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Contents

Foreword

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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].

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".

[27] 3GPP TR 21.900: "Technical Specification Group working methods".

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

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 clauses, 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 clause 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]. Pattern: '^([A-Za-z0-9]+([-A-Za-z0-9]+)\.)+[a-z]{2,}$'
DiameterIdentityRm	string	This data type is defined in the same way as the "DiameterIdentity" data type, but with the OpenAPI "nullable: true" property.
Double	number	Number with format "double" as defined in OpenAPI Specification [3]
DoubleRm	number	This data type is defined in the same way as the "Double" data type, but with the OpenAPI "nullable: true" property.
DurationSec	integer	Unsigned integer identifying a period of time in units of seconds.
DurationSecRm	integer	This data type is defined in the same way as the "DurationSec" data type, but with the OpenAPI "nullable: true" property.
Float	number	Number with format "float" as defined in OpenAPI Specification [3]
FloatRm	number	This data type is defined in the same way as the "Float" data type, but with the OpenAPI "nullable: true" property.
Uint16	integer	Unsigned 16-bit integers, i.e. only value between 0 and 65535 are permissible.
Uint16Rm	integer	This data type is defined in the same way as the "Uint16" data type, but with the OpenAPI "nullable: true" property.
Int32	integer	Integer with format "int32" as defined in OpenAPI Specification [3]
Int32Rm	integer	This data type is defined in the same way as the "Int32" data type, but with the OpenAPI "nullable: true" property.
Int64	integer	Integer with format "int64" as defined in OpenAPI Specification [3]
Int64Rm	integer	This data type is defined in the same way as the "Int64" data type, but with the OpenAPI "nullable: true" property.
Ipv4Addr	string	String identifying a IPv4 address formatted in the "dotted decimal" notation as defined in in IETF RFC 1166 [4]. Pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])$'
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. 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})))$' and Pattern: '^((([^:]+:){7}([^:]+))\|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))$'
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]. 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])))$' and Pattern: '^((([^:]+:){7}([^:]+))\|((([^:]+:)*[^:]+)?::(([^:]+:)*[^:]+)?))(\/.+)$'

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 clause 1.1 and clause 2.1 of IETF RFC 7042 [17]. Pattern: '^([0-9a-fA-F]{2})((-[0-9a-fA-F]{2}){5})$'
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 clause 6.6 in 3GPP TS 29.500 [25]. The string shall contain a bitmask indicating supported features in hexadecimal representation: 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.
VarUeId	string	String represents the SUPI or GPSI. Pattern: "^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|.+)$".
VarUeIdRm	string	This data type is defined in the same way as the "VarUeId" data type, but with the OpenAPI "nullable: true" property.
TimeZone	string	String with format "<time-numoffset>" optionally appended by "<daylightSavingTime>", where: - <time-numoffset> shall represent the time zone adjusted for daylight saving time and be encoded as time-numoffset as defined in clause 5.6 of IETF RFC 3339 [10]; - <daylightSavingTime> shall represent the adjustment that has been made and shall be encoded as "+1" or "+2" for a +1 or +2 hours adjustment. 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 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.
supportedFeatures	SupportedFeatures	C	0..1	Features supported by the NF Service Producer. This IE shall be present when rejecting a request due to an unsupported query parameter, if at least one feature is defined for the corresponding service in the version of the specification that the NF Service Producer implements (see clause 5.2.x of 1 29.500 [25]). When present, this IE shall indicate the features supported by the NF Service Producer; if the NF Service Producer supports no features, this IE shall be set to the character "0".
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. 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. It shall be present if the patch operation is "add", "replace" or "test". 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 ChangeItem

Table 5.2.4.8-1: Definition of type ChangeItem

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 target location within the resource on which the change has been applied. (See Note)	
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. It shall be present if the "op" attribute is of value "MOVE".	
origValue	Any type	O	0..1	This IE indicates the original value at the target location within the resource specified in the path attribute. This attribute only applies when the "op" attribute is of value "REMOVE", "REPLACE" or "MOVE" Based on the use case, this attribute may be included.	
newValue	Any type	C	0..1	This IE indicates a new value at the target location within the resource specified in the path attribute. It shall be present if the "op" attribute is of value "ADD", "REPLACE". The data type of this attribute shall be the same as the type of the resource on which the change has happened. The null value shall be allowed.	
NOTE: As described in IETF RFC 6901 [12], the value "" (empty JSON string) is the JSON Pointer expression to represent "the whole JSON document"; therefore, when the attribute "path" takes value "" and attribute "op" takes values "ADD" or "REMOVE", this shall be interpreted as the creation or deletion respectively of the resource to which this "ChangeItem" refers to.					

