in ETSI TS 132 300 [13], clause 8.

5.2.2.3.2 Simple data types

None.

5.2.2.3.3 Enumerations

None.

5.2.2.4 Schemas

5.2.2.4.1 Data production schema

The data production schema is based on the JSON schema.

```
{
  "$schema": "https://json-schema.org/draft/2020-12/schema",
  "description": "dataJobSchema for data subscription/data request",
  "version": "v1",
  "type": "object",
  "properties": {
    "dataSelector": {
      "managementData": {"$ref": "#/definitions/ManagementData"}
    },
    "targetSelector": {
      "oneOf": [
        {
          "type": "object",
          "properties": {
            "nodeFilter": {
              "$ref": "#/definitions/NodeFilter"
            }
          },
          "additionalProperties": false
        },
        {
          "type": "object",
          "properties": {
            "objectInstances": {
              "$ref": "#/definitions/DnList"
            }
          },
          "additionalProperties": false
        }
```

```
      ]
    },
    "timing": {
      "type": "object",
      "properties": {
        "collectionWindow": {
          "type": "object",
          "properties": {
            "startTime": {
              "$ref": "#/definitions/TimeOfDay"
            },
            "stopTime": {
              "$ref": "#/definitions/TimeOfDay"
            }
          },
          "additionalProperties": false,
          "required": [
            "startTime",
            "stopTime"
          ]
        },
        "granularityPeriod": {
          "$ref": "#/definitions/GranularityPeriod"
        },
        "reportingPeriod": {
          "$ref": "#/definitions/ReportingPeriod"
        }
      },
      "additionalProperties": false,
      "required": [
        "collectionWindow",
        "granularityPeriod"
      ]
    }
  },
  "required": [
    "dataSelector",
    "targetSelector"
  ],
  "definitions": {
    "ManagementData": {
      "oneOf": [
        {
          "type": "object",
          "properties": {
            "mgtDataCategory": {
              "type": "string"
            }
          },
          "additionalProperties": false,
          "required": [
            "mgtDataCategory"
          ]
        },
        {
          "type": "object",
          "properties": {
            "mgtDataName": {
              "type": "array"
            }
          },
          "additionalProperties": false,
          "required": [
            "mgtDataName"
          ]
        }
      ]
    },
    "NodeFilter": {
      "type": "array",
      "properties": {
        "areaOfInterest": {
          "$ref": "#/definitions/AreaOfInterest"
        },
        "networkDomain": {
          "$ref": "#/definitions/NetworkDomain"
        },
        "cPuPType": {
```

```
        "$ref": "#/definitions/CPuPType"
      },
      "sst": {
        "$ref": "#/definitions/Sst"
      }
    },
    "additionalProperties": false
  },
  "DnList": {
    "type": "array",
    "minItems": 1,
    "items": {
      "$ref": "#/definitions/Dn"
    }
  },
  "Dn": {
    "type": "string"
  },
  "AreaOfInterest": {
    "oneOf": [
      {
        "type": "object",
        "properties": {
          "geoAreaToCellMapping": {
            "$ref": "#/definitions/GeoAreaToCellMapping"
          }
        },
        "addtionalProperties": false,
        "required": [
          "geoAreaToCellMapping"
        ]
      },
      {
        "type": "object",
        "properties": {
          "taiList": {
            "type": "array",
            "item": {
              "$ref": "#/definitions/Tai"
            },
            "minItems": 1,
            "maxItems": 8
          }
        },
        "addtionalProperties": false,
        "required": [
          "taiList"
        ]
      },
      {
        "type": "object",
        "properties": {
          "nrCellIdList": {
            "type": "array",
            "items": {
              "$ref": "#/definitions/NrCellIdList"
            },
            "minItems": 1,
            "maxItems": 32
          }
        },
        "addtionalProperties": false,
        "required": [
          "nrCellIdList"
        ]
      },
      {
        "type": "object",
        "properties": {
          "eutraCellIdList": {
            "type": "array",
            "items": {
              "$ref": "#/definitions/E-UTRACGI"
            },
            "minItems": 1,
            "maxItems": 32
          }
        },
```

```
        "addtionalProperties": false,
        "required": [
          "eutraCellIdList"
        ]
      }
    ]
  },
  "NetworkDomain": {
    "type": "string",
    "enum": [
      "RAN",
      "CN"
    ]
  },
  "CPuPType": {
    "type": "string",
    "enum": [
      "CU",
      "UP"
    ]
  },
  "Sst": {
    "type": "integer"
  },
  "GranularityPeriod": {
    "type": "integer"
  },
  "ReportingPeriod": {
    "type": "integer"
  },
  "GeoAreaToCellMapping": {
    "type": "object",
    "properties": {
      "convexGeoPolygon": {
        "type": "array",
        "items": {
          "$ref": "#/definitions/GeoCoordinate"
        },
        "minItems": 3
      },
      "associationThreshold": {
        "type": "integer"
      }
    },
    "additionalProperties": false,
    "required": [
      "convexGeoPolygon"
    ]
  },
  "GeoCoordinate": {
    "type": "object",
    "properties": {
      "latitude": {
        "type": "number"
      },
      "longitude": {
        "type": "number"
      }
    },
    "addtionalProperties": false,
    "required": [
      "latitude",
      "longitude"
    ]
  },
  "Tai": {
    "type": "object",
    "properties": {
      "mcc": {
        "type": "integer"
      },
      "mnc": {
        "type": "integer"
      },
      "tac": {
        "type": "integer"
      }
    },
```

```
      "additionalProperties": false,
      "required": [
        "mcc",
        "mnc",
        "tac"
      ]
    },
    "NrCellIdList": {
      "oneOf": [
        {
          "type": "object",
          "properties": {
            "nrCGI": {
              "$ref": "#/definitions/NRCGI"
            }
          },
          "additionalProperties": false,
          "required": [
            "nrCGI"
          ]
        },
        {
          "type": "object",
          "properties": {
            "e-utraCGI": {
              "$ref": "#/definitions/E-UTRACGI"
            }
          },
          "additionalProperties": false,
          "required": [
            "e-utraCGI"
          ]
        }
      ]
    },
    "NRCGI": {
      "type": "object",
      "properties": {
        "plmnIdentity": {
          "type": "string",
          "format": "base64"
        },
        "nrCellIdentity": {
          "type": "string",
          "format": "base32"
        }
      },
      "addtionalProperties": false,
      "required": [
        "plmnIdentity",
        "nrCellIdentity"
      ]
    },
    "E-UTRACGI": {
      "type": "object",
      "properties": {
        "plmnIdentity": {
          "type": "string",
          "format": "base64"
        },
        "e-utraCellIdentity": {
          "type": "string",
          "format": "base32"
        }
      },
      "addtionalProperties": false,
      "required": [
        "plmnIdentity",
        "e-utraCellIdentity"
      ]
    },
    "TimeOfDay": {
      "type": "string",
      "Description": "String with format as defined in clause 5.6 of IETF RFC 3339. Examples,
20:15:00, 20:15:00-08:00 (for 8 hours behind UTC)."
    }
  }
}
```

