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TECHNICAL SPECIFICATION

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Contents

Foreword

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y　the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

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In the present document, modal verbs have the following meanings:

shall　　　　indicates a mandatory requirement to do something

shall not　　indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should　　　indicates a recommendation to do something

should not　indicates a recommendation not to do something

may　　　　indicates permission to do something

need not　　indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can　　　　indicates that something is possible

cannot　　　indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will　　　　indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not　　indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might　　　indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not   indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is   (or any other verb in the indicative mood) indicates a statement of fact

is not   (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

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".

[28]   3GPP TS 23.502: "Procedures for the 5G System; Stage 2".

[29]   3GPP TS 29.510: "5G System; Network Function Repository Services; Stage 3".

[30]   3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[31]   IEEE Std 802.11-2012: "IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

[32]   CableLabs WR-TR-5WWC-ARCH: "5G Wireless Wireline Converged Core Architecture".

[33]   3GPP TS 23.401: "General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access; Stage 2".

[34]   BBF TR-069: "CPE WAN Management Protocol".

[35]   BBF TR-369: "User Services Platform (USP)".

[36]   3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[37]   BBF WT-470: "5G FMC Architecture".

[38]   IEEE "Guidelines for Use of Extended Unique Identifier (EUI), Organizationally Unique Identifier (OUI), and Company ID (CID)", https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/tutorials/eui.pdf

[39]   3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[40]   IETF RFC 5580: "Carrying Location Objects in RADIUS and Diameter".

[41]   BBF WT-456: "AGF Functional Requirements".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the terms and definitions given in 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
EUI	Extended Unique Identifier
GPSI	Generic Public Subscription Identifier
GUAMI	Globally Unique AMF Identifier
HFC	Hybrid Fiber Coax
N5GC	Non-5G Capable
NSSAA	Network Slice- Specific Authentication and Authorization
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.

5.2.1A Re-used Data Types

This clause specifies the re-used data types from other specifications.

Table 5.2.1A-1: Re-used Data Types

Data Type	Reference	Comments
Fqdn	3GPP TS 29.510 [29]	
NFType	3GPP TS 29.510 [29]	
ServiceName	3GPP TS 29.510 [29]	
DataSetId	3GPP TS 29.510 [29]	
PlmnSnssai	3GPP TS 29.510 [29]	

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,}$'
DiameterIdentityRm	string	This data type is defined in the same way as the "DiameterIdentity" data type, but with the OpenAPI "nullable: true" property.
Double	number	Number with format "double" as defined in OpenAPI Specification [3]
DoubleRm	number	This data type is defined in the same way as the "Double" data type, but with the OpenAPI "nullable: true" property.
DurationSec	integer	Unsigned integer identifying a period of time in units of seconds.
DurationSecRm	integer	This data type is defined in the same way as the "DurationSec" data type, but with the OpenAPI "nullable: true" property.
Float	number	Number with format "float" as defined in OpenAPI Specification [3]
FloatRm	number	This data type is defined in the same way as the "Float" data type, but with the OpenAPI "nullable: true" property.
Uint16	integer	Integer where the allowed values correspond to the value range of an unsigned 16-bit integer, i.e. 0 to 65535. Minimum = 0. Maximum = 65535.
Uint16Rm	integer	This data type is defined in the same way as the "Uint16" data type, but with the OpenAPI "nullable: true" property.
Int32	integer	Integer with format "int32" as defined in OpenAPI Specification [3]
Int32Rm	integer	This data type is defined in the same way as the "Int32" data type, but with the OpenAPI "nullable: true" property.
Int64	integer	Integer with format "int64" as defined in OpenAPI Specification [3]
Int64Rm	integer	This data type is defined in the same way as the "Int64" data type, but with the OpenAPI "nullable: true" property.
Ipv4Addr	string	String identifying a IPv4 address formatted in the "dotted decimal" notation as defined in in IETF RFC 1166 [4]. Pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])$'
Ipv4AddrRm	string	This data type is defined in the same way as the "Ipv4Addr" data type, but with the OpenAPI "nullable: true" property.
Ipv4AddrMask	string	String identifying a IPv4 address mask 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])(\/([0-9]|[1-2][0-9]|3[0-2]))$'
Ipv4AddrMaskRm	string	This data type is defined in the same way as the "Ipv4AddrMask" data type, but with the OpenAPI "nullable: true" property.
Ipv6Addr	string	String identifying an IPv6 address formatted according to clause 4 of IETF RFC 5952 [5]. The mixed IPv4 IPv6 notation according to clause 5 of IETF RFC 5952 [5] shall not be used. Pattern: '^((:|(0?|([1-9a-f][0-9a-f]{0,3}))):)((0?|([1-9a-f][0-9a-f]{0,3})):){0,6}(:|(0?|([1-9a-f][0-9a-f]{0,3})))$' 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", "a" to "f" 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. Minimum = 0.
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	Integer where the allowed values correspond to the value range of an unsigned 32-bit integer, i.e. 0 to (2^{32})-1. Minimum = 0. Maximum = 4294967295.
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	Integer where the allowed values correspond to the value range of an unsigned 64-bit integer, i.e. 0 to (2^{64})-1. Minimum = 0. Maximum = 18446744073709551615.
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-[^@]+@[^@]+|gci-.+|gli-.+|.+)$".
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.
StnSr	string	String representing the STN-SR as defined in clause 18.6 of 3GPP TS 23.003 [7].
StnSrRm	string	This data type is defined in the same way as the "StnSr" data type, but with the OpenAPI "nullable: true" property.
CMsisdn	string	String representing the C-MSISDN as defined in clause 18.7 of 3GPP TS 23.003 [7]). Pattern: "^[0-9]{5,15}$".
CMsisdnRm	string	This data type is defined in the same way as the "CMsisdn" data type, but with the OpenAPI "nullable: true" property.
DayOfWeek	integer	Integer between and including 1 and 7 denoting a weekday. "1" shall indicate "Monday", and the subsequent weekdays shall be indicated with the next higher numbers. "7" shall indicate "Sunday".
TimeOfDay	string	String with format "partial-time" or "full-time" as defined in clause 5.6 of IETF RFC 3339 [10]. Examples: "20:15:00", "20:15:00-08:00" (for 8 hours behind UTC).

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.

5.2.3.4 Enumeration: HttpMethod

Table 5.2.3.4-1: Enumeration HttpMethod

Enumeration value	Description
"GET"	HTTP GET method.
"POST"	HTTP POST method.
"PUT"	HTTP PUT method.
"DELETE"	HTTP DELETE method.
"PATCH"	HTTP PATCH method.
"OPTIONS"	HTTP OPTIONS method.
"HEAD"	HTTP HEAD method.
"CONNECT"	HTTP CONNECT method.
"TRACE"	HTTP TRACE method.

5.2.3.5 Enumeration: NullValue

Table 5.2.3.5-1: Enumeration NullValue

Enumeration value	Description
null	JSON's null 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 5.2.9 of 3GPP TS 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".
targetScp	Uri	O	0..1	ApiRoot of the SCP towards which an HTTP request is redirected (see clause 6.10.x of 3GPP TS 29.500 [25]).
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	If the invalid parameter is an attribute in a JSON body, this IE shall contain the attribute's name and shall be encoded as a JSON Pointer. If the invalid parameter is an HTTP header, this IE shall be formatted as the concatenation of the string "header: " plus the name of such header. If the invalid parameter is a query parameter, this IE shall be formatted as the concatenation of the string "query: " plus the name of such query parameter. If the invalid parameter is a variable part in the path of a resource URI, this IE shall contain the name of the variable, including the symbols "{" and "}" used in OpenAPI specification as the notation to represent variable path segments.
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. See NOTE.	
NOTE:	There may be more than one way to express a given modification of a resource's representation. E.g. removing one attribute from an object can be done by a) a change item with op set to "REMOVE" and path pointing to the attribute to be removed, or b) a change item with op set to "REPLACE" and path pointing to the object, and a newValue of the object i.e. without the attribute that has been removed. It is up to sending nodes decision to select one of the available ways to express the modification and the receiving node shall support all possible ways.				

