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**5G;  
5G System;  
Common Data Types for Service Based Interfaces;  
Stage 3  
(3GPP TS 29.571 version 15.3.0 Release 15)**



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# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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# 1 Scope

The present document specifies the stage 3 protocol and data model for common data types that are used or may be expected to be used by multiple Service Based Interface APIs supported by the same or different Network Function(s).

The Principles and Guidelines for Services Definition are specified in 3GPP TS 29.501 [2].

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 29.501: "5G System; Principles and Guidelines for Services Definition; Stage 3".
- [3] OpenAPI: "OpenAPI 3.0.0 Specification", <https://github.com/OAI/OpenAPI-Specification/blob/master/versions/3.0.0.md>.
- [4] IETF RFC 1166: "Internet Numbers".
- [5] IETF RFC 5952: "A recommendation for IPv6 address text representation".
- [6] IETF RFC 3986: "Uniform Resource Identifier (URI): Generic Syntax".
- [7] 3GPP TS 23.003: "Numbering, addressing and identification".
- [8] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".
- [9] IETF RFC 7807: "Problem Details for HTTP APIs".
- [10] IETF RFC 3339: "Date and Time on the Internet: Timestamps".
- [11] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP) ".
- [12] IETF RFC 6901: "JavaScript Object Notation (JSON) Pointer".
- [13] 3GPP TS 24.007: " Mobile radio interface signalling layer 3; General aspects".
- [14] IETF RFC 6902: "JavaScript Object Notation (JSON) Patch".
- [15] IETF RFC 4122: "A Universally Unique IDentifier (UUID) URN Namespace"
- [16] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".
- [17] IETF RFC 7042: "IANA Considerations and IETF Protocol and Documentation Usage for IEEE 802 Parameters".
- [18] IETF RFC 6733: "Diameter Base Protocol".
- [19] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".
- [20] 3GPP TS 24.501: "Non-Access-Stratum (NAS) Protocol for 5G System (5GS); Stage 3".



|      |   |
|------|---|
| [21] | 3GPP TS 29.002: "Mobile Application Part (MAP) specification".                                    |
| [22] | Void  |
| [23] | 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".                                  |
| [24] | ITU-T Recommendation Q.763 (1999): "Specifications of Signalling System No.7; Formats and codes". |
| [25] | 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".        |
| [26] | 3GPP TS 23.015: "Technical Realization of Operator Determined Barring".                           |

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

|       |  |
|-------|--|
| 5GC   | 5G Core Network                        |
| DNAI  | Data Network Access Identifier         |
| GPSI  | Generic Public Subscription Identifier |
| GUAMI | Globally Unique AMF Identifier         |
| PEI   | Permanent Equipment Identifier         |
| SBI   | Service Based Interface                |
| SUPI  | Subscription Permanent Identifier      |

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## 4 Overview

For the different 5GC SBI API, data types shall be defined. Data types identified as common data types shall be defined in this Technical specification and should be referenced from individual 5GC SBI API specifications.

Data types applicable or intended to be applicable to several 5GC SBI API specifications should be interpreted as common data types.

---

## 5 Common Data Types

### 5.1 Introduction

In the following subclauses, common data types for the following areas are defined:

- Data types for generic usage;
- Data types for Subscription, Identification and Numbering;
- Data types related to 5G Network;
- Data types related to 5G QoS;
- Data types related to 5G Trace;
- Data types related to 5G ODBs.

## 5.2 Data Types for Generic Usage

### 5.2.1 Introduction

This clause defines common data types for generic usage.

### 5.2.2 Simple Data Types

This subclause specifies common simple data types.

**Table 5.2.2-1: Simple Data Types**

| Type Name          | Type Definition | Description  |
|--------------------|-----------------|--|
| Binary             | string          | String with format "binary" as defined in OpenAPI Specification [3]  |
| BinaryRm           | string          | This data type is defined in the same way as the "Binary" data type, but with the OpenAPI "nullable: true" property.   |
| Bytes              | string          | String with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters,   |
| BytesRm            | string          | This data type is defined in the same way as the "Bytes" data type, but with the OpenAPI "nullable: true" property.  |
| Date               | string          | String with format "date" as defined in OpenAPI Specification [3]  |
| DateRm             | string          | This data type is defined in the same way as the "Date" data type, but with the OpenAPI "nullable: true" property.   |
| DateTime           | string          | String with format "date-time" as defined in OpenAPI Specification [3]   |
| DateTimeRm         | string          | This data type is defined in the same way as the "DateTime" data type, but with the OpenAPI "nullable: true" property.   |
| DiameterIdentity   | string          | String containing a Diameter Identity, according to clause 4.3 of IETF RFC 6733 [18].<br>Pattern: '^[A-Za-z0-9]+(-[A-Za-z0-9]+)+[a-z]{2,}\$'   |
| DiameterIdentityRm | string          | This data type is defined in the same way as the "DiameterIdentity" data type, but with the OpenAPI "nullable: true" property.   |
| Double             | number          | Number with format "double" as defined in OpenAPI Specification [3]  |
| DoubleRm           | number          | This data type is defined in the same way as the "Double" data type, but with the OpenAPI "nullable: true" property.   |
| DurationSec        | integer         | Unsigned integer identifying a period of time in units of seconds.   |
| DurationSecRm      | integer         | This data type is defined in the same way as the "DurationSec" data type, but with the OpenAPI "nullable: true" property.  |
| Float              | number          | Number with format "float" as defined in OpenAPI Specification [3]   |
| FloatRm            | number          | This data type is defined in the same way as the "Float" data type, but with the OpenAPI "nullable: true" property.  |
| Uint16             | integer         | Unsigned 16-bit integers, i.e. only value between 0 and 65535 are permissible.   |
| Uint16Rm           | integer         | This data type is defined in the same way as the "Uint16" data type, but with the OpenAPI "nullable: true" property.   |
| Int32              | integer         | Integer with format "int32" as defined in OpenAPI Specification [3]  |
| Int32Rm            | integer         | This data type is defined in the same way as the "Int32" data type, but with the OpenAPI "nullable: true" property.  |
| Int64              | integer         | Integer with format "int64" as defined in OpenAPI Specification [3]  |
| Int64Rm            | integer         | This data type is defined in the same way as the "Int64" data type, but with the OpenAPI "nullable: true" property.  |
| Ipv4Addr           | string          | String identifying a IPv4 address formatted in the "dotted decimal" notation as defined in in IETF RFC 1166 [4].<br>Pattern: '^([0-9] [1-9][0-9] 1[0-9][0-9] 2[0-4][0-9] 25[0-5])\.){3}([0-9] [1-9][0-9] 1[0-9][0-9] 2[0-4][0-9] 25[0-5])\$'   |
| Ipv4AddrRm         | string          | This data type is defined in the same way as the "Ipv4Addr" data type, but with the OpenAPI "nullable: true" property.   |
| Ipv6Addr           | string          | String identifying an IPv6 address formatted according to clause 4 of IETF RFC 5952 [5]. The mixed IPv4 IPv6 notation according to clause 5 of IETF RFC 5952 [5] shall not be used.<br>Pattern: '^(: 0? [1-9a-f][0-9a-f]{0,3})((0? ([1-9a-f][0-9a-f]{0,3})):0,6(: (0? [1-9a-f][0-9a-f]{0,3})))\$'<br>and<br>Pattern: '^((([:+]{7}([^:]+)) (([:+]*[:+]?::(([:+]*[:+]?)))\$' |
| Ipv6AddrRm         | string          | This data type is defined in the same way as the "Ipv6Addr" data type, but with the OpenAPI "nullable: true" property.   |
| Ipv6Prefix         | string          | String identifying an IPv6 address prefix formatted according to clause 4 of IETF RFC 5952 [5].<br>Pattern: '^(: 0? [1-9a-f][0-9a-f]{0,3})((0? ([1-9a-f][0-9a-f]{0,3})):0,6(: (0? [1-9a-f][0-9a-f]{0,3})))(V((([0-9]) ([0-9]{2}) ([0-1][0-9]) ([12][0-8])))\$'<br>and<br>Pattern: '^((([:+]{7}([^:]+)) (([:+]*[:+]?::(([:+]*[:+]?)))V.+)\$'                                |

|                   |         |  |
|-------------------|---------|--|
| Ipv6PrefixRm      | string  | This data type is defined in the same way as the "Ipv6Prefix" data type, but with the OpenAPI "nullable: true" property.   |
| MacAddr48         | string  | String identifying a MAC address formatted in the hexadecimal notation according to subclause 1.1 and subclause 2.1 of IETF RFC 7042 [17].<br>Pattern: <code>^[0-9a-fA-F]{2}((-[0-9a-fA-F]{2}){5})\$</code>  |
| MacAddr48Rm       | string  | This data type is defined in the same way as the "MacAddr48" data type, but with the OpenAPI "nullable: true" property.  |
| SupportedFeatures | string  | A string used to indicate the features supported by an API that is used as defined in subclause 6.6 in 3GPP TS 29.500 [1].<br>The string shall contain a bitmask indicating supported features in hexadecimal representation:<br>Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent the support of 4 features as described in table 5.2.2-3. The most significant character representing the highest-numbered features shall appear first in the string, and the character representing features 1 to 4 shall appear last in the string. The list of features and their numbering (starting with 1) are defined separately for each API. If the string contains a lower number of characters than there are defined features for an API, all features that would be represented by characters that are not present in the string are not supported. |
| UInteger          | integer | Unsigned Integer, i.e. only value 0 and integers above 0 are permissible.  |
| UIntegerRm        | integer | This data type is defined in the same way as the "UInteger" data type, but with the OpenAPI "nullable: true" property.   |
| Uint32            | integer | Unsigned 32-bit integers, i.e. only value 0 and 32-bit integers above 0 are permissible.   |
| Uint32Rm          | integer | This data type is defined in the same way as the "Uint32" data type, but with the OpenAPI "nullable: true" property.   |
| Uint64            | integer | Unsigned 64-bit integers, i.e. only value 0 and 64-bit integers above 0 are permissible.   |
| Uint64Rm          | integer | This data type is defined in the same way as the "Uint64" data type, but with the OpenAPI "nullable: true" property.   |
| Uri               | string  | String providing an URI formatted according to IETF RFC 3986 [6].  |
| UriRm             | string  | This data type is defined in the same way as the "Uri" data type, but with the OpenAPI "nullable: true" property.  |
| VarUeld           | string  | String represents the SUPI or GPSI.<br>Pattern: <code>^(imsi-[0-9]{5,15} nai-.+ msisdn-[0-9]{5,15} extid-[^@]+@[^@]+.+)\$</code> .   |
| VarUeldRm         | string  | This data type is defined in the same way as the "VarUeld" data type, but with the OpenAPI "nullable: true" property.  |
| TimeZone          | string  | String with format " <code>&lt;time-numoffset&gt;</code> " optionally appended by " <code>&lt;daylightSavingTime&gt;</code> ", where:<br><br>- <code>&lt;time-numoffset&gt;</code> shall represent the time zone adjusted for daylight saving time and be encoded as time-numoffset as defined in subclause 5.6 of IETF RFC 3339 [10];<br><br>- <code>&lt;daylightSavingTime&gt;</code> shall represent the adjustment that has been made and shall be encoded as "+1" or "+2" for a +1 or +2 hours adjustment.<br><br>Example: "-08:00+1" (for 8 hours behind UTC, +1 hour adjustment for Daylight Saving Time).  |
| TimeZoneRm        | string  | This data type is defined in the same way as the "TimeZone" data type, but with the OpenAPI "nullable: true" property.   |

**Table 5.2.2-2: Reused OpenAPI data types**

| Type Name | Description  |
|-----------|--|
| boolean   | As defined in OpenAPI Specification [3]  |
| integer   | As defined in OpenAPI Specification [3]  |
| number    | As defined in OpenAPI Specification [3]  |
| string    | As defined in OpenAPI Specification [3]  |
| NOTE      | Data types defined in OpenAPI Specification [3] do not follow the UpperCamel convention for data types in 3GPP TS 29.501 [2] |

**Table 5.2.2-3: Meaning of a Hexadecimal Character in SupportedFeatures Type**

| Character | Feature n+3 supported  | Feature n+2 supported | Feature n+1 supported | Feature n supported |
|-----------|--|-----------------------|-----------------------|---------------------|
| "0"       | no   | no                    | no                    | no                  |
| "1"       | no   | no                    | no                    | yes                 |
| "2"       | no   | no                    | yes                   | no                  |
| "3"       | no   | no                    | yes                   | yes                 |
| "4"       | no   | yes                   | no                    | no                  |
| "5"       | no   | yes                   | no                    | yes                 |
| "6"       | no   | yes                   | yes                   | no                  |
| "7"       | no   | yes                   | yes                   | yes                 |
| "8"       | yes  | no                    | no                    | no                  |
| "9"       | yes  | no                    | no                    | yes                 |
| "A"       | yes  | no                    | yes                   | no                  |
| "B"       | yes  | no                    | yes                   | yes                 |
| "C"       | yes  | yes                   | no                    | no                  |
| "D"       | yes  | yes                   | no                    | yes                 |
| "E"       | yes  | yes                   | yes                   | no                  |
| "F"       | yes  | yes                   | yes                   | yes                 |
| NOTE 1    | "n" shall be $i * 4 + 1$ , where "i" is zero or a natural number, i.e permissible values of "n" are 1, 5, 9, ... |                       |                       |                     |
| NOTE 2    | If a feature is not defined, it shall be indicated with value "no".  |                       |                       |                     |

For example, if only the first feature defined in the feature list is set to 1, the corresponding SupportedFeatures attribute would have a value of "1", or "001" (any amount of 0's to the left of the 1 would result into an equivalent feature list). If we have 32 features defined, and only the last feature in a feature list is set to 1, the corresponding SupportedFeatures attribute would have a value of "80000000".