5.2.2.4.2 Data delivery schemas

5.2.2.4.2.1 Data delivery schema# 1

This data delivery schema is based on the XML schema and is defined in ETSI TS 128 532 [10], clause 12.3.2.4.

5.2.3 DME type: RAN OAM Trace Metrics

5.2.3.1 DME type identifier

The definition of the DME type identifier is provided in clause 5.1.2.2. The DME type for RAN OAM TraceMetrics is identified as:

DmeTypeId: ORAN:RanOamTraceMetrics:1.0.0.

5.2.3.2 Data category

The definition of the data category is provided in clause 5.1.2.1. The DME type for RAN OAM TraceMetrics is categorized as:

DataCategory: RAN_OAM_TRACE_METRICS _DATA.

5.2.3.3 Data type definitions

5.2.3.3.1 Structured data types

5.2.3.3.1.1 Data type: DataSelector

This data type allows selecting the attributes of the data instance to be produced and contains the attributes defined in table 5.2.3.3.1.1-1.

Table 5.2.3.3.1.1-1: Definition of data type DataSelector

Attribute Name	Data Type	P	Cardinality	Description
supportedTraceMetrics	String	M	1	The list of trace metrics as specified in ETSI TS 128 622 [9], clause 4.4.1.

5.2.3.3.1.2 Data type: TargetSelector

This data type allows selecting the target for which data are to be produced and contains the following attributes defined in table 5.2.3.3.1.2-1.

Table 5.2.3.3.1.2-1: Definition of data type TargetSelector

Attribute Name	Data Type	P	Cardinality	Description
nodeFilter	NodeFilter	C	0..1	The NodeFilter type is defined in ETSI TS 128 622 [9], clause 4.3.49.
objectInstances	DnList	C	0..1	See clause 5.2.3.3.1.4
NOTE: Presence condition "C" means one and only one of these attributes shall be present when this data type is used.				