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.	

5.2.4.16 Void

5.2.4.17 Type: PatchResult

Table 5.2.4.17-1: Definition of type PatchResult

Attribute name	Data type	P	Cardinality	Description	Applicability
report	array(ReportItem)	M	1..N	The execution report contains an array of report items. Each report item indicates one failed modification.	

5.2.4.18 Type: ReportItem

Table 5.2.4.18-1: Definition of type ReportItem

Attribute name	Data type	P	Cardinality	Description	Applicability
path	string	M	1	This attribute contains a JSON pointer value (as defined in IETF RFC 6901 [12]) that references a location of a resource to which the modification is subject.	

5.2.4.19 Type: HalTemplate

Table 5.2.4.19-1: Definition of type HalTemplate

Attribute name	Data type	P	Cardinality	Description
title	string	O	0..1	A human-readable string that can be used to identify this template.
method	HttpMethod	M	1	The HTTP method that should be applied for the corresponding link. If the value is not understood, the value shall be treated as an HTTP GET.
contentType	string	O	0..1	The media type that should be used for the corresponding request. If the attribute is missing, or contains an unrecognized value, the client should act as if the contentType is set to "application/json".
properties	array(Property)	O	1..N	The properties that should be included in the body of the corresponding request. If the contentType attribute is set to "application/json", then this attribute describes the attributes of the JSON object of the body.

5.2.4.20   Type: Property

Table 5.2.4.20-1: Definition of type Property

Attribute name	Data type	P	Cardinality	Description
name	string	M	1	The name of the property.
required	boolean	O	0..1	Indicates whether the property is required: - true: required - false(default): not required
regex	string	O	0..1	A regular expression string to be applied to the value of the property.
value	string	O	0..1	The property value. When present, it shall be a valid JSON string.

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 contain either a DNN Network Identifier, or a full DNN with both the Network Identifier and Operator Identifier, as specified in 3GPP TS 23.003 [7] clause 9.1.1 and 9.1.2. It shall be coded as string in which the labels are separated by dots (e.g. "Label1.Label2.Label3"). See NOTE 2.
DnnRm	string	This data type is defined in the same way as the "Dnn" data type, but with the OpenAPI "nullable: true" property.
WildcardDnn	string	String representing the Wildcard DNN. It shall contain the string "*". Pattern: '^[*]$'
WildcardDnnRm	string	This data type is defined in the same way as the "WildcardDnn" data type, but with the OpenAPI "nullable: true" property.
Gpsi	string	String identifying a Gpsi shall contain either an External Id or an MSISDN. It shall be formatted as follows: -External Identifier: "extid-<extid>, where <extid> shall be formatted according to clause 19.7.2 of 3GPP TS 23.003 [7] that describes an External Identifier. -MSISDN: "msisdn-<msisdn>, where <msisdn> shall be formatted according to clause 3.3 of 3GPP TS 23.003 [7] that describes an MSISDN. Pattern: '^(msisdn-[0-9]{5,15}|extid-.+@.+|.+)$'
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}$'.
GroupIdRm	string	This data type is defined in the same way as the "GroupId" data type, but with the OpenAPI "nullable: true" property.
ExternalGroupId	string	String identifying External Group Identifier that identifies a group made up of one or more subscriptions associated to a group of IMSIs, as specified in clause 19.7.3 of 3GPP TS 23.003 [7]. Pattern: "^extgroupid-[^@]+@[^@]+$"
ExternalGroupIdRm	string	This data type is defined in the same way as the "ExternalGroupId" data type, but with the OpenAPI "nullable: true" property.
Pei	string	String representing a Permanent Equipment Identifier that may contain: - an IMEI or IMEISV, as specified in clause 6.2 of 3GPP TS 23.003 [7]; - a MAC address for a 5G-RG or FN-RG via wireline access, with an indication that this address cannot be trusted for regulatory purpose if this address cannot be used as an Equipment Identifier of the FN-RG, as specified in clause 4.7.7 of 3GPP TS 23.316 [30]. - an IEEE Extended Unique Identifier (EUI-64), for UEs not supporting any 3GPP access technologies, as defined in IEEE "Guidelines for Use of Extended Unique Identifier (EUI), Organizationally Unique Identifier (OUI), and Company ID (CID)" [38]. Pattern: '^(imei-[0-9]{15}|imeisv-[0-9]{16}|mac((-[0-9a-fA-F]{2}){6})(-untrusted)?|eui((-[0-9a-fA-F]{2}){8})|.+)$'. See NOTE 1. Examples: imei-012345678901234 imeisv-0123456789012345 mac-00-00-5E-00-53-00 mac-00-00-5E-00-53-00-untrusted eui-AC-DE-48-23-45-67-01-9F

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 that shall contain either an IMSI, a network specific identifier, a Global Cable Identifier (GCI) or a Global Line Identifier (GLI) as specified in clause 2.2A of 3GPP TS 23.003 [7]. It shall be formatted as follows: - for an IMSI "imsi-<imsi>", where <imsi> shall be formatted according to clause 2.2 of 3GPP TS 23.003 [7] that describes an IMSI. - for a network specific identifier "nai-<nai>, where <nai> shall be formatted according to clause 28.7.2 of 3GPP TS 23.003 [7] that describes an NAI. - for a GCI: "gci-<gci>", where <gci> shall be formatted according to clause 28.15.2 of 3GPP TS 23.003 [7]. - for a GLI: "gli-<gli>", where <gli> shall be formatted according to clause 28.16.2 of 3GPP TS 23.003 [7]. 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-.+| gci-.+|gli-.+|.+)$' (NOTE 1).
SupiRm	string	This data type is defined in the same way as the "Supi" data type, but with the OpenAPI "nullable: true" property.
NfInstanceId	string	String uniquely identifying a NF instance. The format of the NF Instance ID shall be a Universally Unique Identifier (UUID) version 4, as described in IETF RFC 4122 [15]. (NOTE 3)
AmfId	string	String identifying the AMF ID composed of AMF Region ID (8 bits), AMF Set ID (10 bits) and AMF Pointer (6 bits) as specified in clause 2.10.1 of 3GPP TS 23.003 [7]. It is encoded as a string of 6 hexadecimal characters (i.e., 24 bits). Pattern: '^[A-Fa-f0-9]{6}$'
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
MtcProviderInformation	string	String uniquely identifying MTC provider information.
CagId	string	String containing a Closed Access Group Identifier. Pattern: "^[A-Fa-f0-9]{8}$"
SupiOrSuci	string	String identifying a SUPI or a SUCI. Pattern: "^(imsi-[0-9]{5,15}|nai-.+|gli-.+|gci-.+|suci-(0-[0-9]{3}-[0-9]{2,3}|[1-7]-.+)-[0-9]{1,4}-(0-0-.+|[a-fA-F1-9]-([1-9]|[1-9][0-9]|1[0-9]{2}|2[0-4][0-9]|25[0-5])-[a-fA-F0-9]+)|.+)$"
NOTE 1:	The encoding of 3GPP defined identifiers (e.g. IMSI, NAI, IMEI, GCI, GLI) shall be prefixed with its corresponding prefix (e.g. 'imsi-','nai-', 'imei-', 'gci-', 'gli-').	
NOTE 2:	Whether the Dnn data type contains just the DNN Network Identifier, or the Network Identifier plus the Operator Identifier, shall be documented in each API where this data type is used.	
NOTE 3:	NFs shall be able to receive a NF Instance Id in any UUID format.	