## 5.2.3 Enumerations

### 5.2.3.1 Enumeration: PatchOperation

**Table 5.2.3.1-1: Enumeration PatchOperation**

| Enumeration value | Description   |
|-------------------|---|
| "add"             | Add operation as defined in IETF RFC 6902 [14].     |
| "copy"            | Copy operation as defined in IETF RFC 6902 [14].    |
| "move"            | Move operation as defined in IETF RFC 6902 [14].    |
| "remove"          | Remove operation as defined in IETF RFC 6902 [14].  |
| "replace"         | Replace operation as defined in IETF RFC 6902 [14]. |
| "test"            | Test operation as defined in IETF RFC 6902 [14].    |

### 5.2.3.2 Enumeration: UriScheme

**Table 5.2.3.2-1: Enumeration UriScheme**

| Enumeration value | Description      |
|-------------------|------------------|
| "http"            | HTTP URI scheme  |
| "https"           | HTTPS URI scheme |

## 5.2.3.3 Enumeration: ChangeType

Table 5.2.3.3-1: Enumeration ChangeType

| Enumeration value | Description   |
|-------------------|---|
| "ADD"             | This value indicates new attribute has been added to the resource                           |
| "MOVE"            | This value indicates existing attribute has been moved to a different path in the resource. |
| "REMOVE"          | This value indicates existing attribute has been deleted from the resource.                 |
| "REPLACE"         | This value indicates existing attribute has been updated with new value.                    |

## 5.2.4 Structured Data Types

## 5.2.4.1 Type: ProblemDetails

Table 5.2.4-1: Definition of type ProblemDetails

| Attribute name   | Data type           | P | Cardinality | Description   |
|--|---------------------|---|-------------|---|
| type   | Uri                 | O | 0..1        | A URI reference according to IETF RFC 3986 [6] that identifies the problem type.  |
| title  | string              | O | 0..1        | A short, human-readable summary of the problem type. It should not change from occurrence to occurrence of the problem.   |
| status   | integer             | O | 0..1        | The HTTP status code for this occurrence of the problem.  |
| detail   | string              | O | 0..1        | A human-readable explanation specific to this occurrence of the problem.  |
| instance   | Uri                 | O | 0..1        | A URI reference that identifies the specific occurrence of the problem.   |
| cause  | string              | C | 0..1        | A machine-readable application error cause specific to this occurrence of the problem<br>This IE should be present and provide application-related error information, if available. |
| invalidParams  | array(InvalidParam) | O | 1..N        | Description of invalid parameters, for a request rejected due to invalid parameters.  |
| NOTE 1: See IETF RFC 7807 [9] for detailed information and guidance for each attribute, and 3GPP TS 29.501 [2] for guidelines on error handling support by 5GC SBI APIs. |                     |   |             |   |
| NOTE 2: Additional attributes may be defined per API.  |                     |   |             |   |

## 5.2.4.2 Type: Link

Table 5.2.4.2-1: Definition of type link

| Attribute name | Data type | P | Cardinality | Description                                 |
|----------------|-----------|---|-------------|---|
| href           | Uri       | M | 1           | It contains the URI of the linked resource. |

## 5.2.4.3 Type PatchItem

Table 5.2.4.3-1: Definition of type PatchItem

| Attribute name | Data type      | P | Cardinality | Description   | Applicability |
|----------------|----------------|---|-------------|---|---------------|
| op             | PatchOperation | M | 1           | This IE indicates the patch operation as defined in IETF RFC 6902 [14] to be performed on resource.   |               |
| path           | string         | M | 1           | This IE contains a JSON pointer value (as defined in IETF RFC 6901 [12]) that references a location of a resource on which the patch operation shall be performed.  |               |
| from           | string         | C | 0..1        | This IE indicates the path of the source JSON element (according to JSON Pointer syntax) being moved or copied to the location indicated by the "path" attribute.<br>It shall be present if the patch operation is "move" or "copy".  |               |
| value          | Any type       | C | 0..1        | This IE indicates a new value for the resource specified in the path attribute.<br>It shall be present if the patch operation is "add", "replace" or "test".<br>The data type of this attribute shall be the same as the type of the resource on which the patch operation shall be performed. The null value shall be allowed. |               |

## 5.2.4.4 Type: LinksValueSchema

Table 5.2.4.4-1: Definition of type LinksValueSchema as a list of mutually exclusive alternatives

| Data type   | Cardinality | Description    |
|-------------|-------------|----------------|
| array(Link) | 1..N        | Array of links |
| Link        | 1           | link           |

## 5.2.4.5 Type: SelfLink

Table 5.2.4.5-1: Definition of type SelfLink

| Attribute name | Data type | P | Cardinality | Description                                 |
|----------------|-----------|---|-------------|---|
| self           | Link      | M | 1           | It contains the URI of the linked resource. |

## 5.2.4.6 Type: InvalidParam

Table 5.2.4.6-1: Definition of type InvalidParam

| Attribute name | Data type | P | Cardinality | Description   |
|----------------|-----------|---|-------------|---|
| param          | string    | M | 1           | Attribute's name encoded as a JSON Pointer.                 |
| reason         | string    | O | 0..1        | A human-readable reason, e.g. "must be a positive integer". |

## 5.2.4.7 Type: LinkRm

This data type is defined in the same way as the "Link" data type, but with the OpenAPI "nullable: true" property.



## 5.2.4.8 Type Changeltem

Table 5.2.4.8-1: Definition of type Changeltem

| Attribute name | Data type  | P | Cardinality | Description  | Applicability |
|----------------|------------|---|-------------|--|---------------|
| op             | ChangeType | M | 1           | This IE indicates the change type which happens to the resource.   |               |
| path           | string     | M | 1           | This IE contains a JSON pointer value (as defined in IETF RFC 6901 [12]) that references a location of an attribute on which the change has been applied.  |               |
| from           | string     | C | 0..1        | This IE indicates the path of the source JSON element (according to JSON Pointer syntax) being moved or copied to the location indicated by the "path" attribute.<br>It shall be present if the "op" attribute is of value "MOVE".   |               |
| origValue      | Any type   | O | 0..1        | This IE indicates the original value of the attribute specified in the path attribute. This attribute only applies when the "op" attribute is of value "REMOVE", "REPLACE" or "MOVE".<br>Based on the use case, this attribute may be included.  |               |
| newValue       | Any type   | C | 0..1        | This IE indicates a new value of the attribute specified in the path attribute. It shall be present if the "op" attribute is of value "ADD", "REPLACE".<br>The data type of this attribute shall be the same as the type of the resource on which the change has happened.<br>The null value shall be allowed. |               |

## 5.2.4.9 Type Notifyltem

Table 5.2.4.9-1: Definition of type Notifyltem

| Attribute name | Data type         | P | Cardinality | Description  | Applicability |
|----------------|-------------------|---|-------------|--|---------------|
| resourceId     | Uri               | M | 1           | This IE contains the URI of the resource which has been changed.   |               |
| changes        | array(Changeltem) | M | 1..N        | This IE contains the changes which have been applied on the resource identified by the resourceId attribute. |               |

## 5.2.4.10 Type: ComplexQuery

Table 5.2.4.10-1: Definition of type ComplexQuery as a list of mutually exclusive alternatives

| Data type | Cardinality | Description               |
|-----------|-------------|---------------------------|
| Cnf       | 1           | A conjunctive normal form |
| Dnf       | 1           | A disjunctive normal form |

The ComplexQuery data type is either a conjunctive normal form or a disjunctive normal form. The attribute names "cnfUnits" and "dnfUnits" (see subclause 5.2.4.11 and subclause 5.2.4.12) serve as discriminator.

## 5.2.4.11 Type: Cnf

Table 5.2.4.11-1: Definition of type Cnf

| Attribute name | Data type      | P | Cardinality | Description  | Applicability |
|----------------|----------------|---|-------------|--|---------------|
| cnfUnits       | array(CnfUnit) | M | 1..N        | During the processing of cnfUnits attribute, all the members in the array shall be interpreted as logically concatenated with logical "AND". |               |

## 5.2.4.12 Type: Dnf

Table 5.2.4.12-1: Definition of type Dnf

| Attribute name | Data type      | P | Cardinality | Description   | Applicability |
|----------------|----------------|---|-------------|---|---------------|
| dnfUnits       | array(DnfUnit) | M | 1..N        | During the processing of dnfUnits attribute, all the members in the array shall be interpreted as logically concatenated with logical "OR". |               |

## 5.2.4.13 Type: CnfUnit

Table 5.2.4.13-1: Definition of type CnfUnit

| Attribute name | Data type   | P | Cardinality | Description  | Applicability |
|----------------|-------------|---|-------------|--|---------------|
| cnfUnit        | array(Atom) | M | 1..N        | During the processing of cnfUnit attribute, all the members in the array shall be interpreted as logically concatenated with logical "OR". |               |

## 5.2.4.14 Type: DnfUnit

Table 5.2.4.14-1: Definition of type DnfUnit

| Attribute name | Data type   | P | Cardinality | Description   | Applicability |
|----------------|-------------|---|-------------|---|---------------|
| dnfUnit        | array(Atom) | M | 1..N        | During the processing of dnfUnit attribute, all the members in the array shall be interpreted as logically concatenated with logical "AND". |               |

## 5.2.4.15 Type: Atom

Table 5.2.4.15-1: Definition of type Atom

| Attribute name | Data type | P | Cardinality | Description  | Applicability |
|----------------|-----------|---|-------------|--|---------------|
| attr           | string    | M | 1           | This attribute contains the name of a defined query parameter.                           |               |
| value          | any type  | M | 1           | This attribute contains the value of the query parameter as indicated by attr attribute. |               |
| negative       | boolean   | O | 0..1        | This attribute indicates whether the negative condition applies for the query condition. |               |

## 5.3 Data Types related to Subscription, Identification and Numbering

### 5.3.1 Introduction

This clause defines common data types related to subscription, identification and numbering information.

## 5.3.2 Simple Data Types

This subclause specifies common simple data types.

**Table 5.3.2-1: Simple Data Types**

| Type Name    | Type Definition | Description   |
|--------------|-----------------|---|
| Dnn          | string          | String representing a Data Network as defined in subclause 9A of 3GPP TS 23.003 [7]. It shall be formatted as string in which the labels are separated by dots (e.g. "Label1.Label2.Label3").   |
| DnnRm        | string          | This data type is defined in the same way as the "Dnn" data type, but with the OpenAPI "nullable: true" property.   |
| Gpsi         | string          | String identifying a Gpsi shall contain either an External Id or an MSISDN. It shall be formatted as follows:<br>-External Identifier: "extid-<extid>", where <extid> shall be formatted according to subclause 19.7.2 of 3GPP TS 23.003 [7] that describes an External Identifier.<br>-MSISDN: "msisdn-<msisdn>", where <msisdn> shall be formatted according to subclause 3.3 of 3GPP TS 23.003 [7] that describes an MSISDN.<br>Pattern: '^(\msisdn-[0-9]{5,15} extid-.\+@.\+.)\$'   |
| GpsiRm       | string          | This data type is defined in the same way as the "Gpsi" data type, but with the OpenAPI "nullable: true" property.  |
| GroupId      | string          | String identifying a group of devices network internal globally unique ID which identifies a set of IMSIs, as specified in subclause 19.9 of 3GPP TS 23.003 [7].<br><br>Pattern: '^([A-Fa-f0-9]{8}-[0-9]{3}-[0-9]{2,3}-([A-Fa-f0-9][A-Fa-f0-9]){1,10})\$'   |
| GroupIdRm    | string          | This data type is defined in the same way as the "GroupId" data type, but with the OpenAPI "nullable: true" property.   |
| Pei          | string          | String representing a Permanent Equipment Identifier, if it contains an IMEI or IMEISV it is defined as specified in subclause 6.2 of 3GPP TS 23.003 [7].<br><br>Pattern: '^(\imei-[0-9]{15} imeisv-[0-9]{16}).+\$'   |
| PeiRm        | string          | This data type is defined in the same way as the "Pei" data type, but with the OpenAPI "nullable: true" property.   |
| Supi         | string          | String identifying a Supi shall contain either an IMSI or an NAI. It shall be formatted as follows for:<br>- IMSI "imsi-<imsi>", <imsi> shall be formatted according to subclause 2.2 of 3GPP TS 23.003 [7] that describes an IMSI.<br>- NAI "nai-<nai>", <nai> shall be formatted according to subclause 28.6.2 of 3GPP TS 23.003 [7] that describes an NAI.<br>To enable that the value is used as part of an URI, the string shall only contain characters allowed according to the "lower-with-hyphen" naming convention defined in 3GPP TS 29.501 [2].<br><br>Pattern: '^(\imsi-[0-9]{5,15} nai-.\+.)\$' |
| SupiRm       | string          | This data type is defined in the same way as the "Supi" data type, but with the OpenAPI "nullable: true" property.  |
| NfInstanceId | string          | String uniquely identifying a NF instance. The format of the NF Instance ID shall be a Universally Unique Identifier (UUID) version 4, as described in IETF RFC 4122 [15].  |
| AmfId        | string          | String identifying the AMF ID composed of AMF Region ID (8 bits), AMF Set ID (10 bits) and AMF Pointer (6 bits) as specified in subclause 2.10.1 of 3GPP TS 23.003 [7].<br>It is encoded as a string of 6 hexadecimal characters (i.e., 24 bits).<br><br>Pattern: '^([A-Fa-f0-9]{6})\$'   |
| AmfRegionId  | string          | String identifying the AMF Region ID (8 bits), as specified in subclause 2.10.1 of 3GPP TS 23.003 [7].<br>It is encoded as a string of 2 hexadecimal characters (i.e. 8 bits).<br>Pattern: '^([A-Fa-f0-9]{2})\$'  |
| AmfSetId     | string          | String identifying the AMF Set ID (10 bits) as specified in subclause 2.10.1 of 3GPP TS 23.003 [7].<br>It is encoded as a string of 3 hexadecimal characters where the first character is limited to values 0 to 3 (i.e. 10 bits).<br>Pattern: '^([0-3][A-Fa-f0-9]{2})\$'   |
| RfspIndex    | integer         | Unsigned integer representing the "Subscriber Profile ID for RAT/Frequency Priority" as specified in 3GPP TS 36.413 [16].<br>Minimum = 1. Maximum = 256.  |

|             |         |   |
|-------------|---------|---|
| RfspIndexRm | integer | This data type is defined in the same way as the "RfspIndex" data type, but with the OpenAPI "nullable: true" property. |
| NfGroupld   | string  | Identifier of a group of NFs  |

### 5.3.3 Enumerations

For Data Types related to Subscription, Identification and Numbering, no Enumerations data types are defined in this version of the specification.

### 5.3.4 Structured Data Types

#### 5.3.4.1 Type: Guami

**Table 5.3.4.1-1: Definition of type Guami**

| Attribute name | Data type | P | Cardinality | Description   |
|----------------|-----------|---|-------------|---------------|
| plmnld         | Plmnld    | M | 1           | PLMN Identity |
| amfld          | Amfld     | M | 1           | AMF Identity  |

#### 5.3.4.2 Type: Networkld

**Table 5.3.4.2-1: Definition of type Networkld**

| Attribute name                                   | Data type | P | Cardinality | Description         |
|--|-----------|---|-------------|---------------------|
| mcc  | Mcc       | C | 0..1        | Mobile Country Code |
| mnc  | Mnc       | C | 0..1        | Mobile Network Code |
| NOTE: At least one MNC or MCC shall be included. |           |   |             |                     |

#### 5.3.4.3 Type: GuamiRm

This data type is defined in the same way as the "Guami" data type, but with the OpenAPI "nullable: true" property.

## 5.4 Data Types related to 5G Network

### 5.4.1 Introduction

This clause defines common data types related to 5G Network (other than related to 5G QoS).

### 5.4.2 Simple Data Types

This subclause specifies common simple data types.