5.2.3.3.1.3 Data type: Timing

This data type allows selecting the timing for production of the data instance and contains the attributes defined in table 5.2.3.3.1.3-1.

Table 5.2.3.3.1.3-1: Definition of data type Timing

Attribute Name	Data Type	P	Cardinality	Description
collectionWindow	CollectionWindow	M	1	See clause 5.1.5.1.1
granularityPeriod	GranularityPeriod	M	1	See clause 5.1.4.2
reportingPeriod	integer	C	0..1	Reporting period as defined in ETSI TS 132 401 [12], clause 5.4.1.5. (See note)
NOTE: For subscribe data procedure as defined in R1AP [1], clause 7.3.4.1.2.2, this attribute shall be present if the data is delivered in the form of files and shall be absent if the data is streamed. For data request procedure as defined in R1AP [1], clause 7.3.4.1.2.1 this attribute shall be absent.				

5.2.3.3.1.4 Data type: DnList

This data type allows selecting list of DNs and contains the attributes defined in table 5.2.3.3.1.4-1.

Table 5.2.3.3.1.4-1: Definition of data type DnList

Attribute Name	Data Type	P	Cardinality	Description
DnList	array(Dn)	M	1..N	The Dn data type is defined in ETSI TS 132 300 [13], clause 7. Example of DN in a string representation is defined in ETSI TS 132 300 [13], clause 8.

5.2.3.3.2 Simple data types

None.

5.2.3.3.3 Enumerations

None.