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	PlmnIdNid	M	1	PLMN Identity and Network 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]. If the PDU Session ID is allocated by the Core Network for UEs not supporting N1 mode, reserved range 64 to 95 is used. PDU Session ID within the reserved range is only visible in the Core Network (NOTE).
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", "a" to "f" 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", "a" to "f" 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}$' Example: An E-UTRA Cell Id 0x5BD6007 shall be encoded as "5BD6007".
EutraCellIdRm	string	This data type is defined in the same way as the "EutraCellId" data type, but with the OpenAPI "nullable: true" property.
NrCellId	string	36-bit string identifying an NR Cell Id as specified in clause 9.3.1.7 of 3GPP TS 38.413 [11], in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the Cell Id shall appear first in the string, and the character representing the 4 least significant bit of the Cell Id shall appear last in the string. Pattern: '^[A-Fa-f0-9]{9}$' 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] in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the N3IWF ID shall appear first in the string, and the character representing the 4 least significant bit of the N3IWF ID shall appear last in the string. Pattern: '^[A-Fa-f0-9]+$' Example: The N3IWF Id 0x5BD6 shall be encoded as "5BD6".
WAgfId	string	This represents the identifier of the W-AGF ID as specified in clause 9.3.1.xx of 3GPP TS 38.413 [11] in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the W-AGF ID shall appear first in the string, and the character representing the 4 least significant bit of the W-AGF ID shall appear last in the string. Pattern: '^[A-Fa-f0-9]+$' Example: The W-AGF Id 0x5BD6 shall be encoded as "5BD6".
TngfId	string	This represents the identifier of the TNGF ID as specified in clause 9.3.1.yy of 3GPP TS 38.413 [11] in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the TNGF ID shall appear first in the string, and the character representing the 4 least significant bit of the TNGF ID shall appear last in the string. Pattern: '^[A-Fa-f0-9]+$' Example: The TNGF Id 0x5BD6 shall be encoded as "5BD6".
NgeNbId	string	This represents the identifier of the ng-eNB ID as specified in clause 9.3.1.8 of 3GPP TS 38.413 [11]. The string shall be formatted with following pattern: Pattern: '^('MacroNGeNB-[A-Fa-f0-9]{5}| LMacroNGeNB-[A-Fa-f0-9]{6}| SMacroNGeNB-[A-Fa-f0-9]{5})$' 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", "a" to "f" 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.

Nid	string	This represents the Network Identifier, which together with a PLMN ID is used to identify an SNPN (see 3GPP TS 23.003 [7] and 3GPP TS 23.501 [8] clause 5.30.2.1). Pattern: '^[A-Fa-f0-9]{11}$'
NidRm	string	This data type is defined in the same way as the "Nid" data type, but with the OpenAPI "nullable: true" property.

NfSetId	string	NF Set Identifier (see clause 28.12 of 3GPP TS 23.003 [7]), formatted as the following string:
		
		" set\<Set ID>.\<nftype>set.5gc.mnc\<MNC>.mcc\<MCC>"
		
		with
		    \<MCC> encoded as defined in clause 5.4.2
		
		    \<MNC> encoded as defined in clause 5.4.2
		
		    \<NFType> encoded as a value defined in Table 6.1.6.3.3-1 of 3GPP TS 29.510 [29] but with lower case characters
		
		    \<Set ID> encoded as a string of characters consisting of alphabetic characters (A-Z and a-z), digits (0-9) and/or the hyphen (-) and that shall end with either an alphabetic character or a digit.
		    Pattern: '^([A-Za-z0-9\-]*[A-Za-z0-9])$'
		
		Examples:
		    "setxyz.smfset.5gc.mnc012.mcc345"
		    "set12.pcfset.5gc.mnc012.mcc345"

NfServiceSetId	string	NF Service Set Identifier (see clause 28.12 of 3GPP TS 23.003 [7]) formatted as the following string:
		
		" set\<Set ID>.sn\<Service Name>.nfi\<NF Instance ID>.5gc.mnc\<MNC>.mcc\<MCC>"
		
		with
		    \<MCC> encoded as defined in clause 5.4.2
		
		    \<MNC> encoded as defined in clause 5.4.2
		
		    \<NFInstanceId> encoded as defined in clause 5.3.2
		
		    \<ServiceName> encoded as defined in 3GPP TS 29.510 [29]
		
		    \<Set ID> encoded as a string of characters consisting of alphabetic characters (A-Z and a-z), digits (0-9) and/or the hyphen (-) and that shall end with either an alphabetic character or a digit.
		    Pattern: '^([A-Za-z0-9\-]*[A-Za-z0-9])$
		
		Examples:
		    "setxyz.snnsmf-pdusession.nfi54804518-4191-46b3-955c-ac631f953ed8.5gc.mnc012.mcc345"
		    "set2.snnpcf-smpolicycontrol.nfi54804518-4191-46b3-955c-ac631f953ed8.5gc.mnc012.mcc345"

PlmnAssiUeRadioCapId	Bytes	String with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, encoding the "UE radio capability ID" IE as specified in clause 9.11.3.68 of 3GPP TS 24.501 [20] (starting from octet 1).
ManAssiUeRadioCapId	Bytes	String with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, encoding the "UE radio capability ID" IE as specified in clause 9.11.3.68 of 3GPP TS 24.501 [20] (starting from octet 1).

TypeAllocationCode	string	Type Allocation Code (TAC) of the UE, comprising the initial eight-digit portion of the 15-digit IMEI and 16-digit IMEISV codes. See clause 6.2 of 3GPP TS 23.003 [7]. Pattern: '^[0-9]{8}$'
HfcNId	string	This IE represents the identifier of the HFC node Id as specified in CableLabs WR-TR-5WWC-ARCH [32]. It is provisioned by the wireline operator as part of wireline operations and may contain up to six characters.
HfcNIdRm	string	This data type is defined in the same way as the "HfcNId" data type, but with the OpenAPI "nullable: true" property.
ENbId	string	This represents the identifier of the eNB ID as specified in clause 9.2.1.37 of 3GPP TS 36.413 [16]. The string shall be formatted with following pattern: Pattern: '^('MacroeNB-[A-Fa-f0-9]{5}|LMacroeNB-[A-Fa-f0-9]{6}|SMacroeNB-[A-Fa-f0-9]{5}|HomeeNB-[A-Fa-f0-9]{7})$' The value of the eNB ID shall be encoded in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" 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 eNB ID shall appear first in the string, and the character representing the 4 least significant bit of the eNB ID (to form a nibble) shall appear last in the string. Examples: "SMacroeNB-34B89" indicates a Short Macro eNB ID with value 0x34B89.
Gli	Bytes	Global Line Identifier uniquely identifying the line connecting the 5G-BRG or FN-BRG to the 5GS. See clause 28.16.3 of 3GPP TS 23.003 [7]. This shall be encoded as a string with format "byte" as defined in OpenAPI Specification [3], i.e. base64-encoded characters, representing the GLI value (up to 150 bytes) encoded as specified in BBF WT-470 [37].
Gci	string	Global Cable Identifier uniquely identifying the connection between the 5G-CRG or FN-CRG to the 5GS. See clause 28.15.4 of 3GPP TS 23.003 [7]. This shall be encoded as a string per clause 28.15.4 of 3GPP TS 23.003 [7], and compliant with the syntax specified in clause 2.2 of IETF RFC 7542 [126] for the username part of a NAI. The GCI value is specified in CableLabs WR-TR-5WWC-ARCH [32].
NOTE:		For a PDN connection established via MME, the PDU Session ID value is set to 64 plus the EPS bearer ID of the default EPS bearer of the PDN connection; for a PDN connection established via ePDG, the PDU Session ID value is set to 80 plus the EPS bearer ID of the default EPS bearer of the PDN connection.

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"	Untrusted Wireless LAN (IEEE 802.11) access
"VIRTUAL"	Virtual (see NOTE 1)
"NBIOT"	NB IoT
"WIRELINE"	Wireline access
"WIRELINE_CABLE"	Wireline Cable access
"WIRELINE_BBF"	Wireline BBF access
"LTE-M"	LTE-M (see NOTE 2)
"NR_U"	New Radio in unlicensed bands
"EUTRA_U"	(WB) Evolved Universal Terrestrial Radio Access in unlicensed bands
"TRUSTED_N3GA"	Trusted Non-3GPP access
"TRUSTED_WLAN"	Trusted Wireless LAN (IEEE 802.11) access
"UTRA"	UMTS Terrestrial Radio Access
"GERA"	GSM EDGE Radio Access Network
NOTE 1: Virtual shall be used if the N3IWF does not know the access technology used for an untrusted non-3GPP access.	
NOTE 2: This RAT type value is used only in the Core Network; it shall be used when a Category M UE using E-UTRA has provided a Category M indication to the NG-RAN.	