**Table 5.4.2-1: Simple Data Types**

| Type Name       | Type Definition | Description   |
|-----------------|-----------------|---|
| ApplicationId   | string          | String providing an application identifier.   |
| ApplicationIdRm | string          | This data type is defined in the same way as the "ApplicationId" data type, but with the OpenAPI "nullable: true" property.   |
| PduSessionId    | integer         | Unsigned integer identifying a PDU session, within the range 0 to 255, as specified in subclause 11.2.3.1b, bits 1 to 8, of 3GPP TS 24.007 [13].  |
| Mcc             | string          | Mobile Country Code part of the PLMN, comprising 3 digits, as defined in subclause 9.3.3.5 of 3GPP TS 38.413 [11].<br><br>Pattern: '^[0-9]{3}\$'  |
| MccRm           | string          | This data type is defined in the same way as the "Mcc" data type, but with the OpenAPI "nullable: true" property.   |
| Mnc             | string          | Mobile Network Code part of the PLMN, comprising 2 or 3 digits, as defined in subclause 9.3.3.5 of 3GPP TS 38.413 [11].<br><br>Pattern: '^[0-9]{2,3}\$'   |
| MncRm           | string          | This data type is defined in the same way as the "Mnc" data type, but with the OpenAPI "nullable: true" property.   |
| Tac             | string          | 2 or 3-octet string identifying a tracking area code as specified in subclause 9.3.3.10 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the TAC shall appear first in the string, and the character representing the 4 least significant bit of the TAC shall appear last in the string.<br><br>Examples:<br>A legacy TAC 0x4305 shall be encoded as "4305".<br>An extended TAC 0x63F84B shall be encoded as "63F84B" |
| TacRm           | string          | This data type is defined in the same way as the "Tac" data type, but with the OpenAPI "nullable: true" property.   |
| EutraCellId     | string          | 28-bit string identifying an E-UTRA Cell Id as specified in subclause 9.3.1.9 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Cell Id shall appear first in the string, and the character representing the 4 least significant bit of the Cell Id shall appear last in the string.<br><br>Pattern: '^[A-Fa-f0-9]{7}\$'  |
| EutraCellIdRm   | string          | This data type is defined in the same way as the "EutraCellId" data type, but with the OpenAPI "nullable: true" property.   |
| NrCellId        | string          | 36-bit string identifying an NR Cell Id as specified in subclause 9.3.1.7 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Cell Id shall appear first in the string, and the character representing the 4 least significant bit of the Cell Id shall appear last in the string.<br><br>Pattern: '^[A-Fa-f0-9]{9}\$'  |
| NrCellIdRm      | string          | This data type is defined in the same way as the "NrCellId" data type, but with the OpenAPI "nullable: true" property.  |
| Dnai            | string          | DNAI (Data network access identifier), see subclause 5.6.7 of 3GPP TS 23.501 [8].   |
| DnaiRm          | string          | This data type is defined in the same way as the "Dnai" data type, but with the OpenAPI "nullable: true" property.  |



|            |          |   |
|------------|----------|---|
| 5GMMCause  | UInteger | This represents the 5GMM cause code values as specified in 3GPP TS 24.501 [20].   |
| AreaCodeRm | string   | This data type is defined in the same way as the "AreaCode" data type, but with the OpenAPI "nullable: true" property.  |
| AmfName    | string   | FQDN (Fully Qualified Domain Name) of the AMF as defined in subclause 28.3.2.5 of 3GPP TS 23.003 [7].   |
| AreaCode   | string   | Values are operator specific.   |
| N3Iwflid   | string   | This represents the identifier of the N3IWF ID as specified in subclause 9.3.1.57 of 3GPP TS 38.413 [11].<br>Pattern: '^[A-Fa-f0-9]+\$'   |
| NgeNbld    | string   | This represents the identifier of the ng-eNB ID as specified in subclause 9.3.1.8 of 3GPP TS 38.413 [11].<br><br>The string shall be formatted with following pattern:<br>Pattern: '^('MacroNGeNB-[A-Fa-f0-9]{5} <br>LMacroNGeNB-[A-Fa-f0-9]{6} <br>SMacroNGeNB-[A-Fa-f0-9]{5})\$'<br><br>The value of the ng-eNB ID shall be encoded in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The padding 0 shall be added to make multiple nibbles, so the most significant character representing the padding 0 if required together with the 4 most significant bits of the ng-eNB ID shall appear first in the string, and the character representing the 4 least significant bit of the ng-eNB ID (to form a nibble) shall appear last in the string.<br><br>Examples:<br>"SMacroNGeNB-34B89" indicates a Short Macro NG-eNB ID with value 0x34B89. |

## 5.4.3 Enumerations

### 5.4.3.1 Enumeration: AccessType

**Table 5.4.3.1-1: Enumeration AccessType**

| Enumeration value | Description     |
|-------------------|-----------------|
| "3GPP_ACCESS"     | 3GPP access     |
| "NON_3GPP_ACCESS" | Non-3GPP access |

### 5.4.3.2 Enumeration: RatType

**Table 5.4.3.2-1: Enumeration RatType**

| Enumeration value | Description   |
|-------------------|---|
| "NR"              | New Radio   |
| "EUTRA"           | (WB) Evolved Universal Terrestrial Radio Access   |
| "WLAN"            | Wireless LAN  |
| "VIRTUAL"         | Virtual (see NOTE)  |
| NOTE:             | Virtual shall be used if the N3IWF does not know the access technology used for an untrusted non-3GPP access. |

### 5.4.3.3 Enumeration: PduSessionType

The enumeration PduSessionType indicates the type of a PDU session. It shall comply with the provisions defined in table 5.4.3.3-1.

**Table 5.4.3.3-1: Enumeration PduSessionType**

| Enumeration value | Description  |
|-------------------|--|
| "IPV4"            | IPv4   |
| "IPV6"            | IPv6   |
| "IPV4V6"          | IPv4v6 (see subclause 5.8.2.2.1 of 3GPP TS 23.501 [8]) |
| "UNSTRUCTURED"    | Unstructured   |
| "ETHERNET"        | Ethernet   |

#### 5.4.3.4 Enumeration: UpIntegrity

The enumeration UpIntegrity indicates whether UP integrity protection is required, preferred or not needed for all the traffic on the PDU Session. It shall comply with the provisions defined in table 5.4.3.4-1.

**Table 5.4.3.4-1: Enumeration UpIntegrity**

| Enumeration value | Description  |
|-------------------|--|
| "REQUIRED"        | UP integrity protection shall apply for all the traffic on the PDU Session.  |
| "PREFERRED"       | UP integrity protection should apply for all the traffic on the PDU Session. |
| "NOT_NEEDED"      | UP integrity protection shall not apply on the PDU Session.                  |

#### 5.4.3.5 Enumeration: UpConfidentiality

The enumeration UpConfidentiality indicates whether UP confidentiality protection is required, preferred or not needed for all the traffic on the PDU Session. It shall comply with the provisions defined in table 5.4.3.5-1.

**Table 5.4.3.5-1: Enumeration UpConfidentiality**

| Enumeration value | Description  |
|-------------------|--|
| "REQUIRED"        | UP confidentiality protection shall apply for all the traffic on the PDU Session.  |
| "PREFERRED"       | UP confidentiality protection should apply for all the traffic on the PDU Session. |
| "NOT_NEEDED"      | UP confidentiality protection shall not apply on the PDU Session.                  |

#### 5.4.3.6 Enumeration: SscMode

The enumeration SscMode represents the service and session continuity mode.

**Table 5.4.3.6-1: Enumeration SscMode**

| Enumeration value | Description            |
|-------------------|------------------------|
| "SSC_MODE_1"      | see 3GPP TS 23.501 [2] |
| "SSC_MODE_2"      | see 3GPP TS 23.501 [2] |
| "SSC_MODE_3"      | see 3GPP TS 23.501 [2] |

#### 5.4.3.7 Enumeration: DnaiChangeType

The enumeration DnaiChangeType represents the type of a DNAI change. A NF service consumer may subscribe to "EARLY", "LATE" or "EARLY\_LATE" types of DNAI change. The types of observed DNAI change the SMF may notify are "EARLY" or "LATE". The DnaiChangeType data type shall comply with the provisions defined in table 5.4.3.7-1.

**Table 5.4.3.7-1: Enumeration DnaiChangeType**

| Enumeration value | Description  | Applicability |
|-------------------|--|---------------|
| EARLY             | Early notification of UP path reconfiguration.   |               |
| EARLY_LATE        | Early and late notification of UP path reconfiguration. This value shall only be present in the subscription to the DNAI change event. |               |
| LATE              | Late notification of UP path reconfiguration.  |               |

#### 5.4.3.8 Enumeration: RestrictionType

**Table 5.4.3.8-1: Enumeration RestrictionType**

| Enumeration value   | Description                                      |
|---------------------|--|
| "ALLOWED_AREAS"     | This value indicates that areas are allowed.     |
| "NOT_ALLOWED_AREAS" | This value indicates that areas are not allowed. |

#### 5.4.3.9 Enumeration: CoreNetworkType

**Table 5.4.3.9-1: Enumeration CoreNetworkType**

| Enumeration value | Description         |
|-------------------|---------------------|
| "5GC"             | 5G Core             |
| "EPC"             | Evolved Packet Core |

#### 5.4.3.10 Enumeration: AccessTypeRm

This enumeration is defined in the same way as the "AccessType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.11 Enumeration: RatTypeRm

This enumeration is defined in the same way as the "RatType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.12 Enumeration: PduSessionTypeRm

This enumeration is defined in the same way as the "PduSessionType" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.13 Enumeration: UpIntegrityRm

This enumeration is defined in the same way as the "UpIntegrity" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.14 Enumeration: UpConfidentialityRm

This enumeration is defined in the same way as the "UpConfidentiality" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.15 Enumeration: SscModeRm

This data type is defined in the same way as the "SscMode" enumeration, but with the OpenAPI "nullable: true" property.

#### 5.4.3.17 Enumeration: DnaiChangeTypeRm

This data type is defined in the same way as the "DnaiChangeType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.18 Enumeration: RestrictionTypeRm

This data type is defined in the same way as the "RestrictionType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.19 Enumeration: CoreNetworkType

This data type is defined in the same way as the "CoreNetworkType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.4.3.20 Enumeration: PresenceState

**Table 5.4.3.20-1: Enumeration PresenceState**

| Enumeration value | Description  |
|-------------------|--|
| "IN_AREA"         | Indicates that the UE is inside or enters the presence reporting area.           |
| "OUT_OF_AREA"     | Indicates that the UE is outside or leaves the presence reporting area.          |
| "UNKNOWN"         | Indicates it is unknown whether the UE is in the presence reporting area or not. |
| "INACTIVE"        | Indicates that the presence reporting area is inactive in the serving node.      |

## 5.4.4 Structured Data Types

### 5.4.4.1 Type: SubscribedDefaultQos

**Table 5.4.4.1-1: Definition of type SubscribedDefaultQos**

| Attribute name | Data type        | P | Cardinality | Description  |
|----------------|------------------|---|-------------|--|
| 5qi            | 5Qi              | M | 1           | Default 5G QoS identifier  |
| arp            | Arp              | M | 1           | Default Allocation and Retention Priority see 3GPP TS 23.501 [8] subclause 5.7.2.7.  |
| priorityLevel  | 5QiPriorityLevel | O | 0..1        | Defines the 5QI Priority Level. When present, it contains the 5QI Priority Level value that overrides the standardized or pre-configured value as described in 3GPP TS 23.501 [8]. |

## 5.4.4.2 Type: Sns sai

Table 5.4.4.2-1: Definition of type Sns sai

| Attribute name | Data type | P | Cardinality | Description  |
|----------------|-----------|---|-------------|--|
| sst            | UInteger  | M | 1           | Unsigned integer, within the range 0 to 255, representing the Slice/Service Type. It indicates the expected Network Slice behaviour in terms of features and services.<br>Values 0 to 127 correspond to the standardized SST range. Values 128 to 255 correspond to the Operator-specific range. See subclause 28.4.2 of 3GPP TS 23.003 [7].<br>Standardized values are defined in subclause 5.15.2.2 of 3GPP TS 23.501 [8].   |
| sd             | string    | O | 0..1        | 3-octet string, representing the Slice Differentiator, in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the SD shall appear first in the string, and the character representing the 4 least significant bit of the SD shall appear last in the string.<br><br>This is an optional parameter that complements the Slice/Service type(s) to allow to differentiate amongst multiple Network Slices of the same Slice/Service type.<br><br>Pattern: '[A-Fa-f0-9]{6}' |

When Sns sai needs to be converted to string (e.g. when used in maps as key), the string shall be composed of one to three digits "sst" optionally followed by "-" and 6 hexadecimal digits "sd", and shall match the following pattern:

$^{\wedge}([0-9][1-9][0-9]1[0-9][0-9]2([0-4][0-9]5[0-5]))(-[A-Fa-f0-9]{6})? \$$

Example 1: "255-19CDE0"

Example 2: "29"

## 5.4.4.3 Type: Plm n id

Table 5.4.4.3-1: Definition of type Plm n id

| Attribute name | Data type | P | Cardinality | Description         |
|----------------|-----------|---|-------------|---------------------|
| mcc            | Mcc       | M | 1           | Mobile Country Code |
| mnc            | Mnc       | M | 1           | Mobile Network Code |

## 5.4.4.4 Type: Tai

Table 5.4.4.4-1: Definition of type Tai

| Attribute name | Data type | P | Cardinality | Description        |
|----------------|-----------|---|-------------|--------------------|
| plmnid         | Plmnid    | M | 1           | PLMN Identity      |
| tac            | Tac       | M | 1           | Tracking Area Code |

## 5.4.4.5 Type: Ecgi

Table 5.4.4.5-1: Definition of type Ecgi

| Attribute name | Data type   | P | Cardinality | Description          |
|----------------|-------------|---|-------------|----------------------|
| plmnId         | PlmnId      | M | 1           | PLMN Identity        |
| eutraCellId    | EutraCellId | M | 1           | E-UTRA Cell Identity |

## 5.4.4.6 Type: Ncgi

Table 5.4.4.6-1: Definition of type Ncgi

| Attribute name | Data type | P | Cardinality | Description      |
|----------------|-----------|---|-------------|------------------|
| plmnId         | PlmnId    | M | 1           | PLMN Identity    |
| nrCellId       | NrCellId  | M | 1           | NR Cell Identity |

## 5.4.4.7 Type: UserLocation

Table 5.4.4.7-1: Definition of type UserLocation

| Attribute name   | Data type     | P | Cardinality | Description                               |
|--|---------------|---|-------------|---|
| eutraLocation  | EutraLocation | C | 0..1        | E-UTRA user location (see NOTE).          |
| nrLocation   | NrLocation    | C | 0..1        | NR user location (see NOTE).              |
| n3gaLocation   | N3gaLocation  | C | 0..1        | Non-3GPP access user location (see NOTE). |
| NOTE: At least one of eutraLocation, nrLocation and n3gaLocation shall be present. Several of them may be present. |               |   |             |   |

## 5.4.4.8 Type: EutraLocation

Table 5.4.4.8-1: Definition of type EutraLocation

| Attribute name           | Data type        | P | Cardinality | Description  |
|--------------------------|------------------|---|-------------|--|
| tai                      | Tai              | M | 1           | Tracking Area Identity   |
| ecgi                     | Ecgi             | M | 1           | E-UTRA Cell Identity   |
| ageOfLocationInformation | integer          | O | 0..1        | The value represents the elapsed time in minutes since the last network contact of the mobile station. Value "0" indicates that the location information was obtained after a successful paging procedure for Active Location Retrieval when the UE is in idle mode or after a successful NG-RAN location reporting procedure with the eNB when the UE is in connected mode. Any other value than "0" indicates that the location information is the last known one. See 3GPP TS 29.002 [21] subclause 17.7.8. |
| ueLocationTimestamp      | DateTime         | O | 0..1        | The value represents the UTC time when the UeLocation information was acquired.  |
| geographicalInformation  | string           | O | 0..1        | Refer to geographical Information. See 3GPP TS 23.032 [23] subclause 7.3.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F;  |
| geodeticInformation      | string           | O | 0..1        | Refers to Calling Geodetic Location. See ITU-T Recommendation Q.763 (1999) [24] subclause 3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F.  |
| globalNgenbId            | GlobalRanNodeBId | O | 0..1        | It indicates the global identity of the ng-eNodeB in which the UE is currently located. See 3GPP TS 38.413 [11] subclause 9.3.1.8.   |