5.2.4.9 Type NotifyItem

Table 5.2.4.9-1: Definition of type NotifyItem

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(ChangeItem)	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 clause 5.2.4.11 and clause 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 clause 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 clause 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: -External Identifier: "extid-<extid>, where <extid> shall be formatted according to clause 19.7.2 of 3GPP TS 23.003 [7] that describes an External Identifier. -MSISDN: "msisdn-<msisdn>, where <msisdn> shall be formatted according to clause 3.3 of 3GPP TS 23.003 [7] that describes an MSISDN. Pattern: '^(msisdn-[0-9]{5,15}|extid-.+@.+|.+)$'
GpsiRm	string	This data type is defined in the same way as the "Gpsi" data type, but with the OpenAPI "nullable: true" property.
GroupId	string	String identifying a group of devices network internal globally unique ID which identifies a set of IMSIs, as specified in clause 19.9 of 3GPP TS 23.003 [7]. Pattern: '^[A-Fa-f0-9]{8}-[0-9]{3}-[0-9]{2,3}-([A-Fa-f0-9][A-Fa-f0-9]){1,10}$'.
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 clause 6.2 of 3GPP TS 23.003 [7]. Pattern: '^(imei-[0-9]{15}|imeisv-[0-9]{16}|.+)$'. See NOTE.
PeiRm	string	This data type is defined in the same way as the "Pei" data type, but with the OpenAPI "nullable: true" property.
Supi	string	String identifying a Supi shall contain either an IMSI or an NAI. It shall be formatted as follows for: - IMSI "imsi-<imsi>, <imsi> shall be formatted according to clause 2.2 of 3GPP TS 23.003 [7] that describes an IMSI. - NAI "nai-<nai>, <nai> shall be formatted according to clause 28.6.2 of 3GPP TS 23.003 [7] that describes an NAI. To enable that the value is used as part of an URI, the string shall only contain characters allowed according to the "lower-with-hyphen" naming convention defined in 3GPP TS 29.501 [2]. Pattern: '^(imsi-[0-9]{5,15}|nai-.+|.+)$'. See NOTE.
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 clause 2.10.1 of 3GPP TS 23.003 [7]. It is encoded as a string of 6 hexadecimal characters (i.e., 24 bits). Pattern: '^[A-Fa-f0-9]{6}$'
AmfRegionId	string	String identifying the AMF Region ID (8 bits), as specified in clause 2.10.1 of 3GPP TS 23.003 [7]. It is encoded as a string of 2 hexadecimal characters (i.e. 8 bits). Pattern: '^[A-Fa-f0-9]{2}$'
AmfSetId	string	String identifying the AMF Set ID (10 bits) as specified in clause 2.10.1 of 3GPP TS 23.003 [7]. 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). 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]. 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.
NfGroupId	string	Identifier of a group of NFs
NOTE: The encoding of 3GPP defined identifiers (e.g. IMSI, NAI) shall be prefixed with its corresponding prefix (e.g. 'imsi-','nai-').		