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.

5.4.3.21 Enumeration: StationaryIndication

Table 5.4.3.21-1: Enumeration StationaryIndication

Enumeration value	Description
"STATIONARY"	Identifies the UE is stationary
"MOBILE"	Identifies the UE is mobile

5.4.3.22 Enumeration: StationaryIndicationRm

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

5.4.3.23 Enumeration: ScheduledCommunicationType

Table 5.4.3.23-1: Enumeration ScheduledCommunicationType

Enumeration value	Description
"DOWNLINK_ONLY"	Downlink only
"UPLINK_ONLY"	Uplink only
"BIDIRECTIONAL"	Bi-directional

5.4.3.24 Enumeration: ScheduledCommunicationTypeRm

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

5.4.3.25 Enumeration: TrafficProfile

Table 5.4.3.25-1: Enumeration TrafficProfile

Enumeration value	Description
"SINGLE_TRANS_UL"	Uplink single packet transmission.
"SINGLE_TRANS_DL"	Downlink single packet transmission.
"DUAL_TRANS_UL_FIRST"	Dual packet transmission, firstly uplink packet transmission with subsequent downlink packet transmission.
"DUAL_TRANS_DL_FIRST"	Dual packet transmission, firstly downlink packet transmission with subsequent uplink packet transmission.
"MULTI_TRANS"	Multiple packet transmission.

5.4.3.26 Enumeration: TrafficProfileRm

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

5.4.3.27 Enumeration: LcsServiceAuth

Table 5.4.3.27-1: Enumeration LcsServiceAuth

Enumeration value	Description
"LOCATION_ALLOWED_WITH_NOTIFICATION"	Location allowed with notification
"LOCATION_ALLOWED_WITHOUT_NOTIFICATION"	Location allowed without notification
"LOCATION_ALLOWED_WITHOUT_RESPONSE"	Location with notification and privacy verification; location allowed if no response
"LOCATION_RESTRICTED_WITHOUT_RESPONSE"	Location with notification and privacy verification; location restricted if no response
"NOTIFICATION_ONLY"	Notification only
"NOTIFICATION_AND_VERIFICATION_ONLY"	Notification and privacy verification only

5.4.3.28 Enumeration: UeAuth

Table 5.4.3.28-1: Enumeration UeAuth

Enumeration value	Description
"AUTHORIZED"	Indicates that the UE is authorized.
"NOT_AUTHORIZED"	Indicates that the UE is not authorized.

5.4.3.29 Enumeration: DlDataDeliveryStatus

Table 5.4.3.29-1: Enumeration DddStatus

Enumeration value	Description
"BUFFERED"	The first downlink data is buffered with extended buffering matching the source of the downlink traffic.
"TRANSMITTED"	The first downlink data matching the source of the downlink traffic is transmitted after previous buffering or discarding of corresponding packet(s) because the UE of the PDU Session becomes ACTIVE, and buffered data can be delivered to UE.
"DISCARDED"	The first downlink data matching the source of the downlink traffic is discarded because the Extended Buffering time, as determined by the SMF, expires or the amount of downlink data to be buffered is exceeded.

5.4.3.30 Enumeration: DlDataDeliveryStatusRm

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

5.4.3.31 Void

5.4.3.32 Enumeration: AuthStatus

Table 5.4.3.32-1: Enumeration AuthStatus

Enumeration value	Description
"EAP_SUCCESS"	The NSSAA status is EAP-Success.
"EAP_FAILURE"	The NSSAA status is EAP-Failure.
"PENDING"	The NSSAA status is Pending, i.e. the NSSAA procedure is ongoing.

5.4.3.33 Enumeration: LineType

Table 5.4.3.33-1: Enumeration LineType

Enumeration value	Description
"DSL"	DSL line
"PON"	PON line

5.4.3.34 Enumeration: LineTypeRm

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

5.4.3.35 Enumeration: LineType

Table 5.4.3.35-1: Enumeration LineType

Enumeration value	Description
"DSL"	DSL line
"PON"	PON line

5.4.3.36 Enumeration: LineTypeRm

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

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 3GPP TS 23.501 [8] clause 5.7.2.7.
arp	Arp	M	1	Default Allocation and Retention Priority see 3GPP TS23.501 [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", "a" to "f" 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. This IE shall be absent if no SD value is associated with the SST. 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

When PlmnId needs to be converted to string (e.g. when used in maps as key), the string shall be composed of three digits "mcc" followed by "-" and two or three digits "mnc", and shall match the following pattern:

^[0-9]{3}-[0-9]{2,3}$

Example 1:   "262-01"

Example 2:   "302-720"

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
nid	Nid	O	0..1	Network Identifier, shall be present in case of SNPN, PlmnId together with Nid indicates the identity of the SNPN to which the TA belongs to.

NOTE: The "nid" attribute is used to convey the Network Identifier (NID) of the SNPN as part of the "Tai" JSON object data type definition; this is a protocol aspect that does not imply any change on the system-wide definition of the TAI, as described in 3GPP 23.003 [7].

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
nid	Nid	O	0..1	Network Identifier

NOTE: The "nid" attribute is used to convey the Network Identifier (NID) of the SNPN as part of the "Ecgi" JSON object data type definition; this is a protocol aspect that does not imply any change on the system-wide definition of the ECGI, as described in 3GPP 23.003 [7].

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
nid	Nid	C	0..1	Network Identifier, shall be present in case of SNPN, PlmnId together with Nid indicates the identity of the SNPN to which the NR cell belongs to.

NOTE: The "nid" attribute is used to convey the Network Identifier (NID) of the SNPN as part of the "Ncgi" JSON object data type definition; this is a protocol aspect that does not imply any change on the system-wide definition of the NCGI, as described in 3GPP 23.003 [7].

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
ignoreEcgi	boolean	O	0..1	This flag when present shall indicate that the Ecgi shall be ignored. When present, it shall be set as follows: - true: ecgi shall be ignored. - false (default): ecgi shall not be ignored.
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 3GPP TS 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 3GPP TS 38.413 [11] clause 9.3.1.8.
globalENbId	GlobalRanNodeId	O	0..1	It indicates the global identity of the eNodeB in which the UE is currently located. See 3GPP TS 36.413 [16] clause 9.2.1.37.
NOTE: Either the "globalNgenbId" attribute or the "globalENbId" attribute shall be included in the "EutraLocation" data type.				