## 5.4.4.9 Type: NrLocation

Table 5.4.4.9-1: Definition of type NrLocation

| Attribute name           | Data type        | P | Cardinality | Description  |
|--------------------------|------------------|---|-------------|--|
| tai                      | Tai              | M | 1           | Tracking Area Identity   |
| ncgi                     | Ncgi             | M | 1           | NR Cell Identity   |
| ageOfLocationInformation | integer          | O | 0..1        | The value represents the elapsed time in minutes since the last network contact of the mobile station. Value "0" indicates that the location information was obtained after a successful paging procedure for Active Location Retrieval when the UE is in idle mode or after a successful NG-RAN location reporting procedure with the gNB when the UE is in connected mode. Any other value than "0" indicates that the location information is the last known one. See 3GPP TS 29.002 [21] subclause 17.7.8. |
| ueLocationTimestamp      | DateTime         | O | 0..1        | The value represents the UTC time when the UeLocation information was acquired.  |
| geographicalInformation  | string           | O | 0..1        | Refer to geographical Information. See 3GPP TS 23.032 [23] subclause 7.3.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F;  |
| geodeticInformation      | string           | O | 0..1        | Refers to Calling Geodetic Location. See ITU-T Recommendation Q.763 (1999) [24] subclause 3.88.2. Only the description of an ellipsoid point with uncertainty circle is allowed to be used. Allowed characters are 0-9 and A-F.  |
| globalGnbld              | GlobalRanNodeBld | O | 0..1        | It indicates the global identity of the gNodeB in which the UE is currently located. See 3GPP TS 38.413 [11] subclause 9.3.1.6.  |

## 5.4.4.10 Type: N3gaLocation

Table 5.4.4.10-1: Definition of type N3gaLocation

| Attribute name | Data type | P | Cardinality | Description  |
|----------------|-----------|---|-------------|--|
| n3gppTai       | Tai       | C | 0..1        | The unique non 3GPP TAI used in the PLMN. It shall be present over the 3GPP PLMN internal interfaces, but shall not be present over the N5 interface.  |
| n3lwfld        | string    | C | 0..1        | This IE shall contain the N3IWF identifier received over NGAP and shall be encoded as a string of hexadecimal characters. Pattern: '[A-Fa-f0-9]+'<br>It shall be present over the 3GPP PLMN internal interfaces, but shall not be present over the N5 interface. |
| uelpv4Addr     | Ipv4Addr  | C | 0..1        | UE local IPv4 address (used to reach the N3IWF). The uelPv4Addr or the uelPv6Addr shall be present.  |
| uelpv6Addr     | Ipv6Addr  | C | 0..1        | UE local IPv6 address (used to reach the N3IWF). The uelPv4Addr or the uelPv6Addr shall be present.  |
| portNumber     | UInteger  | C | 0..1        | UDP or TCP source port number. It shall be present if NAT is detected.   |

## 5.4.4.11 Type: UpSecurity

Table 5.4.4.11-1: Definition of type UpSecurity

| Attribute name | Data type         | P | Cardinality | Description   |
|----------------|-------------------|---|-------------|---|
| upIntegr       | UpIntegrity       | M | 1           | This IE shall indicate whether UP integrity protection is required, preferred or not needed for all the traffic on the PDU Session.       |
| upConfid       | UpConfidentiality | M | 1           | This IE shall indicate whether UP confidentiality protection is required, preferred or not needed for all the traffic on the PDU Session. |

## 5.4.4.12 Type: NgApCause

Table 5.4.4.12-1: Definition of type NgApCause

| Attribute name | Data type | P | Cardinality | Description   |
|----------------|-----------|---|-------------|---|
| group          | UInteger  | M | 1           | This IE shall indicate the group of the NGAP cause. The value of this IE shall equal to the ASN.1 value of the specified NGAP cause group.<br><br>NGAP supports following cause groups defined as separate enumerations, as specified in subclause 9.4.5 of 3GPP TS 38.413 [11], with following values:<br><br>0 – radioNetwork<br>1 – transport<br>2 – nas<br>3 – protocol<br>4 – misc |
| value          | UInteger  | M | 1           | This IE shall carry the NG AP cause value in specific cause group identified by the "group" attribute, as specified in subclause 9.4.5 of 3GPP TS 38.413 [11].  |

## 5.4.4.13 Type: BackupAmfInfo

Table 5.4.4.13-1: Definition of type BackupAmfInfo

| Attribute name | Data type    | P | Cardinality | Description   |
|----------------|--------------|---|-------------|---|
| backupAmf      | AmfName      | M | 1           | This IE shall contain the AMF name of the backup AMF related to the specific GUAMI(s) (see subclause 5.21.2.3 of 3GPP TS 23.501 [2]). If no GUAMI is included in BackupAmfinfo, the AMF name of the backup AMF is related to all the GUAMI(s) supported by the AMF. |
| guamiList      | array(Guami) | C | 1..N        | If present, this IE shall contain the GUAMI(s).   |

## 5.4.4.14 Type: RefToBinaryData

Table 5.4.4.14-1: Definition of type RefToBinaryData

| Attribute name | Data type | P | Cardinality | Description  |
|----------------|-----------|---|-------------|--|
| contentId      | string    | M | 1           | This IE shall contain the value of the Content-ID header of the referenced binary body part. |



## 5.4.4.15 Type RouteToLocation

Table 5.4.4.15-1: Definition of type RouteToLocation

| Attribute name  | Data type        | P | Cardinality | Description                                 |
|---|------------------|---|-------------|---|
| dnai  | Dnai             | M | 1           | Identifies the location of the application. |
| routeInfo   | RouteInformation | C | 0..1        | Includes the traffic routing information.   |
| routeProfId   | string           | C | 0..1        | Identifies the routing profile Id.          |
| NOTE: Either the "routeInfo" attribute or the "routeProfId" attribute shall be included in the "RouteToLocation" data type. |                  |   |             |   |

## 5.4.4.16 Type RouteInformation

Table 5.4.4.16-1: Definition of type RouteInformation

| Attribute name   | Data type | P | Cardinality | Description  |
|--|-----------|---|-------------|--|
| ipv4Addr   | Ipv4Addr  | C | 0..1        | Ipv4address of the tunnel end point in the data network.     |
| ipv6Addr   | Ipv6Addr  | C | 0..1        | Ipv6 address of the tunnel end point in the data network.    |
| portNumber   | UInteger  | M | 1           | UDP port number of the tunnel end point in the data network. |
| NOTE: At least one of the "ipv4Addr" attribute and the "ipv6Addr" attribute shall be included in the "RouteInformation" data type. |           |   |             |  |

## 5.4.4.17 Type: Area

Table 5.4.4.17-1: Definition of type Area

| Attribute name | Data type  | P | Cardinality | Description   |
|----------------|------------|---|-------------|---|
| tacs           | array(Tac) | C | 1..N        | List of TACs; shall be present if and only if areaCode is absent. |
| areaCodes      | AreaCode   | C | 0..1        | Area Code; shall be present if and only if tacs is absent.        |

## 5.4.4.18 Type: ServiceAreaRestriction

Table 5.4.4.18-1: Definition of type ServiceAreaRestriction

| Attribute name  | Data type       | P | Cardinality    | Description  |
|---|-----------------|---|----------------|--|
| restrictionType   | RestrictionType | C | 0..1           | string<br>"ALLOWED_AREAS" or<br>"NOT_ALLOWED_AREAS"<br>shall be present if and only if the areas attribute is present  |
| areas   | array(Area)     | O | 0..N<br>(NOTE) | A list of Areas.<br>These areas are:<br>- allowed areas if RestrictionType is "ALLOWED_AREAS"<br>- not allowed areas if RestrictionType is "NOT_ALLOWED_AREAS" |
| maxNumOfTAs   | UInteger        | C | 0..1           | Maximum number of allowed tracking areas.<br>This attribute shall be absent when attribute "restrictionType" takes the value "NOT_ALLOWED_AREAS".              |
| NOTE: The empty array is used when service is allowed/restricted nowhere. |                 |   |                |  |

## 5.4.4.19 Type: PlmnIdRm

This data type is defined in the same way as the "PlmnId" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.20 Type: TaiRm

This data type is defined in the same way as the "Tai" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.21 Type: EcgiRm

This data type is defined in the same way as the "Ecgi" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.22 Type: NcgiRm

This data type is defined in the same way as the "Ncgi" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.23 Type: EutraLocationRm

This data type is defined in the same way as the "EutraLocation" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.24 Type: NrLocationRm

This data type is defined in the same way as the "NrLocation" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.25 Type: UpSecurityRm

This data type is defined in the same way as the "UpSecurity" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.26 Type: RefToBinaryDataRm

This data type is defined in the same way as the "RefToBinaryData" data type, but with the OpenAPI "nullable: true" property.

#### 5.4.4.27 Type: PresenceInfo

**Table 5.4.4.27-1: Definition of type PresenceInfo**

| Attribute name      | Data type              | P | Cardinality | Description  |
|---------------------|------------------------|---|-------------|--|
| prald               | String                 | C | 0..1        | Represents an identifier to the specified area. This IE shall be present if the Area of Interest subscribed or reported is a Presence Reporting Area.  |
| presenceState       | PresenceState          | C | 0..1        | Indicates whether the UE is inside or outside of the area of interest (e.g presence reporting area or the LADN area), or if the presence reporting area is inactive in the serving node.   |
| trackingAreaList    | array(Tai)             | C | 1..N        | Represents the list of tracking areas that constitutes the area. This IE shall be present if the subscription or the event report is for tracking UE presence in the tracking areas. For non 3GPP access the TAI shall be the N3GPP TAI. |
| ecgiList            | array(Ecgi)            | C | 1..N        | Represents the list of EUTRAN cell Ids that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of EUTRAN cell Ids.  |
| ncgiList            | array(Ncgi)            | C | 1..N        | Represents the list of NR cell Ids that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of NR cell Ids.  |
| globalRanNodeIdList | array(GlobalRanNodeId) | C | 1..N        | Represents the list of NG RAN node identifiers that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of NG RAN node identifiers.  |

## 5.4.4.28 Type: GlobalRanNodeId

Table 5.4.4.28-1: Definition of type GlobalRanNodeId

| Attribute name   | Data type | P | Cardinality | Description  |
|--|-----------|---|-------------|--|
| plmnId   | PlmnId    | M | 1           | Indicates the identity of the PLMN that the RAN node belongs to.   |
| n3IwId   | N3IwId    | C | 0..1        | This IE shall be included if the RAN node belongs to non 3GPP access (i.e a N3IWF). (NOTE).  |
| gNbId  | GNbId     | C | 0..1        | This IE shall be included if the RAN Node Id represents a gNB. When present, this IE shall contain the identifier of the gNB. (NOTE 1).      |
| ngNbId   | NgeNbId   | C | 0..1        | This IE shall be included if the RAN Node Id represents a NG-eNB. When present, this IE shall contain the identifier of an NG-eNB. (NOTE 1). |
| NOTE: At most one of the three attributes n3IwId, gNbId, ngeNbId shall be present. |           |   |             |  |

## 5.4.4.29 Type: GNbId

Table 5.4.4.29-1: Definition of type GNbId

| Attribute name | Data type | P | Cardinality | Description  |
|----------------|-----------|---|-------------|--|
| bitLength      | integer   | M | 1           | Unsigned integer representing the bit length of the gNB ID as defined in subclause 9.3.1.6 of 3GPP TS 38.413 [11], within the range 22 to 32   |
| gNbValue       | string    | M | 1           | <p>This represents the identifier of the gNB.</p> <p>The string shall be formatted with following pattern: <code>^[A-Fa-f0-9]{6,8}\$</code></p> <p>The value of the gNB ID shall be encoded in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The padding 0 shall be added to make multiple nibbles, the most significant character representing the padding 0 if required together with the 4 most significant bits of the gNB ID shall appear first in the string, and the character representing the 4 least significant bit of the gNB ID shall appear last in the string.</p> <p>Examples:<br/> A 30 bit value "382A3F47" indicates a gNB ID with value 0x382A3F47<br/> A 22 bit value "2A3F47" indicates a gNB ID with value 0x2A3F47</p> |

## 5.4.4.30 Type: PresenceInfoRm

This data type is defined in the same way as the "PresenceInfo" data type, but with the OpenAPI "nullable: true" property.

## 5.5 Data Types related to 5G QoS

## 5.5.1 Introduction

This clause defines common data types related to 5G QoS.

## 5.5.2 Simple Data Types

This subclause specifies common simple data types.

**Table 5.5.2-1: Simple Data Types**

| Type Name          | Type Definition | Description   |
|--------------------|-----------------|---|
| Qfi                | integer         | Unsigned integer identifying a QoS flow, within the range 0 to 63.  |
| QfiRm              | integer         | This data type is defined in the same way as the "Qfi" data type, but with the OpenAPI "nullable: true" property.   |
| 5Qi                | integer         | Unsigned integer representing a 5G QoS Identifier (see subclause 5.7.2.1 of 3GPP TS 23.501 [8]), within the range 0 to 255.   |
| 5QiRm              | integer         | This data type is defined in the same way as the "5Qi" data type, but with the OpenAPI "nullable: true" property.   |
| BitRate            | string          | String representing a bit rate that shall be formatted as follows:<br><br>Pattern: '^d+(\.d+)? (bps Kbps Mbps Gbps Tbps)\$'<br><br>Examples:<br>"125 Mbps", "0.125 Gbps", "125000 Kbps"   |
| BitRateRm          | string          | This data type is defined in the same way as the "BitRate" data type, but with the OpenAPI "nullable: true" property.   |
| ArpPriorityLevel   | integer         | Unsigned integer indicating the ARP Priority Level (see subclause 5.7.2.2 of 3GPP TS 23.501 [8]), within the range 1 to 15.<br>Values are ordered in decreasing order of priority, i.e. with 1 as the highest priority and 15 as the lowest priority.   |
| ArpPriorityLevelRm | integer         | This data type is defined in the same way as the "ArpPriorityLevel" data type, but with the OpenAPI "nullable: true" property.  |
| 5QiPriorityLevel   | integer         | Unsigned integer indicating the 5QI Priority Level (see subclauses 5.7.3.3 and 5.7.4 of 3GPP TS 23.501 [8]), within the range 1 to 127.<br>Values are ordered in decreasing order of priority, i.e. with 1 as the highest priority and 127 as the lowest priority.  |
| 5QiPriorityLevelRm | integer         | This data type is defined in the same way as the "5QiPriorityLevel" data type, but with the OpenAPI "nullable: true" property.  |
| PacketDelBudget    | Integer         | Unsigned integer indicating Packet Delay Budget (see subclauses 5.7.3.4 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in milliseconds.<br>Minimum = 1.  |
| PacketDelBudgetRm  | integer         | This data type is defined in the same way as the "PacketDelBudget" data type, but with the OpenAPI "nullable: true" property.   |
| PacketErrRate      | string          | String representing Packet Error Rate (see subclause 5.7.3.5 and 5.7.4 of 3GPP TS 23.501 [8]), expressed as a "scalar x 10-k" where the scalar and the exponent k are each encoded as one decimal digit..<br>Pattern: '^([0-9]E-[0-9])\$'<br><br>Examples:<br>Packer Error Rate 4x10 <sup>-6</sup> shall be encoded as "4E-6".<br>Packer Error Rate 10 <sup>-2</sup> shall be encoded as "1E2". |
| PacketErrRateRm    | string          | This data type is defined in the same way as the "PacketErrRate" data type, but with the OpenAPI "nullable: true" property.   |
| PacketLossRate     | Integer         | Unsigned integer indicating Packet Loss Rate (see subclauses 5.7.2.8 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in tenth of percent.<br>Minimum = 0. Maximum = 1000.   |
| PacketLossRateRm   | Integer         | This data type is defined in the same way as the "PacketLossRate" data type, but with the OpenAPI "nullable: true" property.  |
| AverWindow         | Integer         | Unsigned integer indicating Averaging Window (see subclause 5.7.3.6 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in milliseconds.<br>Minimum = 1. Maximum = 4095. Default = 2000..   |
| AverWindowRm       | integer         | This data type is defined in the same way as the "AverWindow" data type, but with the OpenAPI "nullable: true" property.  |

|                   |         |   |
|-------------------|---------|---|
| MaxDataBurstVol   | Integer | Unsigned integer indicating Maximum Data Burst Volume (see subclauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in Bytes.<br>Minimum = 1. Maximum = 4095. |
| MaxDataBurstVolRm | Integer | This data type is defined in the same way as the "MaxDataBurstVol" data type, but with the OpenAPI "nullable: true" property.                                       |

## 5.5.3 Enumerations

### 5.5.3.1 Enumeration: PreemptionCapability

The enumeration PreemptionCapability indicates the pre-emption capability of a request on other QoS flows. See subclause 5.7.2.2 of 3GPP TS 23.501 [8]. It shall comply with the provisions defined in table 5.5.3.1-1.