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
plmnId	PlmnId	M	1	PLMN Identity
amfId	AmfId	M	1	AMF Identity

5.3.4.2 Type: NetworkId

Table 5.3.4.2-1: Definition of type NetworkId

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 clause 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 clause 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 clause 9.3.3.5 of 3GPP TS 38.413 [11]. Pattern: '^[0-9]{3}$'
MccRm	string	This data type is defined in the same way as the "Mcc" data type, but with the OpenAPI "nullable: true" property.
Mnc	string	Mobile Network Code part of the PLMN, comprising 2 or 3 digits, as defined in clause 9.3.3.5 of 3GPP TS 38.413 [11]. Pattern: '^[0-9]{2,3}$'
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 clause 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. Examples: A legacy TAC 0x4305 shall be encoded as "4305". 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 clause 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. Pattern: '^[A-Fa-f0-9]{7}$' Example: An E-UTRA Cell Id 0x5BD6007 shall be encoded as "5BD6007".
EutraCellIdRm	string	This data type is defined in the same way as the "EutraCellId" data type, but with the OpenAPI "nullable: true" property.
NrCellId	string	36-bit string identifying an NR Cell Id as specified in clause 9.3.1.7 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Cell Id shall appear first in the string, and the character representing the 4 least significant bit of the Cell Id shall appear last in the string. Pattern: '^[A-Fa-f0-9]{9}$' Example: An NR Cell Id 0x225BD6007 shall be encoded as "225BD6007".
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 clause 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 clause 28.3.2.5 of 3GPP TS 23.003 [7].
AreaCode	string	Values are operator specific.
N3IwfId	string	This represents the identifier of the N3IWF ID as specified in clause 9.3.1.57 of 3GPP TS 38.413 [11]. Pattern: '^[A-Fa-f0-9]+$'
NgeNbId	string	This represents the identifier of the ng-eNB ID as specified in clause 9.3.1.8 of 3GPP TS 38.413 [11].. The string shall be formatted with following pattern: Pattern: '^('MacroNGeNB-[A-Fa-f0-9]{5}| LMacroNGeNB-[A-Fa-f0-9]{6}| SMacroNGeNB-[A-Fa-f0-9]{5})$' 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. Examples: " 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 clause 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 [8]
"SSC_MODE_2"	see 3GPP TS 23.501 [8]
"SSC_MODE_3"	see 3GPP TS 23.501 [8]

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 see 1 23.501 [8] clause 5.7.2.7.
arp	Arp	M	1	Default Allocation and Retention Priority see 1 23.501 [8] clause 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: Snssai

Table 5.4.4.2-1: Definition of type Snssai

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. Values 0 to 127 correspond to the standardized SST range. Values 128 to 255 correspond to the Operator-specific range. See clause 28.4.2 of 3GPP TS 23.003 [7]. Standardized values are defined in clause 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. 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. Pattern: '^[A-Fa-f0-9]{6}$'

When Snssai 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:

^([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: PlmnId

Table 5.4.4.3-1: Definition of type PlmnId

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] clause 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 1 23.032 [23] clause 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] clause 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	GlobalRanNodeId	O	0..1	It indicates the global identity of the ng-eNodeB in which the UE is currently located. See 1 38.413 [11] clause 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 1 29.002 [21] clause 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 1 23.032 [23] clause 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] clause 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.
globalGnbId	GlobalRanNodeId	O	0..1	It indicates the global identity of the gNodeB in which the UE is currently located. See 3GPP TS 38.413 [11] clause 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.
n3IwfId	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]+$' It shall be present over the 3GPP PLMN internal interfaces, but shall not be present over the N5 interface.
ueIpv4Addr	Ipv4Addr	C	0..1	UE local IPv4 address (used to reach the N3IWF). The ueIPv4Addr or the ueIPv6Addr shall be present.
ueIpv6Addr	Ipv6Addr	C	0..1	UE local IPv6 address (used to reach the N3IWF). The ueIPv4Addr or the ueIPv6Addr 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. NGAP supports following cause groups defined as separate enumerations, as specified in clause 9.4.5 of 3GPP TS 38.413 [11], with following values: 0 – radioNetwork 1 – transport 2 – nas 3 – protocol 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 clause 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 clause 5.21.2.3 of 3GPP TS 23.501 [8]). 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.
areaCode	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 "ALLOWED_AREAS" or "NOT_ALLOWED_AREAS" shall be present if and only if the areas attribute is present
areas	array(Area)	O	0..N (NOTE)	A list of Areas. These areas are: - allowed areas if RestrictionType is "ALLOWED_AREAS" - not allowed areas if RestrictionType is "NOT_ALLOWED_AREAS"
maxNumOfTAs	Uinteger	C	0..1	Maximum number of allowed tracking areas for use when restrictionType indicates "ALLOWED_AREAS". This attribute shall be absent when attribute "restrictionType" takes the value "NOT_ALLOWED_AREAS".
maxNumOfTAsForNotAllowedAreas	Uinteger	C	0..1	Maximum number of allowed tracking areas for use when restrictionType indicates "NOT_ALLOWED_AREAS". This attribute shall be absent when attribute "restrictionType" takes the value "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
praId	String	C	0..1	Represents an identifier of the Presence Reporting Area (see clause 28.10 of 3GPP TS 23.003 [7]). This IE shall be present if the Area of Interest subscribed or reported is a Presence Reporting Area. When present, it shall be encoded as a string representing an integer in the following ranges: 0 to 8 388 607 for UE-dedicated PRA 8 388 608 to 16 777 215 for Core Network predefined PRA. Examples: PRA ID 123 is encoded as "123". PRA ID 11 238 660 is encoded as "11238660"
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.
n3IwfId	N3IwfId	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).
ngeNbId	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 n3IwfId, gNbIdm, 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 clause 9.3.1.6 of 3GPP TS 38.413 [11], within the range 22 to 32
gNbValue	string	M	1	This represents the identifier of the gNB. The string shall be formatted with following pattern: '^[A-Fa-f0-9]{6,8}$' 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. Examples: A 30 bit value "382A3F47" indicates a gNB ID with value 0x382A3F47 A 22 bit value "2A3F47" indicates a gNB ID with value 0x2A3F47

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 clause 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 clause 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: Pattern: '^\d+(\.\d+)? (bps|Kbps|Mbps|Gbps|Tbps)$' Examples: "125 Mbps", "0.125 Gbps", "125000 Kbps"
BitRateRm	string	This data type is defined in the same way as the "BitRate" data type, but with the OpenAPI "nullable: true" property.
ArpPriorityLevel	integer	Unsigned integer indicating the ARP Priority Level (see clause 5.7.2.2 of 3GPP TS 23.501 [8]), within the range 1 to 15. Values are ordered in decreasing order of priority, i.e. with 1 as the highest priority and 15 as the lowest priority.
ArpPriorityLevelRm	integer	This data type is defined in the same way as the "ArpPriorityLevel" data type, but with the OpenAPI "nullable: true" property.
5QiPriorityLevel	integer	Unsigned integer indicating the 5QI Priority Level (see clauses 5.7.3.3 and 5.7.4 of 3GPP TS 23.501 [8]), within the range 1 to 127. Values are ordered in decreasing order of priority, i.e. with 1 as the highest priority and 127 as the lowest priority.
5QiPriorityLevelRm	integer	This data type is defined in the same way as the "5QiPriorityLevel" data type, but with the OpenAPI "nullable: true" property.
PacketDelBudget	Integer	Unsigned integer indicating Packet Delay Budget (see clauses 5.7.3.4 and 5.7.4 of 3GPP TS 23.501 [8])), expressed in milliseconds. Minimum = 1.
PacketDelBudgetRm	integer	This data type is defined in the same way as the "PacketDelBudget" data type, but with the OpenAPI "nullable: true" property.
PacketErrRate	string	String representing Packet Error Rate (see clause 5.7.3.5 and 5.7.4 of 3GPP TS 23.501 [8]), expressed as a "*scalar* x 10-k" where the scalar and the *exponent k are each encoded as one decimal digit*.. Pattern: '^([0-9]E-[0-9])$' Examples: Packer Error Rate $4x10^{-6}$ shall be encoded as "4E-6". Packer Error Rate 10^{-2} 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 clauses 5.7.2.8 and 5.7.4 of 3GPP TS 23.501 [8])), expressed in tenth of percent. 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 clause 5.7.3.6 and 5.7.4 of 3GPP TS 23.501 [8]), expressed in milliseconds. 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 clauses 5.7.3.7 and 5.7.4 of 3GPP TS 23.501 [8])), expressed in Bytes. 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 clause 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 clause 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 clause 5.7.2.3 of 3GPP TS 23.501 [8]). 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 clause 5.7.2.4 of 3GPP TS 23.501 [8]). 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 clauses 5.7.3.4 and 5.7.3.5 of 3GPP TS 23.501 [8]). 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 clause 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 clause 5.5.3.6.	
priorityLevel	5QiPriorityLevel	M	1	Defines the 5QI Priority Level. See clause 5.5.2.	
packetDelayBudget	PacketDelBudget	M	1	Defines the packet delay budget. See clause 5.5.2.	
packetErrRate	PacketErrRate	M	1	Defines the packet error rate. See clause 5.5.2.	
averWindow	AverWindow	C	0..1	Defines the averaging window. See clause 5.5.2. This IE shall be present only for a GBR QoS flow or a Delay Critical GBR QoS flow.	
maxDataBurstVol	MaxDataBurstVol	C	0..1	Defines the maximum data burst volume. See clause 5.5.2. 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 clause 5.5.2. 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 clause 5.5.2. This IE may be present for a GBR QoS flow or a Delay Critical GBR QoS flow. 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 clause 5.5.2. 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 clause 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]). It shall be encoded as the concatenation of MCC, MNC and Trace ID as follows: <MCC><MNC>-<Trace ID> 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. Pattern: '^[0-9]{3}[0-9]{2,3}-[A-Fa-f0-9]{6}$'
traceDepth	TraceDepth	M	1	Trace Depth (see 3GPP TS 32.422 [19]).
neTypeList	string	M	1	List of NE Types (see 3GPP TS 32.422 [19]). It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string. Octets shall be coded according to 3GPP TS 32.422 [19]. Pattern: '^[A-Fa-f0-9]+$'
eventList	string	M	1	Triggering events (see 3GPP TS 32.422 [19]). 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. Octets shall be coded according to 3GPP TS 32.422 [19]. Pattern: '^[A-Fa-f0-9]+$'
collectionEntityIpv4Addr	Ipv4Addr	C	0..1	IPv4 Address of the Trace Collection Entity (see 3GPP TS 32.422 [19]). 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 [19]). At least one of the collectionEntityIpv4Addr or collectionEntityIpv6Addr attributes shall be present.