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
ignoreNcgi	boolean	O	0..1	This flag when present shall indicate that the Ncgi shall be ignored. When present, it shall be set as follows: - true: ncgi shall be ignored. - false (default): ncgi shall not be ignored.
ageOfLocationInformation	integer	O	0 1	The value represents the elapsed time in minutes since the last network contact of the mobile station. Value "0" indicates that the location information was obtained after a successful paging procedure for Active Location Retrieval when the UE is in idle mode or after a successful NG-RAN location reporting procedure with the gNB when the UE is in connected mode. Any other value than "0" indicates that the location information is the last known one. See 3GPP TS 29.002 [21] 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 3GPP TS 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. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits of the N3IWF ID shall appear first in the string, and the character representing the 4 least significant bit of the N3IWF ID shall appear last in the string. Pattern: '^[A-Fa-f0-9]+$' Example: The N3IWF Id 0x5BD6 shall be encoded as "5BD6". It shall be present over the 3GPP PLMN internal interfaces if the UE is accessing the 5GC via an untrusted non-3GPP access, but shall not be present over the N5 interface.
ueIpv4Addr	Ipv4Addr	C	0..1	UE/N5CW device local IPv4 address (used to reach the N3IWF, TNGF or TWIF). The ueIPv4Addr or the ueIPv6Addr shall be present if the UE is accessing the 5GC via a trusted or untrusted non-3GPP access and the information is available.
ueIpv6Addr	Ipv6Addr	C	0..1	UE/N5CW device local IPv6 address (used to reach the N3IWF, TNGF or TWIF). The ueIPv4Addr or the ueIPv6Addr shall be present if the UE is accessing the 5GC via a trusted or untrusted non-3GPP access and the information is available.
portNumber	Uinteger	C	0..1	UDP or TCP source port number. It shall be present if the UE is accessing the 5GC via a trusted or untrusted non-3GPP access and NAT is detected.
tnapId	TnapId	C	0..1	This IE shall contain the TNAP Identifier, see clause 5.6.2 of 3GPP TS 23.501 [8].
twapId	TwapId	C	0..1	This IE shall contain the TWAP Identifier, see clause 4.2.8.5.3 of 3GPP TS 23.501 [8].
hfcNodeId	HfcNodeId	C	0..1	This IE shall contain the HFC Node Identifier received over NGAP. It shall be present for a 5G-CRG/FN-CRG accessing the 5GC via wireline access network.
gli	Gli	C	0..1	This IE shall contain the Global Line Identifier. It shall be present for a 5G-BRG/FN-BRG accessing the 5GC via wireline access network.
w5gbanLineType	LineType	O	0..1	This IE may be present for a 5G-BRG/FN-BRG accessing the 5GC via wireline access network. When present, it shall indicate the type of the wireline (DSL or PON).
gci	Gci	C	0..1	This IE shall contain the Global Cable Identifier. It shall be present for the N5GC device accessing the 5GC via wireline access network. See clause 4.10a of 3GPP TS 23.316 [30]

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 list of GUAMI(s) (supported by the AMF) for which the backupAmf IE applies.

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".
maxNumOfTAsForNot AllowedAreas	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 or a Set of Core Network predefined Presence Reporting Areas. 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"
additionalPraId	string	C	0..1	This IE may be present if the praId IE is present and if it contains a PRA identifier referring to a set of Core Network predefined Presence Reporting Areas. When present, this IE shall contain a PRA Identifier of an individual PRA within the Set of Core Network predefined Presence Reporting Areas indicated by the praId IE.
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. (NOTE)
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(GlobalRan NodeId)	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.
globalENbIdList	array(GlobalRan NodeId)	C	1..N	Represents the list of eNodeB identifiers that constitutes the area. This IE shall be present if the Area of Interest subscribed is a list of eNodeB identifiers.
NOTE: If the additionalPraId IE is present, this IE shall state the presence information of the UE for the individual PRA identified by the additionalPraId IE; If the additionalPraId IE is not present, this IE shall state the presence information of the UE for the PRA identified by the praId IE.				

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 AN node represents a N3IWF. When present, this IE shall contain the identifier of the N3IWF. (NOTE 1).
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).
wagfId	WAgfId	C	0..1	This IE shall be included if the AN node represents a W-AGF. When present, this IE shall contain the identifier of the W-AGF. (NOTE 1).
tngfId	TngfId	C	0..1	This IE shall be included if the AN node represents a TNGF. When present, this IE shall contain the identifier of the TNGF. (NOTE 1).
nid	Nid	O	0..1	Network Identifier shall be present in case of SNPN, PlmnId together with Nid indicates the identity of the SNPN to which the RanNode belongs to.
eNbId	ENbId	C	0..1	This IE shall be included if the RAN Node Id represents an eNB. When present, this IE shall contain the identifier of an eNB. (NOTE 1, NOTE 2).
NOTE 1: One of the six attributes n3Iwfld, gNbIdm, ngeNbId, wagfId, tngfId, eNbId shall be present.				
NOTE 2: For UEs with 5GS subscription but without 5G NAS support, eNbId is used on N7 instead of n3Iwfld, gNbIdm, ngeNbId.				

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", "a" to "f" 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.

5.4.4.31 Void

5.4.4.32 Type: AtsssCapability

Table 5.4.4.32-1: Definition of type AtsssCapability

Attribute name	Data type	P	Cardinality	Description
atsssLL	boolean	C	0..1	Indicates the ATSSS-LL capability to support procedures related to Access Traffic Steering, Switching, Splitting (see clauses 4.2.10, 5.32 of 3GPP TS 23.501 [8]). true: Supported false (default): Not Supported
mptcp	boolean	C	0..1	Indicates the MPTCP capability to support procedures related to Access Traffic Steering, Switching, Splitting (see clauses 4.2.10, 5.32 of 3GPP TS 23.501 [8]). true: Supported false (default): Not Supported
rttWithoutPmf	boolean	C	0..1	This IE is only used by the UPF to indicate whether the UPF supports RTT measurement without PMF (see clauses 5.32.2, 6.3.3.3 of 3GPP TS 23.501 [8]). If this attribute is present and set to true, the mptcp attribute shall also be present and set to true. true: Supported false (default): Not Supported.

5.4.4.33 Type: PlmnIdNid

Table 5.4.4.33-1: Definition of type PlmnIdNid

Attribute name	Data type	P	Cardinality	Description
mcc	Mcc	M	1	Mobile Country Code
mnc	Mnc	M	1	Mobile Network Code
nid	Nid	C	0..1	Network Identity; shall be present if PlmnIdNid identifies an SNPN; otherwise shall be absent.

5.4.4.34 Type: PlmnIdNidRm

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

5.4.4.35 Type: SmallDataRateStatus

Table 5.4.4.35-1: Definition of type SmallDataRateStatus

Attribute name	Data type	P	Cardinality	Description
remainPacketsUl	integer	C	0..1	This IE shall be included if available. When present, it shall contain the number of packets the UE is allowed to send uplink in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS 23.501 [8]).
remainPacketsDl	integer	C	0..1	This IE shall be included if available. When present it shall contain the number of packets the AF is allowed to send downlink in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS 23.501 [8]).
validityTime	DateTime	C	0..1	This IE shall be included if available. When present, it shall indicate the period of time during which the small data rate control status will remain valid (see clause 5.31.14.3 of 3GPP TS 23.501 [8]).
remainExReportsUl	integer	C	0..1	This IE shall be included if available. When present, it shall indicate number of additional exception reports the UE is allowed to send uplink in the given time unit for the given PDU session (see clause 5.31.14.3 of 3GPP TS 23.501 [8]).
remainExReportsDl	integer	C	0..1	This IE shall be included if available. When present, it shall indicate number of additional exception reports the AF is allowed to send downlink in the given time unit for the given PDU session (see clause 5.31.14.3 in 3GPP TS 23.501 [8]).

5.4.4.36 Type: HfcNodeId

Table 5.4.4.36-1: Definition of type HfcNodeId

Attribute name	Data type	P	Cardinality	Description	Applicability
hfcNId	HfcNId	M	1	HFC Node Id.	

5.4.4.37 Type: HfcNodeIdRm

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

5.4.4.38 Type: WirelineArea

Table 5.4.4.38-1: Definition of type WirelineArea

Attribute name	Data type	P	Cardinality	Description	Applicability
globalLineIds	array(Gli)	C	1..N	List of Global Line Identifiers, for a 5G-BRG accessing the 5GC via wireline access network.	
hfcNIds	array(HfcNId)	C	1..N	List of HFC Node Ids, for a 5G-CRG/FN-CRG is accessing the 5GC via wireline access network.	
areaCodeB	AreaCode	C	0..1	Area Code for for 5G-BRG accessing via wireline access network	
areaCodeC	AreaCode	C	0..1	Area Code for 5G-CRG/FN-CRG is accessing via wireline access network	
NOTE: One and only one of the "globLineIds", "hfcNIds", "areaCodeB" and "areaCodeC" attributes shall be included in a WirelineArea data structure.					

5.4.4.39 Type: WirelineServiceAreaRestriction

Table 5.4.4.39-1: Definition of type WirelineServiceAreaRestriction

Attribute name	Data type	P	Cardinality	Description
restrictionType	RestrictionType	C	0..1	string "ALLOWED_AREAS" or "NOT_ALLOWED_AREAS" (NOTE 1)
areas	array(WirelineArea)	C	0..N	A list of Areas. These areas are: - allowed areas if RestrictionType is "ALLOWED_AREAS" - not allowed areas if RestrictionType is "NOT_ALLOWED_AREAS" (NOTE 1) (NOTE 2)
NOTE 1: The "restrictionType" attribute and the "areas" attribute shall be either both present or absent. NOTE 2: The empty array is used when service is allowed/restricted nowhere.				