**Table 5.5.3.1-1: Enumeration PreemptionCapability**

| Enumeration value | Description                    |
|-------------------|--------------------------------|
| "NOT_PREEMPT"     | Shall not trigger pre-emption. |
| "MAY_PREEMPT"     | May trigger pre-emption.       |

### 5.5.3.2 Enumeration: PreemptionVulnerability

The enumeration PreemptionVulnerability indicates the pre-emption vulnerability of the QoS flow to pre-emption from other QoS flows. See subclause 5.7.2.2 of 3GPP TS 23.501 [8]. It shall comply with the provisions defined in table 5.5.3.2-1.

**Table 5.5.3.2-1: Enumeration PreemptionVulnerability**

| Enumeration value | Description              |
|-------------------|--------------------------|
| "NOT_PREEMPTABLE" | Shall not be pre-empted. |
| "PREEMPTABLE"     | May be pre-empted.       |

### 5.5.3.3 Enumeration: ReflectiveQosAttribute

The enumeration ReflectiveQosAttribute indicates whether certain traffic of the QoS flow may be subject to Reflective QoS (see subclause 5.7.2.3 of 3GPP TS 23.501 [2]). It shall comply with the provisions defined in table 5.5.3.3-1.

**Table 5.5.3.3-1: Enumeration ReflectiveQosAttribute**

| Enumeration value | Description   |
|-------------------|---|
| "RQOS"            | Certain traffic of the QoS flow may be subject to Reflective QoS. |
| "NO_RQOS"         | Traffic of the QoS flow is not subject to Reflective QoS.         |

### 5.5.3.4 Void

### 5.5.3.5 Enumeration: NotificationControl

The enumeration NotificationControl indicates whether notifications are requested from the RAN when the GFBR can no longer (or again) be fulfilled for a QoS Flow during the lifetime of the QoS Flow (see subclause 5.7.2.4 of 3GPP TS 23.501 [2]). It shall comply with the provisions defined in table 5.5.3.5-1.

**Table 5.5.3.5-1: Enumeration NotificationControl**

| Enumeration value | Description                                   |
|-------------------|---|
| "REQUESTED"       | Notifications are requested from the RAN.     |
| "NOT_REQUESTED"   | Notifications are not requested from the RAN. |

### 5.5.3.6 Enumeration: QosResourceType

The enumeration QosResourceType indicates whether a QoS Flow is non-GBR, delay critical GBR, or non-delay critical GBR (see subclauses 5.7.3.4 and 5.7.3.5 of 3GPP TS 23.501 [2]). It shall comply with the provisions defined in table 5.5.3.6-1.

**Table 5.5.3.6-1: Enumeration QosResourceType**

| Enumeration value  | Description                      |
|--------------------|----------------------------------|
| "NON_GBR"          | Non-GBR QoS Flow.                |
| "NON_CRITICAL_GBR" | Non-delay critical GBR QoS flow. |
| "CRITICAL_GBR"     | Delay critical GBR QoS flow.     |

### 5.5.3.7 Enumeration: PreemptionCapabilityRm

This enumeration is defined in the same way as the "PreemptionCapability" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.8 Enumeration: PreemptionVulnerabilityRm

This enumeration is defined in the same way as the "PreemptionVulnerability" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.9 Enumeration: ReflectiveQosAttributeRm

This enumeration is defined in the same way as the "ReflectiveQosAttribute" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.10 Enumeration: NotificationControlRm

This enumeration is defined in the same way as the "NotificationControl" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.11 Enumeration: QosResourceTypeRm

This enumeration is defined in the same way as the "QosResourceType" enumeration, but with the OpenAPI "nullable: true" property.

### 5.5.3.12 Enumeration: AdditionalQosFlowInfo

The enumeration AdditionalQosFlowInfo provides additional QoS flow information (see subclause 9.3.1.12 3GPP TS 38.413 [11]). It shall comply with the provisions defined in table 5.5.3.12-1.

**Table 5.5.3.12-1: Enumeration AdditionalQosFlowInfo**

| Enumeration value | Description   |
|-------------------|---|
| "MORE_LIKELY"     | Traffic for the QoS flow is likely to appear more often than traffic for other flows established for the PDU session. |

## 5.5.4 Structured Data Types

### 5.5.4.1 Type: Arp

**Table 5.5.4.1-1: Definition of type Arp**

| Attribute name | Data type               | P | Cardinality | Description   |
|----------------|-------------------------|---|-------------|---|
| priorityLevel  | ArpPriorityLevel        | M | 1           | Defines the relative importance of a resource request.  |
| preemptCap     | PreemptionCapability    | M | 1           | Defines whether a service data flow may get resources that were already assigned to another service data flow with a lower priority level.  |
| preemptVuln    | PreemptionVulnerability | M | 1           | Defines whether a service data flow may lose the resources assigned to it in order to admit a service data flow with higher priority level. |

### 5.5.4.2 Type: Ambr

**Table 5.5.4.2-1: Definition of type Ambr**

| Attribute name | Data type | P | Cardinality | Description       |
|----------------|-----------|---|-------------|-------------------|
| uplink         | BitRate   | M | 1           | AMBR for uplink   |
| downlink       | BitRate   | M | 1           | AMBR for downlink |

### 5.5.4.3 Type: Dynamic5Qi

**Table 5.5.4.3-1: Definition of type Dynamic5Qi**

| Attribute name    | Data type          | P | Cardinality | Description  | Applicability |
|-------------------|--------------------|---|-------------|--|---------------|
| resourceType      | QosResourceType    | M | 1           | Defines the 5QI resource type. See subclause 5.5.3.6.  |               |
| priorityLevel     | 5QIPriorityLevel   | M | 1           | Defines the 5QI Priority Level. See subclause 5.5.2.   |               |
| packetDelayBudget | PacketDelBudget    | M | 1           | Defines the packet delay budget. See subclause 5.5.2.  |               |
| packetErrRate     | PacketErrRate      | M | 1           | Defines the packet error rate. See subclause 5.5.2.  |               |
| averWindow        | AverWindow         | C | 0..1        | Defines the averaging window. See subclause 5.5.2.<br>This IE shall be present only for a GBR QoS flow or a Delay Critical GBR QoS flow. |               |
| maxDataBurstVol   | MaxDataBurstVolume | C | 0..1        | Defines the maximum data burst volume. See subclause 5.5.2.<br>This IE shall be present for a Delay Critical GBR QoS flow.               |               |



## 5.5.4.4 Type: NonDynamic5Qi

Table 5.5.4.4-1: Definition of type NonDynamic5Qi

| Attribute name  | Data type        | P | Cardinality | Description   | Applicability |
|-----------------|------------------|---|-------------|---|---------------|
| priorityLevel   | 5QiPriorityLevel | O | 0..1        | Defines the 5QI Priority Level. See subclause 5.5.2.<br>When present, it contains the 5QI Priority Level value that overrides the standardized or pre-configured value.   |               |
| averWindow      | AverWindow       | O | 0..1        | Defines the averaging window. See subclause 5.5.2.<br>This IE may be present for a GBR QoS flow or a Delay Critical GBR QoS flow.<br>When present, it contains the Averaging Window that overrides the standardized or pre-configured value.    |               |
| maxDataBurstVol | MaxDataBurstVol  | O | 0..1        | Defines the maximum data burst volume. See subclause 5.5.2.<br>This IE may be present for a Delay Critical GBR QoS flow. When present, it contains the Maximum Data Burst Volume value that overrides the standardized or pre-configured value. |               |

## 5.5.4.5 Type: ArpRm

This data type is defined in the same way as the "Arp" data type, but with the OpenAPI "nullable: true" property.

## 5.5.4.6 Type: AmbrRm

This data type is defined in the same way as the "Ambr" data type, but with the OpenAPI "nullable: true" property.

## 5.6 Data Types related to 5G Trace

## 5.6.1 Introduction

This clause defines common data types related to 5G Trace.

## 5.6.2 Simple Data Types

This subclause specifies common simple data types.

Table 5.6.2-1: Simple Data Types

| Type Name | Type Definition | Description |
|-----------|-----------------|-------------|
|           |                 |             |

## 5.6.3 Enumerations

## 5.6.3.1 Enumeration: TraceDepth

The enumeration TraceDepth defines how detailed information should be recorded in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.1-1.

Table 5.6.3.1-1: Enumeration TraceDepth

| Enumeration value             | Description                               |
|-------------------------------|---|
| "MINIMUM"                     | Minimum                                   |
| "MEDIUM"                      | Medium                                    |
| "MAXIMUM"                     | Maximum                                   |
| "MINIMUM_WO_VENDOR_EXTENSION" | Minimum without vendor specific extension |
| "MEDIUM_WO_VENDOR_EXTENSION"  | Medium without vendor specific extension  |
| "MAXIMUM_WO_VENDOR_EXTENSION" | Maximum without vendor specific extension |

### 5.6.3.2 Enumeration: TraceDepthRm

This enumeration is defined in the same way as the "TraceDepth" enumeration, but with the OpenAPI "nullable: true" property.

## 5.6.4 Structured Data Types

### 5.6.4.1 Type: TraceData

**Table 5.6.4.1-1: Definition of type TraceData**

| Attribute name           | Data type  | P | Cardinality | Description  |
|--------------------------|------------|---|-------------|--|
| traceRef                 | string     | M | 1           | Trace Reference (see 3GPP TS 32.422 [19]).<br><br>It shall be encoded as the concatenation of MCC, MNC and Trace ID as follows:<br><MCC><MNC>-<Trace ID><br><br>The Trace ID shall be encoded as a 3 octet string in hexadecimal representation. Each character in the Trace ID string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Trace ID shall appear first in the string, and the character representing the 4 least significant bit of the Trace ID shall appear last in the string.<br><br>Pattern: '^[0-9]{3}[0-9]{2,3}-[A-Fa-f0-9]{6}\$' |
| traceDepth               | TraceDepth | M | 1           | Trace Depth (see 3GPP TS 32.422 [19]).   |
| neTypeList               | string     | M | 1           | List of NE Types (see 3GPP TS 32.422 [19]).<br><br>It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string.<br><br>Octets shall be coded according to 3GPP TS 32.422 [19].<br><br>Pattern: '^[A-Fa-f0-9]+\$'  |
| eventList                | string     | M | 1           | Triggering events (see 3GPP TS 32.422 [19]).<br><br>It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string.<br><br>Octets shall be coded according to 3GPP TS 32.422 [19].<br><br>Pattern: '^[A-Fa-f0-9]+\$'   |
| collectionEntityIpv4Addr | Ipv4Addr   | C | 0..1        | IPv4 Address of the Trace Collection Entity (see 3GPP TS 32.422 [x]).<br>At least one of the collectionEntityIpv4Addr or collectionEntityIpv6Addr attributes shall be present.   |
| collectionEntityIpv6Addr | Ipv6Addr   | C | 0..1        | IPv6 Address of the Trace Collection Entity (see 3GPP TS 32.422 [x]).<br>At least one of the collectionEntityIpv4Addr or collectionEntityIpv6Addr attributes shall be present.   |

|               |        |   |      |  |
|---------------|--------|---|------|--|
| interfaceList | string | O | 0..1 | <p>List of Interfaces (see 3GPP TS 32.422 [19]).</p> <p>It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string.</p> <p>Octets shall be coded according to 3GPP TS 32.422 [19].</p> <p>If this attribute is not present, all the interfaces applicable to the list of NE types indicated in the neTypeList attribute should be traced.</p> <p>Pattern: '[A-Fa-f0-9]+\$'</p> |
|---------------|--------|---|------|--|

## 5.7 Data Types related to 5G Operator Determined Barring

### 5.7.1 Introduction

This clause defines common data types related to 5G Operator Determined Barring.

### 5.7.2 Simple Data Types

This subclause specifies common simple data types.

**Table 5.7.2-1: Simple Data Types**

| Type Name | Type Definition | Description |
|-----------|-----------------|-------------|
|           |                 |             |

### 5.7.3 Enumerations

#### 5.7.3.1 Enumeration: RoamingOdb

The enumeration RoamingOdb defines the Barring of Roaming as. See 3GPP TS 23.015 [26] for further description. It shall comply with the provisions defined in table 5.7.3.1-1.

**Table 5.7.3.1-1: Enumeration RoamingOdb**

| Enumeration value           | Description                                      |
|-----------------------------|--|
| "OUTSIDE_HOME_PLMN"         | Barring of roaming outside the home PLMN         |
| "OUTSIDE_HOME_PLMN_COUNTRY" | Barring of roaming outside the home PLMN country |

#### 5.7.4.1 Enumeration: OdbPacketServices

The enumeration OdbPacketServices defines the Barring of Packet Oriented Services. See 3GPP TS 23.015 [26] for further description. It shall comply with the provisions defined in table 5.7.4.1-1.

**Table 5.7.4.1-1: Enumeration OdbPacketServices**

| Enumeration value        | Description  |
|--------------------------|--|
| "ALL_PACKET_SERVICES"    | Barring of all Packet Oriented Services  |
| "ROAMER_ACCESS_HPLMN_AP" | Barring of Packet Oriented Services from access points that are within the HPLMN whilst the subscriber is roaming in a VPLMN |
| "ROAMER_ACCESS_VPLMN_AP" | Barring of Packet Oriented Services from access points that are within the roamed to VPLMN.                                  |

## 5.7.4 Structured Data Types

### 5.7.4.1 Type: OdbData

**Table 5.7.4.1-1: Definition of type OdbData**

| Attribute name | Data type  | P | Cardinality | Description                                   |
|----------------|------------|---|-------------|---|
| roamingOdb     | RoamingOdb | O | 0..1        | Barring of Roaming (see 3GPP TS 23.015 [26]). |

## 5.8 Data Types related to Charging

### 5.8.1 Introduction

This clause defines common data types related to Charging.

### 5.8.2 Simple Data Types

This subclause specifies common simple data types.