interfaceList	string	O	0..1	List of Interfaces (see 3GPP TS 32.422 [19]). 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. Octets shall be coded according to 3GPP TS 32.422 [19]. If this attribute is not present, all the interfaces applicable to the list of NE types indicated in the neTypeList attribute should be traced. Pattern: '^[A-Fa-f0-9]+$'

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 clause 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 clause 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

5.8.4.3 Type: SecondaryRatUsageInfo

Table 5.8.4.3-1: Definition of type SecondaryRatUsageInfo

Attribute name	Data type	P	Cardinality	Description
secondaryRatType	RatType	M	1	Secondary RAT type
qosFlowsUsageData	array(QosFlowUsageReport)	O	1..N	QoS flows usage data
pduSessionUsageData	array(VolumeTimedReport)	O	1..N	PDU session usage data

5.8.4.4 Type: VolumeTimedReport

Table 5.8.4.4-1: Definition of type VolumeTimedReport

Attribute name	Data type	P	Cardinality	Description
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.

This Annex takes precedence when being discrepant to other parts of the specification with respect to the encoding of information elements and methods within the API(s).

NOTE 1: The semantics and procedures, as well as conditions, e.g. for the applicability and allowed combinations of attributes or values, not expressed in the OpenAPI definitions but defined in other parts of the specification also apply.

Informative copies of the OpenAPI specification files contained in this 3GPP Technical Specification are available on the public 3GPP file server in the following locations (see clause 5B of the 3GPP TR 21.900 [27] for further information):

- https://www.3gpp.org/ftp/Specs/archive/OpenAPI/<Release>/, and
- https://www.3gpp.org/ftp/Specs/<Plenary>/<Release>/OpenAPI/.