5.4.4.40 Type: ApnRateStatus

Table 5.4.4.40-1: Definition of type ApnRateStatus

Attribute name	Data type	P	Cardinality	Description
remainPacketsUl	integer	C	0..1	This IE shall be included if available. When present, it shall contain the number of packets the UE is allowed to send uplink in the given time unit for the given APN (all PDN connections of the UE to this APN see clause 4.7.7.3 in 3GPP TS 23.401 [33]).
remainPacketsDl	integer	C	0..1	This IE shall be included if available. When present, it shall contain the number of packets, which the UE is allowed to send downlink for the given time unit period of time and for the given APN (all PDN connections of the UE to this APN, see clause 4.7.7.3 in 3GPP TS 23.401 [33]).
validityTime	DateTime	C	0..1	This IE shall be included if available. When present, it shall indicate the period of time during which the APN rate control status will remain valid.
remainExReportsUl	integer	C	0..1	This IE shall be included if available. When present, it shall indicate the number of additional exception reports the UE is allowed to send uplink in the given time unit for the given APN (all PDN connections of the UE to this APN, see clause 4.7.7.3 in 3GPP TS 23.401 [33]).
remainExReportsDl	integer	C	0..1	This IE shall be included if available. When present, it shall indicate the number of additional exception reports the AF is allowed to send downlink in the given time unit for the given APN (all PDN connections of the UE to this APN, see clause 4.7.7.3 in 3GPP TS 23.401 [33]).

5.4.4.41 Type: ScheduledCommunicationTime

Table 5.4.4.41-1: Definition of type ScheduledCommunicationTime

Attribute name	Data type	P	Cardinality	Description
daysOfWeek	array(DayOfWeek)	O	1..6	Identifies the day(s) of the week. If absent, it indicates every day of the week.
timeOfDayStart	TimeOfDay	O	0..1	Identifies the start time of the day.
timeOfDayEnd	TimeOfDay	O	0..1	Identifies the end time of the day.

5.4.4.42 Type: ScheduledCommunicationTimeRm

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

5.4.4.43   Type: BatteryIndication

Table 5.4.4.43-1: Definition of type BatteryIndication

Attribute name	Data type	P	Cardinality	Description
batteryInd	boolean	O	0..1	When present, this IE shall indicate whether the UE is battery powered or not. true: the UE is battery powered; false or absent: the UE is not battery powered.
replaceableInd	boolean	O	0..1	When present, this IE shall indicate whether the battery of the UE is replaceable or not. true: the battery of the UE is replaceable; false or absent: the battery of the UE is not replaceable.
rechargeableInd	boolean	O	0..1	When present, this IE shall indicate whether the battery of the UE is rechargeable or not. true: the battery of UE is rechargeable; false or absent: the battery of the UE is not rechargeable.
NOTE: Parameters "replaceableInd" and "rechargeableInd" are only included if the value of Parameter "batteryInd" is true.				

5.4.4.44   Type: BatteryIndicationRm

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

5.4.4.45   Type: AcsInfo

Table 5.4.4.45-1: Definition of type AcsInfo

Attribute name	Data type	P	Cardinality	Description
acsUrl	Uri	O	0..1	This IE may contain the URL of the ACS, see BBF TR-069 [34] or BBF TR-369 [35]. (NOTE)
acsIpv4Addr	Ipv4Addr	O	0..1	This IE may contain the IPv4 address of the ACS, see BBF TR-069 [34] or BBF TR-369 [35]. (NOTE)
acsIpv6Addr	Ipv6Addr	O	0..1	This IE may contain the IPv6 address of the ACS, see BBF TR-069 [34] or BBF TR-369 [35]. (NOTE)
NOTE: At least one of acsUrl, acsIpv4Addr, acsIpv6Addr shall be included.				

5.4.4.46   Type: AcsInfoRm

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

5.4.4.47   Type: NrV2xAuth

Table 5.4.4.47-1: Definition of type NrV2xAuth

Attribute name	Data type	P	Cardinality	Description
vehicleUeAuth	UeAuth	C	0..1	This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Vehicle UE.
pedestrianUeAuth	UeAuth	C	0..1	This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Pedestrian UE.

5.4.4.48 Type: LteV2xAuth

Table 5.4.4.48-1: Definition of type LteV2xAuth

Attribute name	Data type	P	Cardinality	Description
vehicleUeAuth	UeAuth	C	0..1	This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Vehicle UE.
pedestrianUeAuth	UeAuth	C	0..1	This IE shall be present if available. When present, it shall indicate whether the UE is authorized as Pedestrian UE.

5.4.4.49 Type: Pc5QoSPara

Table 5.4.4.49-1: Definition of type Pc5QoSPara

Attribute name	Data type	P	Cardinality	Description
pc5QosFlowList	array(Pc5QosFlowItem)	M	1..N	This IE shall contain the set of PC5 flow(s).
pc5LinkAmbr	BitRate	C	0..1	This IE shall be present if available. When present, it shall represent the PC5 Link Aggregated Bit Rates for all the Non-GBR QoS Flows (see clause 5.4.2.3 of 3GPP TS 23.287 [36]).

5.4.4.50 Type: Pc5QosFlowItem

Table 5.4.4.50-1: Definition of type Pc5QosFlowItem

Attribute name	Data type	P	Cardinality	Description
pqi	5Qi	M	1	PQI is a special 5QI (see clause 5.4.2.1 of 3GPP TS 23.287 [36]).
pc5FlowBitRates	Pc5FlowBitRates	C	0..1	This IE shall be present if available. When present, it shall represent the PC5 Flow Bit Rates (see clause 5.4.2.2 of 3GPP TS 23.287 [36]).
range	Uinteger	C	0..1	This IE shall be present if available. When present, it shall represent the Range in the unit of meters (see clause 5.4.2.4 of 3GPP TS 23.287 [36]).

5.4.4.51 Type: Pc5FlowBitRates

Table 5.4.4.51-1: Definition of type Pc5FlowBitRates

Attribute name	Data type	P	Cardinality	Description
guaFbr	BitRate	C	0..1	This IE shall be present if available. When present, it shall contain the guaranteed Bit Rate for the PC5 QoS flow.
maxFbr	BitRate	C	0..1	This IE shall be present if available. When present, it shall contain the maximum Bit Rate for the PC5 QoS flow.

5.4.4.52 Type: UtraLocation

Table 5.4.4.52-1: Definition of type UtraLocation

Attribute name	Data type	P	Cardinality	Description
cgi	CellGlobalId	O	0..1	Cell Global Identification. See 3GPP TS 23.003 [7], clause 4.3.1 (NOTE 1)
sai	ServiceAreaId	O	0..1	Service Area Identifier. See 3GPP TS 23.003 [7], clause 12.5 (NOTE 1)
lai	LocationAreaId	O	0..1	Location area identification. See 3GPP TS 23.003 [7], clause 4.1 (NOTE 1)
rai	RoutingAreaId	O	0..1	Routing Area Identification. See 3GPP TS 23.003 [7], clause 4.2
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 location reporting procedure 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 3GPP TS 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.
NOTE 1: Exactly one of cgi, sai or lai shall be present.				

5.4.4.53 Type: GeraLocation

Table 5.4.4.53-1: Definition of type GeraLocation

Attribute name	Data type	P	Cardinality	Description
locationNumber	string	O	0..1	Location number within the PLMN. See 3GPP TS 23.003 [7], clause 4.5.
cgi	CellGlobalId	O	0..1	Cell Global Identification. See 3GPP TS 23.003 [7], clause 4.3.1 (NOTE 1)
sai	ServiceAreaId	O	0..1	Service Area Identifier. See 3GPP TS 23.003 [7], clause 12.5 (NOTE 1)
lai	LocationAreaId	O	0..1	Location Area identification. See 3GPP TS 23.003 [7], clause 4.1 (NOTE 1)
vlrNumber	string	O	0..1	VLR number. See 3GPP TS 23.003 [7] clause 5.1.
mscNumber	string	O	0..1	MSC number. See 3GPP TS 23.003 [7] clause 5.1.
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 location reporting procedure 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 3GPP TS 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.
NOTE 1: Exactly one of cgi, sai or lai shall be present.				