**Table 5.8.2-1: Simple Data Types**

| Type Name   | Type Definition | Description  |
|-------------|-----------------|--|
| ChargingId  | Uint32          | Charging identifier allowing correlation of charging information |
| RatingGroup | Uint32          | Identifier of a Rating Group                                     |
| ServiceId   | Uint32          | Identifier of a Service  |

### 5.8.3 Enumerations

### 5.8.4 Structured Data Types

#### 5.8.4.1 Type: SecondaryRatUsageReport

**Table 5.8.4.1-1: Definition of type SecondaryRatUsageReport**

| Attribute name    | Data type                 | P | Cardinality | Description          |
|-------------------|---------------------------|---|-------------|----------------------|
| secondaryRatType  | RatType                   | M | 1           | Secondary RAT type   |
| qosFlowsUsageData | array(QosFlowUsageReport) | M | 1..N        | QoS flows usage data |

#### 5.8.4.2 Type: QoSFlowUsageReport

**Table 5.8.4.2-1: Definition of type QoSFlowUsageReport**

| Attribute name | Data type | P | Cardinality | Description   |
|----------------|-----------|---|-------------|---|
| qfi            | Qfi       | M | 1           | QoS Flow Indicator  |
| startTimeStamp | DateTime  | M | 1           | UTC time indicating the start time of the collection period of the included usage data for DL and UL. |
| endTimeStamp   | DateTime  | M | 1           | UTC time indicating the end time of the collection period of the included usage data for DL and UL.   |
| downlinkVolume | Int64     | M | 1           | Data usage for DL, encoding a number of octets  |
| uplinkVolume   | Int64     | M | 1           | Data usage for UL, encoding a number of octets  |

# Annex A (normative): OpenAPI specification

## A.1 General

This Annex specifies the formal definition of common data types. It consists of an OpenAPI 3.0.0 specification, in YAML format.

## A.2 Data related to Common Data Types

```

openapi: 3.0.0
info:
  version: '1.0.1'
  title: 'Common Data Types'
  description: 'Common Data Types for Service Based Interfaces '
externalDocs:
  description: 3GPP TS 29.571 Common Data Types for Service Based Interfaces, version 15.3.0
  url: 'http://www.3gpp.org/ftp/Specs/archive/29_series/29.571/'

paths: {}
components:
  schemas:

#
# Common Data Types for Generic usage definitions as defined in subclause 5.2
#

#
# COMMON SIMPLE DATA TYPES
#
  Binary:
    format: binary
    type: string
  BinaryRm:
    format: binary
    type: string
    nullable: true
  Bytes:
    format: byte
    type: string
  BytesRm:
    format: byte
    type: string
    nullable: true
  Date:
    format: date
    type: string
  DateRm:
    format: date
    type: string
    nullable: true
  DateTime:
    format: date-time
    type: string
  DateTimeRm:
    format: date-time
    type: string
    nullable: true
  DiameterIdentity:
    type: string
    pattern: '^[A-Za-z0-9]+(-[A-Za-z0-9]+).)+[a-z]{2,}$'
  DiameterIdentityRm:
    type: string
    pattern: '^[A-Za-z0-9]+(-[A-Za-z0-9]+).)+[a-z]{2,}$'
    nullable: true
  Double:
    format: double
    type: number
  DoubleRm:
    format: double
    type: number
    nullable: true
  DurationSec:

```

```

    type: integer
DurationSecRm:
    type: integer
    nullable: true
Float:
    format: float
    type: number
FloatRm:
    format: float
    type: number
    nullable: true
Int32:
    format: int32
    type: integer
Int32Rm:
    format: int32
    type: integer
    nullable: true
Int64:
    type: integer
    format: int64
Int64Rm:
    format: int64
    type: integer
    nullable: true
Ipv4Addr:
    type: string
    pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])$'
    example: '198.51.100.1'
Ipv4AddrRm:
    type: string
    pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])$'
    example: '198.51.100.1'
    nullable: true
Ipv6Addr:
    type: string
    allOf:
      - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3})))|((0?|([1-9a-f][0-9a-f]{0,3})))|{0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3}))))$'
      - pattern: '^((([:]+){7}([^:]+))|((([:]+)*[:]+)?::(([:]+)*[:]+)?))$'
    example: '2001:db8:85a3::8a2e:370:7334'
Ipv6AddrRm:
    type: string
    allOf:
      - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3})))|((0?|([1-9a-f][0-9a-f]{0,3})))|{0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3}))))$'
      - pattern: '^((([:]+){7}([^:]+))|((([:]+)*[:]+)?::(([:]+)*[:]+)?))$'
    example: '2001:db8:85a3::8a2e:370:7334'
    nullable: true
Ipv6Prefix:
    type: string
    allOf:
      - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3})))|((0?|([1-9a-f][0-9a-f]{0,3})))|{0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3}))))(\\/(([0-9]|[0-9]{2})|(1[0-1][0-9])|(12[0-8])))$'
      - pattern: '^((([:]+){7}([^:]+))|((([:]+)*[:]+)?::(([:]+)*[:]+)?))(/\\.+)$'
    example: '2001:db8:abcd:12::0/64'
Ipv6PrefixRm:
    type: string
    allOf:
      - pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3})))|((0?|([1-9a-f][0-9a-f]{0,3})))|{0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3}))))(\\/(([0-9]|[0-9]{2})|(1[0-1][0-9])|(12[0-8])))$'
      - pattern: '^((([:]+){7}([^:]+))|((([:]+)*[:]+)?::(([:]+)*[:]+)?))(/\\.+)$'
    nullable: true
MacAddr48:
    type: string
    pattern: '^([0-9a-fA-F]{2})((-[0-9a-fA-F]{2}){5})$'
MacAddr48Rm:
    type: string
    pattern: '^([0-9a-fA-F]{2})((-[0-9a-fA-F]{2}){5})$'
    nullable: true
SupportedFeatures:
    type: string
    pattern: '^[A-Fa-f0-9]*$'
UInteger:
    type: integer
    minimum: 0

```



```

UIntegerRm:
  type: integer
  minimum: 0
  nullable: true
Uint16:
  type: integer
  minimum: 0
  maximum: 65535
Uint16Rm:
  type: integer
  minimum: 0
  maximum: 65535
  nullable: true
Uint32:
  format: int32
  type: integer
  minimum: 0
Uint32Rm:
  format: int32
  type: integer
  minimum: 0
  nullable: true
Uint64:
  format: int64
  type: integer
  minimum: 0
Uint64Rm:
  format: int64
  type: integer
  minimum: 0
  nullable: true
Uri:
  type: string
UriRm:
  type: string
  nullable: true
VarUeId:
  type: string
  pattern: '^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)$.+'
VarUeIdRm:
  type: string
  pattern: '^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)$.+'
  nullable: true
TimeZone:
  type: string
TimeZoneRm:
  type: string
  nullable: true

```

```

#
# COMMON ENUMERATED DATA TYPES
#

```

```

PatchOperation:
  anyOf:
    - type: string
      enum:
        - add
        - copy
        - move
        - remove
        - replace
        - test
    - type: string
UriScheme:
  anyOf:
    - type: string
      enum:
        - http
        - https
    - type: string
ChangeType:
  anyOf:
    - type: string
      enum:
        - ADD
        - MOVE
        - REMOVE

```

```
- REPLACE
- type: string

#
# COMMON STRUCTURED DATA TYPES
#

ProblemDetails:
  type: object
  properties:
    type:
      $ref: '#/components/schemas/Uri'
    title:
      type: string
    status:
      type: integer
    detail:
      type: string
    instance:
      $ref: '#/components/schemas/Uri'
    cause:
      type: string
    invalidParams:
      type: array
      items:
        $ref: '#/components/schemas/InvalidParam'
      minItems: 1
Link:
  type: object
  properties:
    href:
      $ref: '#/components/schemas/Uri'
LinkRm:
  type: object
  properties:
    href:
      $ref: '#/components/schemas/Uri'
  nullable: true
PatchItem:
  type: object
  properties:
    op:
      $ref: '#/components/schemas/PatchOperation'
    path:
      type: string
    from:
      type: string
    value:
      nullable: true
  required:
    - op
    - path
LinksValueSchema:
  oneOf:
    - type: array
      items:
        $ref: '#/components/schemas/Link'
      minItems: 1
    - $ref: '#/components/schemas/Link'
SelfLink:
  type: object
  properties:
    self:
      $ref: '#/components/schemas/Link'
  required:
    - self
InvalidParam:
  type: object
  properties:
    param:
      type: string
    reason:
      type: string
  required:
    - param
ChangeItem:
  type: object
  properties:
```

```

    op:
      $ref: '#/components/schemas/ChangeType'
    path:
      type: string
    from:
      type: string
    origValue: {}
    newValue: {}
  required:
    - op
    - path
NotifyItem:
  type: object
  properties:
    resourceId:
      $ref: '#/components/schemas/Uri'
    changes:
      type: array
      items:
        $ref: '#/components/schemas/ChangeItem'
      minItems: 1
ComplexQuery:
  oneOf:
    - $ref: '#/components/schemas/Cnf'
    - $ref: '#/components/schemas/Dnf'
Cnf:
  type: object
  required:
    - cnfUnits
  properties:
    cnfUnits:
      type: array
      items:
        $ref: '#/components/schemas/CnfUnit'
      minItems: 1
Dnf:
  type: object
  required:
    - dnfUnits
  properties:
    dnfUnits:
      type: array
      items:
        $ref: '#/components/schemas/DnfUnit'
      minItems: 1
CnfUnit:
  type: object
  required:
    - cnfUnit
  properties:
    cnfUnit:
      type: array
      items:
        $ref: '#/components/schemas/Atom'
      minItems: 1
DnfUnit:
  type: object
  required:
    - dnfUnit
  properties:
    dnfUnit:
      type: array
      items:
        $ref: '#/components/schemas/Atom'
      minItems: 1
Atom:
  type: object
  required:
    - attr
    - value
  properties:
    attr:
      type: string
    value: {}
    negative:
      type: boolean

```

```

#
# Data Types related to Subscription, Identification and Numbering as defined in subclause 5.3
#
#
# SIMPLE DATA TYPES
#
  Dnn:
    type: string
  DnnRm:
    type: string
    nullable: true
  Gpsi:
    type: string
    pattern: '^(\msisdn-[0-9]{5,15}|extid-[@]+[@]+|.+)$$'
  GpsiRm:
    type: string
    pattern: '^(\msisdn-[0-9]{5,15}|extid-[@]+[@]+|.+)$$'
    nullable: true
  GroupID:
    type: string
    pattern: '^([A-Fa-f0-9]{8}-[0-9]{3}-[0-9]{2,3}-([A-Fa-f0-9][A-Fa-f0-9]){1,10})$$'
  GroupIDRm:
    type: string
    pattern: '^([A-Fa-f0-9]{8}-[0-9]{3}-[0-9]{2,3}-([A-Fa-f0-9][A-Fa-f0-9]){1,10})$$'
    nullable: true
  Pei:
    type: string
    pattern: '^(\imei-[0-9]{15}|imeisv-[0-9]{16}|.+)$$'
  PeiRm:
    type: string
    pattern: '^(\imei-[0-9]{15}|imeisv-[0-9]{16}|.+)$$'
    nullable: true
  Supi:
    type: string
    pattern: '^(\imsi-[0-9]{5,15}|nai-.+|.+)$$'
  SupiRm:
    type: string
    pattern: '^(\imsi-[0-9]{5,15}|nai-.+|.+)$$'
    nullable: true
  NfInstanceId:
    type: string
    format: uuid
  AmfId:
    type: string
    pattern: '^([A-Fa-f0-9]{6})$$'
  AmfRegionId:
    type: string
    pattern: '^([A-Fa-f0-9]{2})$$'
  AmfSetId:
    type: string
    pattern: '^([0-3][A-Fa-f0-9]{2})$$'
  RfspIndex:
    type: integer
    minimum: 1
    maximum: 256
  RfspIndexRm:
    type: integer
    minimum: 1
    maximum: 256
    nullable: true
  NfGroupId:
    type: string
#
# STRUCTURED DATA TYPES
#
  Guami:
    type: object
    properties:
      plmnId:
        $ref: '#/components/schemas/PlmnId'
      amfId:
        $ref: '#/components/schemas/AmfId'
    required:
      - plmnId
      - amfId

```

```

GuamiRm:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
    amfId:
      $ref: '#/components/schemas/AmfId'
  required:
    - plmnId
    - amfId
  nullable: true
NetworkId:
  type: object
  properties:
    mnc:
      $ref: '#/components/schemas/Mnc'
    mcc:
      $ref: '#/components/schemas/Mcc'

#
# Data Types related to 5G Network as defined in subclause 5.4
#

#
# SIMPLE DATA TYPES
#

ApplicationId:
  type: string
ApplicationIdRm:
  type: string
  nullable: true
PduSessionId:
  type: integer
  minimum: 0
  maximum: 255
Mcc:
  type: string
  pattern: '^d{3}$'
MccRm:
  type: string
  pattern: '^d{3}$'
  nullable: true
Mnc:
  type: string
  pattern: '^d{2,3}$'
MncRm:
  type: string
  pattern: '^d{2,3}$'
  nullable: true
Tac:
  type: string
  pattern: '([A-Fa-f0-9]{4}$)|([A-Fa-f0-9]{6}$)'
TacRm:
  type: string
  pattern: '([A-Fa-f0-9]{4}$)|([A-Fa-f0-9]{6}$)'
  nullable: true
EutraCellId:
  type: string
  pattern: '^A-Fa-f0-9]{7}$'
EutraCellIdRm:
  type: string
  pattern: '^A-Fa-f0-9]{7}$'
  nullable: true
NrCellId:
  type: string
  pattern: '^A-Fa-f0-9]{9}$'
NrCellIdRm:
  type: string
  pattern: '^A-Fa-f0-9]{9}$'
  nullable: true
Dnai:
  type: string
DnaiRm:
  type: string
  nullable: true
5GmmCause:
  $ref: '#/components/schemas/Uinteger'

```

```

AmfName:
  type: string
AreaCode:
  type: string
AreaCodeRm:
  type: string
  nullable: true
N3IwfId:
  type: string
  pattern: '^[A-Za-f0-9]+$'
NgeNbId:
  type: string
  pattern: '^(MacroNGeNB-[A-Za-f0-9]{5}|LMacroNGeNB-[A-Za-f0-9]{6}|SMacroNGeNB-[A-Za-f0-9]{5})$'

```

```

#
# ENUMERATED DATA TYPES
#

```

```

AccessType:
  type: string
  enum:
    - 3GPP_ACCESS
    - NON_3GPP_ACCESS
AccessTypeRm:
  type: string
  enum:
    - 3GPP_ACCESS
    - NON_3GPP_ACCESS
  nullable: true
RatType:
  anyOf:
    - type: string
      enum:
        - NR
        - EUTRA
        - WLAN
        - VIRTUAL
    - type: string
RatTypeRm:
  anyOf:
    - type: string
      enum:
        - NR
        - EUTRA
        - WLAN
        - VIRTUAL
    - type: string
  nullable: true
PduSessionType:
  anyOf:
    - type: string
      enum:
        - IPV4
        - IPV6
        - IPV4V6
        - UNSTRUCTURED
        - ETHERNET
    - type: string
PduSessionTypeRm:
  anyOf:
    - type: string
      enum:
        - IPV4
        - IPV6
        - IPV4V6
        - UNSTRUCTURED
        - ETHERNET
    - type: string
  nullable: true
UpIntegrity:
  anyOf:
    - type: string
      enum:
        - REQUIRED
        - PREFERRED
        - NOT_NEEDED
    - type: string
UpIntegrityRm:

```

```

anyOf:
  - type: string
    enum:
      - REQUIRED
      - PREFERRED
      - NOT_NEEDED
  - type: string
nullable: true
UpConfidentiality:
anyOf:
  - type: string
    enum:
      - REQUIRED
      - PREFERRED
      - NOT_NEEDED
  - type: string
UpConfidentialityRm:
anyOf:
  - type: string
    enum:
      - REQUIRED
      - PREFERRED
      - NOT_NEEDED
  - type: string
nullable: true
SscMode:
anyOf:
  - type: string
    enum:
      - SSC_MODE_1
      - SSC_MODE_2
      - SSC_MODE_3
  - type: string
SscModeRm:
anyOf:
  - type: string
    enum:
      - SSC_MODE_1
      - SSC_MODE_2
      - SSC_MODE_3
  - type: string
nullable: true
DnaiChangeType:
anyOf:
  - type: string
    enum:
      - EARLY
      - EARLY_LATE
      - LATE
  - type: string
description: >
  This string provides forward-compatibility with future
  extensions to the enumeration but is not used to encode
  content defined in the present version of this API.
description: >
  Possible values are
  - EARLY: Early notification of UP path reconfiguration.
  - EARLY_LATE: Early and late notification of UP path reconfiguration. This value shall only
be present in the subscription to the DNAI change event.
  - LATE: Late notification of UP path reconfiguration.
DnaiChangeTypeRm:
anyOf:
  - type: string
    enum:
      - EARLY
      - EARLY_LATE
      - LATE
  - type: string
nullable: true
RestrictionType:
anyOf:
  - type: string
    enum:
      - ALLOWED_AREAS
      - NOT_ALLOWED_AREAS
  - type: string
RestrictionTypeRm:
anyOf:

```

```

    - type: string
      enum:
        - ALLOWED_AREAS
        - NOT_ALLOWED_AREAS
    - type: string
nullable: true
CoreNetworkType:
  anyOf:
    - type: string
      enum:
        - 5GC
        - EPC
    - type: string
CoreNetworkTypeRm:
  anyOf:
    - type: string
      enum:
        - 5GC
        - EPC
    - type: string
nullable: true
PresenceState:
  anyOf:
    - type: string
      enum:
        - IN_AREA
        - OUT_OF_AREA
        - UNKNOWN
        - INACTIVE
    - type: string

```

```

#
# STRUCTURED DATA TYPES
#

```

```

Snssai:
  type: object
  properties:
    sst:
      type: integer
      minimum: 0
      maximum: 255
    sd:
      type: string
      pattern: '^[A-Za-f0-9]{6}$'
  required:
    - sst
PlmnId:
  type: object
  properties:
    mcc:
      $ref: '#/components/schemas/Mcc'
    mnc:
      $ref: '#/components/schemas/Mnc'
  required:
    - mcc
    - mnc
PlmnIdRm:
  type: object
  properties:
    mcc:
      $ref: '#/components/schemas/Mcc'
    mnc:
      $ref: '#/components/schemas/Mnc'
  required:
    - mcc
    - mnc
nullable: true
Tai:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
    tac:
      $ref: '#/components/schemas/Tac'
  required:
    - plmnId
    - tac

```



```

TaiRm:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
    tac:
      $ref: '#/components/schemas/Tac'
  required:
    - plmnId
    - tac
  nullable: true
Ecgi:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
      # PLMN Identity
    eutraCellId:
      $ref: '#/components/schemas/EutraCellId'
  required:
    - plmnId
    - eutraCellId
EcgiRm:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
      # PLMN Identity
    eutraCellId:
      $ref: '#/components/schemas/EutraCellId'
  required:
    - plmnId
    - eutraCellId
  nullable: true
Ncgi:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
    nrCellId:
      $ref: '#/components/schemas/NrCellId'
  required:
    - plmnId
    - nrCellId
NcgiRm:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
    nrCellId:
      $ref: '#/components/schemas/NrCellId'
  required:
    - plmnId
    - nrCellId
  nullable: true
UserLocation:
  type: object
  properties:
    eutraLocation:
      $ref: '#/components/schemas/EutraLocation'
    nrLocation:
      $ref: '#/components/schemas/NrLocation'
    n3gaLocation:
      $ref: '#/components/schemas/N3gaLocation'
EutraLocation:
  type: object
  properties:
    tai:
      $ref: '#/components/schemas/Tai'
    ecgi:
      $ref: '#/components/schemas/Ecgi'
    ageOfLocationInformation:
      type: integer
      minimum: 0
      maximum: 32767
    ueLocationTimestamp:
      $ref: '#/components/schemas/DateTime'
    geographicalInformation:

```

```

    type: string
    pattern: '^[0-9A-F]{16}$'
  geodeticInformation:
    type: string
    pattern: '^[0-9A-F]{20}$'
  globalNgenbId:
    $ref: '#/components/schemas/GlobalRanNodeId'
  required:
  - tai
  - ecgi
EutraLocationRm:
  type: object
  properties:
    tai:
      $ref: '#/components/schemas/Tai'
    ecgi:
      $ref: '#/components/schemas/Ecgi'
    ageOfLocationInformation:
      type: integer
      minimum: 0
      maximum: 32767
    ueLocationTimestamp:
      $ref: '#/components/schemas/DateTime'
    geographicalInformation:
      type: string
      pattern: '^[0-9A-F]{16}$'
    geodeticInformation:
      type: string
      pattern: '^[0-9A-F]{20}$'
    globalNgenbId:
      $ref: '#/components/schemas/GlobalRanNodeId'
  required:
  - tai
  - ecgi
  nullable: true
NrLocation:
  type: object
  properties:
    tai:
      $ref: '#/components/schemas/Tai'
    ncgi:
      $ref: '#/components/schemas/Ncgi'
    ageOfLocationInformation:
      type: integer
      minimum: 0
      maximum: 32767
    ueLocationTimestamp:
      $ref: '#/components/schemas/DateTime'
    geographicalInformation:
      type: string
      pattern: '^[0-9A-F]{16}$'
    geodeticInformation:
      type: string
      pattern: '^[0-9A-F]{20}$'
    globalGnbId:
      $ref: '#/components/schemas/GlobalRanNodeId'
  required:
  - tai
  - ncgi
NrLocationRm:
  type: object
  properties:
    tai:
      $ref: '#/components/schemas/Tai'
    ncgi:
      $ref: '#/components/schemas/Ncgi'
    ageOfLocationInformation:
      type: integer
      minimum: 0
      maximum: 32767
    ueLocationTimestamp:
      $ref: '#/components/schemas/DateTime'
    geographicalInformation:
      type: string
      pattern: '^[0-9A-F]{16}$'
    geodeticInformation:
      type: string
      pattern: '^[0-9A-F]{20}$'

```

```

    globalGnbId:
      $ref: '#/components/schemas/GlobalRanNodeId'
    required:
      - tai
      - ncgi
    nullable: true
  N3gaLocation:
    type: object
    properties:
      n3gppTai:
        $ref: '#/components/schemas/Tai'
      n3IwfId:
        type: string
        pattern: '^[A-Za-f0-9]+$'
      ueIpv4Addr:
        $ref: '#/components/schemas/Ipv4Addr'
      ueIpv6Addr:
        $ref: '#/components/schemas/Ipv6Addr'
      portNumber:
        $ref: '#/components/schemas/UInteger'
  UpSecurity:
    type: object
    properties:
      upIntegr:
        $ref: '#/components/schemas/UpIntegrity'
      upConfid:
        $ref: '#/components/schemas/UpConfidentiality'
    required:
      - upIntegr
      - upConfid
  UpSecurityRm:
    type: object
    properties:
      upIntegr:
        $ref: '#/components/schemas/UpIntegrity'
      upConfid:
        $ref: '#/components/schemas/UpConfidentiality'
    required:
      - upIntegr
      - upConfid
    nullable: true
  NgApCause:
    type: object
    properties:
      group:
        $ref: '#/components/schemas/UInteger'
      value:
        $ref: '#/components/schemas/UInteger'
    required:
      - group
      - value
  BackupAmfInfo:
    type: object
    properties:
      backupAmf:
        $ref: '#/components/schemas/AmfName'
      guamiList:
        type: array
        items:
          $ref: '#/components/schemas/Guami'
        minItems: 1
    required:
      - backupAmf
  RefToBinaryData:
    type: object
    properties:
      contentId:
        type: string
    required:
      - contentId
  RefToBinaryDataRm:
    type: object
    properties:
      contentId:
        type: string
    required:
      - contentId
    nullable: true

```

```

RouteToLocation:
  type: object
  properties:
    dnai:
      $ref: '#/components/schemas/Dnai'
    routeInfo:
      $ref: '#/components/schemas/RouteInformation'
    routeProfId:
      type: string
      nullable: true
  required:
    - dnai
  anyOf:
    - required: [ routeInfo ]
    - required: [ routeProfId ]
  nullable: true
RouteInformation:
  type: object
  properties:
    ipv4Addr:
      $ref: '#/components/schemas/Ipv4Addr'
    ipv6Addr:
      $ref: '#/components/schemas/Ipv6Addr'
    portNumber:
      $ref: '#/components/schemas/UInteger'
  required:
    - portNumber
  nullable: true
SubscribedDefaultQos:
  type: object
  required:
    - 5qi
    - arp
  properties:
    5qi:
      $ref: '#/components/schemas/5Qi'
    arp:
      $ref: '#/components/schemas/Arp'
    priorityLevel:
      $ref: '#/components/schemas/5QiPriorityLevel'
Area:
  type: object
  oneOf:
    - required:
      - tacs
    - required:
      - areaCode
  properties:
    tacs:
      type: array
      items:
        $ref: '#/components/schemas/Tac'
      minItems: 1
    areaCodes:
      $ref: '#/components/schemas/AreaCode'
ServiceAreaRestriction:
  type: object
  properties:
    restrictionType:
      $ref: '#/components/schemas/RestrictionType'
    areas:
      type: array
      items:
        $ref: '#/components/schemas/Area'
    maxNumOfTAs:
      $ref: '#/components/schemas/UInteger'
  allOf:
    #
    # 1st condition: restrictionType and areas attributes shall be either both absent
    #                   or both present
    #
    - oneOf:
      - not:
          required: [ restrictionType ]
      - required: [ areas ]
    #
    # 2nd condition: if restrictionType takes value NOT_ALLOWED_AREAS,
    #                 then maxNumOfTAs shall be absent
    #

```

```

#
- anyOf:
  - not:
    required: [ restrictionType ]
    properties:
      restrictionType:
        type: string
        enum: [ NOT_ALLOWED_AREAS ]
  - not:
    required: [ maxNumOfTAs ]
PresenceInfo:
  type: object
  properties:
    praId:
      type: string
    presenceState:
      $ref: '#/components/schemas/PresenceState'
    trackingAreaList:
      type: array
      items:
        $ref: '#/components/schemas/Tai'
      minItems: 1
    ecgiList:
      type: array
      items:
        $ref: '#/components/schemas/Ecgi'
      minItems: 1
    ncgiList:
      type: array
      items:
        $ref: '#/components/schemas/Ncgi'
      minItems: 1
    globalRanNodeIdList:
      type: array
      items:
        $ref: '#/components/schemas/GlobalRanNodeId'
      minItems: 1
PresenceInfoRm:
  type: object
  properties:
    praId:
      type: string
    presenceState:
      $ref: '#/components/schemas/PresenceState'
    trackingAreaList:
      type: array
      items:
        $ref: '#/components/schemas/Tai'
      minItems: 0
    ecgiList:
      type: array
      items:
        $ref: '#/components/schemas/Ecgi'
      minItems: 0
    ncgiList:
      type: array
      items:
        $ref: '#/components/schemas/Ncgi'
      minItems: 0
    globalRanNodeIdList:
      type: array
      items:
        $ref: '#/components/schemas/GlobalRanNodeId'
    nullable: true
GlobalRanNodeId:
  type: object
  properties:
    plmnId:
      $ref: '#/components/schemas/PlmnId'
    n3IwfId:
      $ref: '#/components/schemas/N3IwfId'
    gNbId:
      $ref: '#/components/schemas/GNbId'
    ngeNbId:
      $ref: '#/components/schemas/NgeNbId'
  oneOf:
    - required: [ n3IwfId ]
    - required: [ gNbId ]

```

```

    - required: [ ngeNbId ]
  required:
    - plmnID
  GNBid:
    type: object
    properties:
      bitLength:
        type: integer
        minimum: 22
        maximum: 32
      gNBValue:
        type: string
        pattern: '^[A-Za-f0-9]{6,8}$'
  required:
    - bitLength
    - gNBValue

```

```

#
# Data Types related to 5G QoS as defined in subclause 5.5
#

```

```

#
# SIMPLE DATA TYPES
#
#

```

```

  Qfi:
    type: integer
    minimum: 0
    maximum: 63
  QfiRm:
    type: integer
    minimum: 0
    maximum: 63
    nullable: true
  5Qi:
    type: integer
    minimum: 0
    maximum: 255
  5QiRm:
    type: integer
    minimum: 0
    maximum: 255
    nullable: true
  BitRate:
    type: string
    pattern: '^\\d+(\\.\\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$'
  BitRateRm:
    type: string
    pattern: '^\\d+(\\.\\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$'
    nullable: true
  ArpPriorityLevelRm:
    type: integer
    minimum: 1
    maximum: 15
    nullable: true
  ArpPriorityLevel:
    type: integer
    minimum: 1
    maximum: 15
    nullable: true
    description: nullable true shall not be used for this attribute
  5QiPriorityLevel:
    type: integer
    minimum: 1
    maximum: 127
  5QiPriorityLevelRm:
    type: integer
    minimum: 1
    maximum: 127
    nullable: true
  PacketDelBudget:
    type: integer
    minimum: 1
  PacketDelBudgetRm:
    type: integer
    minimum: 1
    nullable: true

```

```

PacketErrRate:
  type: string
  pattern: '^([0-9]E-[0-9])$'
PacketErrRateRm:
  type: string
  pattern: '^([0-9]E-[0-9])$'
  nullable: true
PacketLossRate:
  type: integer
  minimum: 0
  maximum: 1000
PacketLossRateRm:
  type: integer
  minimum: 0
  maximum: 1000
  nullable: true
AverWindow:
  type: integer
  minimum: 1
  maximum: 4095
  default: 2000
AverWindowRm:
  type: integer
  maximum: 4095
  default: 2000
  minimum: 1
  nullable: true
MaxDataBurstVol:
  type: integer
  minimum: 1
  maximum: 4095
MaxDataBurstVolRm:
  type: integer
  minimum: 1
  maximum: 4095
  nullable: true

```

```

#
# ENUMERATED DATA TYPES
#

```

```

PreemptionCapability:
  anyOf:
    - type: string
      enum:
        - NOT_PREEMPT
        - MAY_PREEMPT
    - type: string
PreemptionCapabilityRm:
  anyOf:
    - type: string
      enum:
        - NOT_PREEMPT
        - MAY_PREEMPT
    - type: string
  nullable: true
PreemptionVulnerability:
  anyOf:
    - type: string
      enum:
        - NOT_PREEMPTABLE
        - PREEMPTABLE
    - type: string
PreemptionVulnerabilityRm:
  anyOf:
    - type: string
      enum:
        - NOT_PREEMPTABLE
        - PREEMPTABLE
    - type: string
  nullable: true
ReflectiveQoSAttribute:
  anyOf:
    - type: string
      enum:
        - RQOS
        - NO_RQOS
    - type: string