NOTE 2: To fetch the OpenAPI specification file after CT#83 plenary meeting for Release 15 in the above links <Plenary> must be replaced with the date the CT Plenary occurs, in the form of year-month (yyyy-mm), e.g. for CT#83 meeting <Plenary> must be replaced with value "2019-03" and <Release> must be replaced with value "Rel-15".

A.2 Data related to Common Data Types

```
openapi: 3.0.0
info:
  version: '1.0.2'
  title: 'Common Data Types'
  description: |
    Common Data Types for Service Based Interfaces.
    © 2019, 3GPP Organizational Partners (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC).
    All rights reserved.
externalDocs:
  description: 3GPP TS 29.571 Common Data Types for Service Based Interfaces, version 15.4.0
  url: 'http://www.3gpp.org/ftp/Specs/archive/29_series/29.571/'

paths: {}
components:
  schemas:

#
# Common Data Types for  Generic usage definitiones as defined in clause 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
        supportedFeatures:
          $ref: '#/components/schemas/SupportedFeatures'
    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
    required:
      - resourceId
      - changes
    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 clause 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 clause 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:
      $ref: '#/components/schemas/Uinteger'
    AmfName:
      type: string
    AreaCode:
      type: string
    AreaCodeRm:
      type: string
      nullable: true
    N3IwfId:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
    NgeNbId:
      type: string
      pattern: '^(MacroNGeNB-[A-Fa-f0-9]{5}|LMacroNGeNB-[A-Fa-f0-9]{6}|SMacroNGeNB-[A-Fa-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-Fa-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:
        $ref: '#/components/schemas/Tai'
      n3IwfId:
        type: string
        pattern: '^[A-Fa-f0-9]+$'
      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
        areaCode:
            $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'
        maxNumOfTAsForNotAllowedAreas:
          $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 ]
        #
        # 3rd condition: if restrictionType takes value ALLOWED_AREAS,
        #                then maxNumOfTAsForNotAllowedAreas shall be absent
        #
        - anyOf:
            - not:
                required: [ restrictionType ]
                properties:
                  restrictionType:
                    type: string
                    enum: [ ALLOWED_AREAS ]
            - not:
                required: [ maxNumOfTAsForNotAllowedAreas ]
    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:
          $ref: '#/components/schemas/NgeNbId'
      oneOf:
        - required: [ n3IwfId ]
        - required: [ gNbId ]
        - required: [ ngeNbId ]
      required:
        - plmnId
    GNbId:
      type: object
      properties:
        bitLength:
          type: integer
          minimum: 22
          maximum: 32
        gNBValue:
          type: string
          pattern: '^[A-Fa-f0-9]{6,8}$'
      required:
        - bitLength
        - gNBValue


#
# Data Types related to 5G QoS as defined in clause 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 clause 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 clause 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 clause 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

    SecondaryRatUsageInfo:
      type: object
      properties:
        secondaryRatType:
          $ref: '#/components/schemas/RatType'
        qosFlowsUsageData:
          type: array
          items:
            $ref: '#/components/schemas/QosFlowUsageReport'
          minItems: 1
        pduSessionUsageData:
          type: array
          items:
            $ref: '#/components/schemas/VolumeTimedReport'
          minItems: 1
      required:
        - secondaryRatType

    VolumeTimedReport:
      type: object
      properties:
        startTimeStamp:
          $ref: '#/components/schemas/DateTime'
        endTimeStamp:
          $ref: '#/components/schemas/DateTime'
        downlinkVolume:
          $ref: '#/components/schemas/Int64'
        uplinkVolume:
          $ref: '#/components/schemas/Int64'
      required:
        - 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 AmfId	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 N3gaLocation 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	Snssai 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	VarUeId 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	ChangeItem 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
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2018-12	CT#82	CP-183024	0067	1	F	Charging related types	15.2.0
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2018-12	CT#82	CP-183024	0072	1	F	Update open API version	15.2.0
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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
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2019-06	CT#84	CP-191041	0099	2	F	Copyright Note in YAML file	15.4.0
2019-09	CT#85	CP-192115	0106	1	F	PRA ID encoding	15.5.0

History

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