5.4.4.54 Type: CellGlobalId

Table 5.4.4.54-1: Definition of type CellGlobalId

Attribute name	Data type	P	Cardinality	Description
plmnId	PlmnId	M	1	PLMN Identity
lac	string	M	1	Location Area Code Pattern: '^[A-Fa-f0-9]$'
cellId	string	M	1	Cell Identity Pattern: '^[A-Fa-f0-9]$'

5.4.4.55 Type: ServiceAreaId

Table 5.4.4.55-1: Definition of type ServiceAreaId

Attribute name	Data type	P	Cardinality	Description
plmnId	PlmnId	M	1	PLMN Identity
lac	string	M	1	Location Area Code Pattern: '^[A-Fa-f0-9]$'
sac	string	M	1	Service Area Code Pattern: '^[A-Fa-f0-9]$'

5.4.4.56 Type: LocationAreaId

Table 5.4.4.56-1: Definition of type LocationAreaId

Attribute name	Data type	P	Cardinality	Description
plmnId	PlmnId	M	1	PLMN Identity
lac	string	M	1	Location Area Code Pattern: '^[A-Fa-f0-9]$'

5.4.4.57 Type: RoutingAreaId

Table 5.4.4.57-1: Definition of type RoutingAreaId

Attribute name	Data type	P	Cardinality	Description
plmnId	PlmnId	M	1	PLMN Identity
lac	string	M	1	Location Area Code Pattern: '^[A-Fa-f0-9]$'
rac	string	M	1	Routing Area Code Pattern: '^[A-Fa-f0-9]$'

5.4.4.58 Type: DddTrafficDescriptor

Table 5.4.4.58-1: Definition of type DddTrafficDescriptor

Attribute name	Data type	P	Cardinality	Description
ipv4Addr	Ipv4Addr	C	0..1	Ipv4 address of the source of downlink data.
ipv6Addr	Ipv6Addr	C	0..1	Ipv6 address of the source of downlink data.
portNumber	Uinteger	O	0..1	Port number of the source of downlink data.
macAddr	MacAddr48	C	0..1	Source MAC address.
NOTE: Either IP address (at least one of the "ipv4Addr" attribute or the "ipv6Addr" attribute) or MAC address (the "macAddr" attribute) shall be included.				

5.4.4.59 Type: MoExpDataCounter

Table 5.4.4.59-1: Definition of type MoExpDataCounter

Attribute name	Data type	P	Cardinality	Description
counter	integer	M	1	Unsigned integer identifying the MO Exception Data Counter, as specified in clause 5.31.14.3 of 3GPP TS 23.501 [8].
timeStamp	DateTime	O	0..1	UTC time indicating the time at which the counter value increased from 0 to 1.

5.4.4.60 Type: NssaaStatus

Table 5.4.4.60-1: Definition of type NssaaStatus

Attribute name	Data type	P	Cardinality	Description
snssai	Snssai	M	1	Subscribed S-NSSAI
status	AuthStatus	M	1	This flag when present shall indicate the NSSAA status of the related Snssai.

5.4.4.61 Type: NssaaStatusRm

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

5.4.4.62 Type: TnapId

Table 5.4.4.62-1: Definition of type TnapId

Attribute name	Data type	P	Cardinality	Description
ssId	string	C	0..1	This IE shall be present if the UE is accessing the 5GC via a trusted WLAN access network. When present, it shall contain the SSID of the access point to which the UE is attached, that is received over NGAP, see IEEE Std 802.11-2012 [31].
bssId	string	C	0..1	This IE shall be present if available. When present, it shall contain the BSSID of the access point to which the UE is attached, that is received over NGAP, see IEEE Std 802.11-2012 [31].
civicAddress	Bytes	C	0..1	This IE shall be present if available. When present, it shall contain the civic address information of the TNAP to which the UE is attached, including the Location-Information Attribute and / or Location-Data Attribute as defined in IETF RFC 5580 [40].

5.4.4.63 Type: TnapIdRm

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

5.4.4.64 Type: TwapId

Table 5.4.4.64-1: Definition of type TwapId

Attribute name	Data type	P	Cardinality	Description
ssId	string	M	1	This IE shall contain the SSID of the access point to which the UE is attached, that is received over NGAP, see IEEE Std 802.11-2012 [31].
bssId	string	C	0..1	This IE shall be present if available. When present, it shall contain the BSSID of the access point to which the UE is attached, for trusted WLAN access, see IEEE Std 802.11-2012 [31].
civicAddress	Bytes	C	0..1	This IE shall be present if available. When present, it shall contain the civic address information of the TWAP to which the UE is attached, for trusted WLAN access. This IE shall include the Location-Information Attribute and / or Location-Data Attribute as defined in IETF RFC 5580 [40].

5.4.4.65 Type: TwapIdRm

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

5.4.4.66 Type: SnssaiExtension

Table 5.4.4.66-1: Definition of type SnssaiExtension

Attribute name	Data type	P	Cardinality	Description
sdRanges	array(SdRange)	C	1..N	When present, it shall contain the range(s) of Slice Differentiator values supported for the Slice/Service Type value indicated in the sst attribute of the Snssai data type (see clause 5.4.4.2).
wildcardSd	boolean	C	0..1	When present, it shall be set to "true", to indicate that all SD values are supported for the Slice/Service Type value indicated in the sst attribute of the Snssai data type (see clause 5.4.4.2).
NOTE: sdRanges and wildcardSd shall not be present simultaneously.				

5.4.4.67 Type: SdRange

Table 5.4.4.67-1: Definition of type SdRange

Attribute name	Data type	P	Cardinality	Description
start	string	M	1	First value identifying the start of an SD range. This string shall be formatted as specified for the sd attribute of the Snssai data type in clause 5.4.4.2.
end	string	M	1	Last value identifying the end of an SD range. This string shall be formatted as specified for the sd attribute of the Snssai data type in clause 5.4.4.2.

EXAMPLE: SD range from 023400 to 023499 (hexadecimal)
JSON: { "start": "023400", "end": "023499" }

5.4.5 Data types describing alternative data types or combinations of data types

5.4.5.1 Type: ExtSnssai

Table 5.4.5.1-1: Definition of type ExtSnssai as a list of to be combined data types

Data type	Cardinality	Description
Snssai	1	Common data type defined in clause 5.4.4.2.
SnssaiExtension	1	Extensions to the Snssai common data type defined in clause 5.4.4.66.
NOTE: The sdRanges and wildcardSd attributes shall be exclusive from each other. If one of these attributes is present, the sd attribute shall also be present and it shall contain one Slice Differentiator value within the range of SD (if the sdRanges attribute is present) or with any value (if the wildcardSd attribute is present).		

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 4×10^{-6} shall be encoded as "4E-6". Packer Error Rate 10^{-2} shall be encoded as "1E-2".
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.