5.2.3.4 Schemas

5.2.3.4.1 Data production schema

The data production schema is based on the JSON schema.

```
       {
"$schema": "https://json-schema.org/draft/2020-12/schema",
"description": "dataJobSchema for data subscription/data request",
"version": "v1",
"type": "object",
"properties": {
  "dataSelector": {
    "supportedTraceMetrics": {
      "$ref": "#/definitions/SupportedTraceMetrics"
    }
  },
  "targetSelector": {
    "oneOf": [
      {
        "type": "object",
        "properties": {
          "nodeFilter": {
            "$ref": "#/definitions/NodeFilter"
          }
        },
        "additionalProperties": false
      },
      {
        "type": "object",
        "properties": {
          "objectInstances": {
            "$ref": "#/definitions/DnList"
          }
```

```
          },
          "additionalProperties": false
        }
      ]
    },
    "timing": {
      "type": "object",
      "properties": {
        "collectionWindow": {
          "type": "object",
          "properties": {
            "startTime": {
              "$ref": "#/definitions/TimeOfDay"
            },
            "stopTime": {
              "$ref": "#/definitions/TimeOfDay"
            }
          },
          "additionalProperties": false,
          "required": [
            "startTime",
            "stopTime"
          ]
        },
        "granularityPeriod": {
          "$ref": "#/definitions/GranularityPeriod"
        },
        "reportingPeriod": {
          "$ref": "#/definitions/ReportingPeriod"
        }
      },
      "additionalProperties": false,
      "required": [
        "collectionWindow",
        "granularityPeriod"
      ]
    }
  },
  "required": [
    "dataSelector",
    "targetSelector"
  ],
"definitions": {
    "SupportedTraceMetrics": {
      "type": "object",
      "properties": {
        "supportedTraceMetrics": {
          "type": "array",
          "items": {
            "type": "string"
          }
        }
      },
"required": [
        "SupportedTraceMetrics"
      ],
      "additionalProperties": false
    },
    "NodeFilter": {
      "type": "array",
      "properties": {
        "areaOfInterest": {
          "$ref": "#/definitions/AreaOfInterest"
        },
        "networkDomain": {
          "$ref": "#/definitions/NetworkDomain"
        },
        "cPuPType": {
          "$ref": "#/definitions/CPuPType"
        },
        "sst": {
          "$ref": "#/definitions/Sst"
        }
      },
      "additionalProperties": false
    },
    "DnList": {
      "type": "array",
```

```
    "minItems": 1,
    "items": {
      "$ref": "#/definitions/Dn"
    }
  },
  "Dn": {
    "type": "string"
  },
  "AreaOfInterest": {
    "oneOf": [
      {
        "type": "object",
        "properties": {
          "geoAreaToCellMapping": {
            "$ref": "#/definitions/GeoAreaToCellMapping"
          }
        },
        "additionalProperties": false,
        "required": [
          "geoAreaToCellMapping"
        ]
      },
      {
        "type": "object",
        "properties": {
          "taiList": {
            "type": "array",
            "item": {
              "$ref": "#/definitions/Tai"
            },
            "minItems": 1,
            "maxItems": 8
          }
        },
        "additionalProperties": false,
        "required": [
          "taiList"
        ]
      },
      {
        "type": "object",
        "properties": {
          "nrCellIdList": {
            "type": "array",
            "items": {
              "$ref": "#/definitions/NrCellIdList"
            },
            "minItems": 1,
            "maxItems": 32
          }
        },
        "additionalProperties": false,
        "required": [
          "nrCellIdList"
        ]
      },
      {
        "type": "object",
        "properties": {
          "eutraCellIdList": {
            "type": "array",
            "items": {
              "$ref": "#/definitions/E-UTRACGI"
            },
            "minItems": 1,
            "maxItems": 32
          }
        },
        "additionalProperties": false,
        "required": [
          "eutraCellIdList"
        ]
      }
    ]
  },
  "NetworkDomain": {
    "type": "string",
    "enum": [
```

```
      "RAN",
      "CN"
    ]
  },
  "CPuPType": {
    "type": "string",
    "enum": [
      "CU",
      "UP"
    ]
  },
  "Sst": {
    "type": "integer"
  },
  "GranularityPeriod": {
    "type": "integer"
  },
  "ReportingPeriod": {
    "type": "integer"
  },
  "GeoAreaToCellMapping": {
    "type": "object",
    "properties": {
      "convexGeoPolygon": {
        "type": "array",
        "items": {
          "$ref": "#/definitions/GeoCoordinate"
        },
        "minItems": 3
      },
      "associationThreshold": {
        "type": "integer"
      }
    },
    "additionalProperties": false,
    "required": [
      "convexGeoPolygon"
    ]
  },
  "GeoCoordinate": {
    "type": "object",
    "properties": {
      "latitude": {
        "type": "number"
      },
      "longitude": {
        "type": "number"
      }
    },
    "additionalProperties": false,
    "required": [
      "latitude",
      "longitude"
    ]
  },
  "Tai": {
    "type": "object",
    "properties": {
      "mcc": {
        "type": "integer"
      },
      "mnc": {
        "type": "integer"
      },
      "tac": {
        "type": "integer"
      }
    },
    "additionalProperties": false,
    "required": [
      "mcc",
      "mnc",
      "tac"
    ]
  },
  "NrCellIdList": {
    "oneOf": [
      {
```

```
          "type": "object",
          "properties": {
            "nrCGI": {
              "$ref": "#/definitions/NRCGI"
            }
          },
          "additionalProperties": false,
          "required": [
            "nrCGI"
          ]
        },
        {
          "type": "object",
          "properties": {
            "e-utraCGI": {
              "$ref": "#/definitions/E-UTRACGI"
            }
          },
          "additionalProperties": false,
          "required": [
            "e-utraCGI"
          ]
        }
      ]
    },
    "NRCGI": {
      "type": "object",
      "properties": {
        "plmnIdentity": {
          "type": "string",
          "format": "base64"
        },
        "nrCellIdentity": {
          "type": "string",
          "format": "base32"
        }
      },
      "additionalProperties": false,
      "required": [
        "plmnIdentity",
        "nrCellIdentity"
      ]
    },
    "E-UTRACGI": {
      "type": "object",
      "properties": {
        "plmnIdentity": {
          "type": "string",
          "format": "base64"
        },
        "e-utraCellIdentity": {
          "type": "string",
          "format": "base32"
        }
      },
      "addtionalProperties": false,
      "required": [
        "plmnIdentity",
        "e-utraCellIdentity"
      ]
    },
    "TimeOfDay": {
      "type": "string",
      "Description": "String with format as defined in clause 5.6 of IETF RFC 3339. Examples,
20:15:00, 20:15:00-08:00 (for 8 hours behind UTC)."
    }
  }
}
```

5.2.3.4.2 Data delivery schemas

5.2.3.4.2.1 Data delivery schema# 1

This data delivery schema for streaming trace is based on the Trace record schema and is defined in ETSI TS 132 423 [17], clause 5.2.

Annex A (informative): Change history

Date	Version	Information about changes
2024.03.14	04.01	Published final version by adding an example of RAN OAM Trace Metrics
2024.11.21	04.00	Published the final version by adding a new DME type for RAN OAM Trace Metrics
2024.07.11	03.00	Published the final version by refactoring the DME type definitions
2024.03.18	02.00	Published the final version by removing the alpha for RanOamPmData and adding the Data Production schema table
2023.11.20	01.00	Published the final version with a DME data type

History

Version	Date	Status
V4.1.0	February 2026	Publication