```

ReflectiveQoSAttributeRm:

anyOf:  
- type: string  
  enum:  
    - RQOS  
    - NO\_RQOS  
- type: string  
nullable: true

NotificationControl:

anyOf:  
- type: string  
  enum:  
    - REQUESTED  
    - NOT\_REQUESTED  
- type: string

NotificationControlRm:

anyOf:  
- type: string  
  enum:  
    - REQUESTED  
    - NOT\_REQUESTED  
- type: string  
nullable: true

QoSResourceType:

anyOf:  
- type: string  
  enum:  
    - NON\_GBR  
    - NON\_CRITICAL\_GBR  
    - CRITICAL\_GBR  
- type: string

QoSResourceTypeRm:

anyOf:  
- type: string  
  enum:  
    - NON\_GBR  
    - NON\_CRITICAL\_GBR  
    - CRITICAL\_GBR  
- type: string  
nullable: true

AdditionalQoSFlowInfo:

anyOf:  
- type: string  
  enum:  
    - MORE\_LIKELY  
- type: string  
nullable: true

#

#

# STRUCTURED DATA TYPES

#

Arp:

type: object  
properties:  
  priorityLevel:  
    \$ref: '#/components/schemas/ArpPriorityLevel'  
  preemptCap:  
    \$ref: '#/components/schemas/PreemptionCapability'  
  preemptVuln:  
    \$ref: '#/components/schemas/PreemptionVulnerability'  
required:  
- priorityLevel  
- preemptCap  
- preemptVuln

ArpRm:

type: object  
properties:  
  priorityLevel:  
    \$ref: '#/components/schemas/ArpPriorityLevel'  
  preemptCap:  
    \$ref: '#/components/schemas/PreemptionCapability'  
  preemptVuln:  
    \$ref: '#/components/schemas/PreemptionVulnerability'  
required:  
- priorityLevel  
- preemptCap



```

    - preemptVuln
    nullable: true
  Ambr:
    type: object
    properties:
      uplink:
        $ref: '#/components/schemas/BitRate'
      downlink:
        $ref: '#/components/schemas/BitRate'
    required:
      - uplink
      - downlink
  AmbrRm:
    type: object
    properties:
      uplink:
        $ref: '#/components/schemas/BitRate'
      downlink:
        $ref: '#/components/schemas/BitRate'
    required:
      - uplink
      - downlink
    nullable: true
  Dynamic5Qi:
    type: object
    properties:
      resourceType:
        $ref: '#/components/schemas/QosResourceType'
      priorityLevel:
        $ref: '#/components/schemas/5QiPriorityLevel'
      packetDelayBudget:
        $ref: '#/components/schemas/PacketDelBudget'
      packetErrRate:
        $ref: '#/components/schemas/PacketErrRate'
      averWindow:
        $ref: '#/components/schemas/AverWindow'
      maxDataBurstVol:
        $ref: '#/components/schemas/MaxDataBurstVol'
    required:
      - resourceType
      - priorityLevel
      - packetDelayBudget
      - packetErrRate
  NonDynamic5Qi:
    type: object
    properties:
      priorityLevel:
        $ref: '#/components/schemas/5QiPriorityLevel'
      averWindow:
        $ref: '#/components/schemas/AverWindow'
      maxDataBurstVol:
        $ref: '#/components/schemas/MaxDataBurstVol'
    minProperties: 0

#
# Data Types related to 5G Trace as defined in subclause 5.6
#

#
# SIMPLE DATA TYPES
#
#
# Enumerations
#
  TraceDepth:
    anyOf:
      - type: string
        enum:
          - MINIMUM
          - MEDIUM
          - MAXIMUM
          - MINIMUM_WO_VENDOR_EXTENSION
          - MEDIUM_WO_VENDOR_EXTENSION
          - MAXIMUM_WO_VENDOR_EXTENSION
      - type: string
  TraceDepthRm:
    anyOf:

```

```

    - type: string
      enum:
        - MINIMUM
        - MEDIUM
        - MAXIMUM
        - MINIMUM_WO_VENDOR_EXTENSION
        - MEDIUM_WO_VENDOR_EXTENSION
        - MAXIMUM_WO_VENDOR_EXTENSION
    - type: string
      nullable: true
#
# STRUCTURED DATA TYPES
#
TraceData:
  type: object
  nullable: true
  properties:
    traceRef:
      type: string
      pattern: '^[0-9]{3}[0-9]{2,3}-[A-Fa-f0-9]{6}$'
    traceDepth:
      $ref: '#/components/schemas/TraceDepth'
    neTypeList:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
    eventList:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
    collectionEntityIpv4Addr:
      $ref: '#/components/schemas/Ipv4Addr'
    collectionEntityIpv6Addr:
      $ref: '#/components/schemas/Ipv6Addr'
    interfaceList:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
  required:
    - traceRef
    - traceDepth
    - neTypeList
    - eventList

# Data Types related to 5G ODB as defined in subclause 5.7
#
# SIMPLE DATA TYPES
#
# Enumerations
#
RoamingOdb:
  anyOf:
    - type: string
      enum:
        - OUTSIDE_HOME_PLMN
        - OUTSIDE_HOME_PLMN_COUNTRY
    - type: string

OdbPacketServices:
  anyOf:
    - type: string
      enum:
        - ALL_PACKET_SERVICES
        - ROAMER_ACCESS_HPLMN_AP
        - ROAMER_ACCESS_VPLMN_AP
    - type: string
  nullable: true

#
# STRUCTURED DATA TYPES
#
OdbData:
  type: object
  properties:
    roamingOdb:
      $ref: '#/components/schemas/RoamingOdb'

```

```
#
# Data Types related to Charging as defined in subclause 5.8
#
#
# SIMPLE DATA TYPES
#
#
#   ChargingId:
#     $ref: '#/components/schemas/Uint32'
#
#   RatingGroup:
#     $ref: '#/components/schemas/Uint32'
#
#   ServiceId:
#     $ref: '#/components/schemas/Uint32'
#
#
# Enumerations
#
#
# STRUCTURED DATA TYPES
#
#   SecondaryRatUsageReport:
#     type: object
#     properties:
#       secondaryRatType:
#         $ref: '#/components/schemas/RatType'
#       qosFlowsUsageData:
#         type: array
#         items:
#           $ref: '#/components/schemas/QosFlowUsageReport'
#         minItems: 1
#     required:
#       - secondaryRatType
#       - qosFlowsUsageData
#
#   QosFlowUsageReport:
#     type: object
#     properties:
#       qfi:
#         $ref: '#/components/schemas/Qfi'
#       startTimeStamp:
#         $ref: '#/components/schemas/DateTime'
#       endTimeStamp:
#         $ref: '#/components/schemas/DateTime'
#       downlinkVolume:
#         $ref: '#/components/schemas/Int64'
#       uplinkVolume:
#         $ref: '#/components/schemas/Int64'
#     required:
#       - qfi
#       - startTimeStamp
#       - endTimeStamp
#       - downlinkVolume
#       - uplinkVolume
#
#
# HTTP responses
#
responses:
  '400':
    description: Bad request
    content:
      application/problem+json:
        schema:
          $ref: '#/components/schemas/ProblemDetails'
  '401':
    description: Unauthorized
    content:
      application/problem+json:
        schema:
          $ref: '#/components/schemas/ProblemDetails'
```

```
'403':
  description: Forbidden
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'404':
  description: Not Found
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'405':
  description: Method Not Allowed
'408':
  description: Request Timeout
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'406':
  description: 406 Not Acceptable
'409':
  description: Conflict
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'410':
  description: Gone
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'411':
  description: Length Required
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'412':
  description: Precondition Failed
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'413':
  description: Payload Too Large
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'414':
  description: URI Too Long
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'415':
  description: Unsupported Media Type
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'429':
  description: Too Many Requests
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'500':
  description: Internal Server Error
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'501':
  description: Not Implemented
```

```
content:
  application/problem+json:
    schema:
      $ref: '#/components/schemas/ProblemDetails'
'503':
  description: Service Unavailable
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
'504':
  description: Gateway Timeout
  content:
    application/problem+json:
      schema:
        $ref: '#/components/schemas/ProblemDetails'
default:
  description: Generic Error
```

## Annex B (informative): Change history

| Change history |         |           |      |     |     |  |             |
|----------------|---------|-----------|------|-----|-----|--|-------------|
| Date           | Meeting | TDoc      | CR   | Rev | Cat | Subject/Comment  | New version |
| 2017-10        | CT4#80  | C4-175048 |      |     |     | Initial Draft.   | 0.1.0       |
| 2017-10        | CT4#80  | C4-175400 |      |     |     | Skeleton and scope   | 0.2.0       |
| 2017-12        | CT4#81  | C4-176442 |      |     |     | After CT4#81   | 0.3.0       |
| 2018-01        | CT4#82  | C4-181395 |      |     |     | After CT4#82   | 0.4.0       |
| 2018-03        | CT4#83  | C4-182440 |      |     |     | After CT4#83   | 0.5.0       |
| 2018-04        | CT4#84  | C4-183521 |      |     |     | After CT4#84   | 0.6.0       |
| 2018-05        | CT4#85  | C4-184635 |      |     |     | After CT4#85   | 0.7.0       |
| 2018-06        | CT#80   | CP-181110 |      |     |     | Presented for information and approval   | 1.0.0       |
| 2018-06        | CT#80   |           |      |     |     | Approved in CT#80  | 15.0.0      |
| 2018-09        | CT#81   | CP-182065 | 0001 |     | F   | ProblemDetails   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0002 |     | F   | Structure of Amfld   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0012 |     | B   | DNAI change notification type  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0015 |     | F   | RatType  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0017 |     | B   | Definition of DNAI   | 15.1.0      |
| 2018-09        | CT#81   | CP-182068 | 0008 | 1   | B   | Add support for 5G Trace   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0010 | 1   | F   | OpenAPI Corrections  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0013 | 1   | B   | Structure of ECGI and NCGI   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0007 | 1   | F   | Averaging Window   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0020 | 1   | F   | sd pattern   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0021 | 1   | F   | Correction of the title of clauses 5.2.4.4 _LinksValueSchema and 5.2.4.5 _ SelfLink            | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0023 |     | F   | NAI format in 5G System  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0031 |     | F   | GroupId Definition   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0009 | 1   | F   | Removal of systematic references to the "format" keyword in data type definitions              | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0033 |     | F   | Naming Conventions   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0027 | 1   | F   | 5GMMCause and NGAP Cause   | 15.1.0      |
| 2018-09        | CT#81   | CP-182173 | 0006 | 3   | F   | BackUp AMF Info  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0035 |     | F   | URI Scheme   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0024 | 2   | F   | Cleanup of the specification   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0025 | 1   | F   | Correction to Regular Expression Pattern of GPSI   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0005 | 4   | F   | Common data types: NonDynamic5qi and Dynamic5qi  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0028 | 1   | F   | Common data type used in both TS 29.505 and TS 29.519  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0029 | 1   | B   | n6 Traffic Routing Information data type   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0019 | 4   | F   | DefaultQoSInformation  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0034 | 1   | F   | Update of N3qaLocation data type   | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0016 | 3   | F   | Mobility Restriction   | 15.1.0      |
| 2018-09        | CT#81   | CP-182042 | 0030 | 3   | F   | Adding "nullable" property to OpenAPI definitions of data types                                | 15.1.0      |
| 2018-09        | CT#81   | CP-182174 | 0026 | 3   | F   | Presence Reporting Area  | 15.1.0      |
| 2018-09        | CT#81   | CP-182011 | 0032 | 4   | F   | Adding age of location, geographic information and other missing ones in the UserLocation type | 15.1.0      |
| 2018-09        | CT#81   | CP-182183 | 0036 | 1   | B   | Common data type for data change notification  | 15.1.0      |
| 2018-09        | CT#81   | CP-182065 | 0037 |     | F   | API version number update  | 15.1.0      |
| 2018-12        | CT#82   | CP-183024 | 0040 |     | F   | Application ID   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0049 |     | F   | Corrections to PDU Session Id, PDU Session Type and SupportedFeatures                          | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0038 | 1   | F   | Area definition  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0047 | 1   | F   | DNN  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0044 | 1   | F   | Update of missing status code 429 in TS 29.571   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0057 | 1   | F   | 29571 CR cardinality   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0045 | 2   | F   | The ARP in Default QoS   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0058 | 1   | F   | Snsai pattern  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0039 | 1   | F   | GroupId pattern  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0059 |     | F   | Adding of HTTP status code "406 Not Acceptable"  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0041 | 1   | F   | VarUeld definition   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0061 |     | F   | ProblemDetails for 501   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0063 |     | F   | Changeltem alignment   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0046 | 2   | F   | Regular Expression Patterns  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0048 | 3   | F   | Alignments with NGAP   | 15.2.0      |
| 2018-12        | CT#82   | CP-183168 | 0065 | 1   | F   | Secondary RAT usage data reporting   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0060 | 1   | F   | Data types associated with Subscribed and Authorized Default QoS for Default QoS Flow          | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0042 | 3   | F   | Alignment of pattern for data types with "nullable" property                                   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0062 | 1   | F   | NF Group Id  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0053 | 2   | F   | data type for complex query expression   | 15.2.0      |
| 2018-12        | CT#82   | CP-183161 | 0064 | 2   | F   | NgRanIdentifier and PresenceInfo   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0068 |     | F   | Addition of HTTP status code "412 Precondition Failed"   | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0051 | 3   | F   | Introduction of Barring of Roaming in 5GC  | 15.2.0      |
| 2018-12        | CT#82   | CP-183024 | 0066 | 1   | F   | Service Area Restriction   | 15.2.0      |

|         |       |           |      |   |   |   |        |
|---------|-------|-----------|------|---|---|---|--------|
| 2018-12 | CT#82 | CP-183024 | 0067 | 1 | F | Charging related types  | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0070 |   | F | Correction of the reference for the SupportedFeatures Data Type | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0072 | 1 | F | Update open API version   | 15.2.0 |
| 2018-12 | CT#82 | CP-183024 | 0073 |   | F | ExternalDoc update  | 15.2.0 |
| 2019-03 | CT#83 | CP-190029 | 0075 | 3 | F | Corrections on subscribed Priority                              | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0076 | 1 | F | AmfRegionId and AmfSetId  | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0077 | 2 | F | Supported features  | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0078 | 2 | F | Corrections on n3iwf Id   | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0079 | 2 | F | Corrections on the encoding of bit string                       | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0081 | 2 | F | Corrections on Type RouteToLocation                             | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0082 | 1 | F | ODB correction  | 15.3.0 |
| 2019-03 | CT#83 | CP-190029 | 0083 |   | F | 3GPP TS 29.571 API version update                               | 15.3.0 |



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# History

| <b>Document history</b> |                |             |
|-------------------------|----------------|-------------|
| V15.0.0                 | September 2018 | Publication |
| V15.1.0                 | October 2018   | Publication |
| V15.2.0                 | April 2019     | Publication |
| V15.3.0                 | April 2019     | Publication |
|                         |                |             |