MaxDataBurstVolR m	Integer	This data type is defined in the same way as the "MaxDataBurstVol" data type, but with the OpenAPI "nullable: true" property.
SamplingRatio	Integer	Unsigned integer indicating Sampling Ratio (see clauses 4.15.1 of 3GPP TS 23.502 [28], expressed in percent. Minimum = 1. Maximum = 100
SamplingRatioRM	Integer	This data type is defined in the same way as the "SamplingRatio" data type, but with the OpenAPI "nullable: true" property.
RgWirelineCharacte ristics	Bytes	RG Level Wireline Access Characteristics(see BBF WT-456 [41] and BBF WT-470 [37]). It shall be encoded using base64.
RgWirelineCharacte risticsRm	Bytes	This data type is defined in the same way as the "RgWirelineCharacteristics" data type, but with the OpenAPI "nullable: true" property.
ExtMaxDataBurstVo l	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 = 4096. Maximum = 2000000.
ExtMaxDataBurstVo lRm	Integer	This data type is defined in the same way as the "ExtMaxDataBurstVol" data type, but with the OpenAPI "nullable: true" property.
ExtPacketDelBudge t	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 0.01 milliseconds. Minimum = 1.
ExtPacketDelBudge tRm	Integer	This data type is defined in the same way as the "ExtPacketDelBudget" 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. See NOTE 3.	
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. See NOTE 1, NOTE 2. This IE shall be present for a Delay Critical GBR QoS flow.	
extMaxDataBurstVol	ExtMaxDataBurstVol	C	0..1	Defines the maximum data burst volume. See clause 5.5.2. See NOTE 1, NOTE 2.	
extPacketDelBudget	ExtPacketDelBudget	O	0..1	Defines the packet delay budget. See clause 5.5.2. See NOTE 3.	
cnPacketDelayBudgetDl	ExtPacketDelBudget	O	0..1	Defines the Core Network Packet Delay Budget for downlink. See clause 5.5.2.	
cnPacketDelayBudgetUl	ExtPacketDelBudget	O	0..1	Defines the Core Network Packet Delay Budget for uplink. See clause 5.5.2.	
NOTE 1: Unless specified otherwise in an API: if the maximum data burst volume value to be transmitted is lower than or equal to 4095 Bytes, the maxDataBurst Vol IE shall be set to the maximum data burst volume value to be transmitted and the extMaxDataBurstVol IE shall be omitted. If the maximum data burst volume value to be transmitted is greater than 4095 Bytes, the maxDataBurst Vol IE shall be set to 4095 Bytes and, if ExtMaxDataBurstVol data type is supported by the sender, the extMaxDataBurstVol IE shall be set to the maximum data burst volume value to be transmitted.					
NOTE 2: Unless specified otherwise in an API: if both the maxDataBurstVol IE and the extMaxDataBurstVol IE are received, the value in the extMaxDataBurstVol IE shall be used if the receiver supports ExtMaxDataBurstVol data type, otherwise the value in the maxDataBurstVol IE shall be used.					
NOTE 3: Unless specified otherwise in an API: if both the packetDelayBudget IE and the extPacketDelBudget IE are received, the value in the extPacketDelBudget IE shall be used if the receiver supports ExtPacketDelBudget data type, otherwise the value in the packetDelayBudget IE shall be used.					

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. See NOTE 1, NOTE 2.	
extMaxDataBurstVol	ExtMaxDataBurstVol	C	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 See NOTE 1, NOTE 2.	
cnPacketDelayBudgetDl	ExtPacketDelBudget	O	0..1	Defines the Core Network Packet Delay Budget for downlink. See clause 5.5.2.	
cnPacketDelayBudgetUl	ExtPacketDelBudget	O	0..1	Defines the Core Network Packet Delay Budget for uplink. See clause 5.5.2.	
NOTE 1: Unless specified otherwise in an API: if the maximum data burst volume value to be transmitted is lower than or equal to 4095 Bytes, the maxDataBurst Vol IE shall be set to the maximum data burst volume value to be transmitted and the extMaxDataBurstVol IE shall be omitted. If the maximum data burst volume value to be transmitted is greater than 4095 Bytes, the maxDataBurst Vol IE shall be set to 4095 Bytes and, if ExtMaxDataBurstVol data type is supported by the sender, the extMaxDataBurstVol IE shall be set to the maximum data burst volume value to be transmitted.					
NOTE 2: Unless specified otherwise in an API: if both the maxDataBurstVol IE and the extMaxDataBurstVol IE are received, the value in the extMaxDataBurstVol IE shall be used if the receiver supports ExtMaxDataBurstVol data type, otherwise the value in the maxDataBurstVol IE shall be used.					

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.

5.5.4.7 Void

5.5.4.8 Void

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.

5.6.3.3 Enumeration: JobType

The enumeration JobType defines Job Type in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.3-1.

Table 5.6.3.3-1: Enumeration JobType

Enumeration value	Description
"IMMEDIATE_MDT_ONLY"	Immediate MDT only
"LOGGED_MDT_ONLY"	Logged MDT only
"TRACE_ONLY"	Trace only
"IMMEDIATE_MDT_AND_TRACE"	Immediate MDT and Trace
"RLF_REPORTS_ONLY"	RLF reports only
"RCEF_REPORTS_ONLY"	RCEF reports only
"LOGGED_MBSFN_MDT"	Logged MBSFN MDT

5.6.3.4 Enumeration: ReportTypeMdt

The enumeration ReportTypeMdt defines Report Type for logged MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.4-1.

Table 5.6.3.4-1: Enumeration ReportTypeMdt

Enumeration value	Description
"PERIODICAL"	Periodical
"EVENT_TRIGGED"	Event triggered

5.6.3.5 Enumeration: MeasurementLteForMdt

The enumeration MeasurementLteForMdt defines Measurements used for MDT in LTE in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.5-1.

Table 5.6.3.5-1: Enumeration MeasurementLteForMdt

Enumeration value	Description
"M1"	M1
"M2"	M2
"M3"	M3
"M4_DL"	M4 for DL
"M4_UL"	M4 for UL
"M5_DL"	M5 for DL
"M5_UL"	M5 for UL

5.6.3.6 Enumeration: MeasurementNrForMdt

The enumeration MeasurementNrForMdt defines Measurements used for MDT in NR in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.6-1.

Table 5.6.3.6-1: Enumeration MeasurementNrForMdt

Enumeration value	Description
"M1"	M1
"M2"	M2
"M3"	M3
"M4_DL"	M4 for DL
"M4_UL"	M4 for UL
"M5_DL"	M5 for DL
"M5_UL"	M5 for UL
"M6_DL"	M6 for DL
"M6_UL"	M6 for UL
"M7_DL"	M7 for DL
"M7_UL"	M7 for UL
"M8"	M8
"M9"	M9

5.6.3.7 Enumeration: SensorMeasurement

The enumeration SensorMeasurement defines sensor measurement type for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.7-1.

Table 5.6.3.7-1: Enumeration SensorMeasurement

Enumeration value	Description
"BAROMETRIC_PRESSURE"	Barometric pressure
"UE_SPEED"	UE speed
"UE_ORIENTATION"	UE orientation

5.6.3.8 Enumeration: ReportingTrigger

The enumeration ReportingTrigger defines Reporting Triggers for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.8-1.

Table 5.6.3.8-1: Enumeration ReportingTrigger

Enumeration value	Description
"PERIODICAL"	Periodical
"EVENT_A2"	Event A2 for LTE
"EVENT_A2_PERIODIC"	A2 event triggered periodic for LTE
"ALL_RRM_EVENT_TRIGGERS"	All configured RRM event triggers for LTE

5.6.3.9 Enumeration: ReportIntervalMdt

The enumeration ReportIntervalMdt defines Report Interval for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.9-1.

Table 5.6.3.9-1: Enumeration ReportIntervalMdt

Enumeration value	Description
"120"	120 ms
"240"	240 ms
"480"	480 ms
"640"	640 ms
"1024"	1024 ms
"2048"	2048 ms
"5120"	5120 ms
"10240"	10240ms
"60000"	1 min=60000 ms
"360000"	6 min=360000 ms
"720000"	12 min=720000 ms
"1800000"	30 min=1800000 ms
"3600000"	60 min=3600000 ms

5.6.3.10 Enumeration: ReportAmountMdt

The enumeration ReportAmountMdt defines Report Amount for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.10-1.

Table 5.6.3.x8-1: Enumeration ReportAmountMdt

Enumeration value	Description
"1"	1
"2"	2
"4"	4
"8"	8
"16"	16
"32"	32
"64"	64
"infinity"	Infinity

5.6.3.11 Enumeration: EventForMdt

The enumeration EventForMdt defines events triggered measurement for logged MDT in the trace. See
3GPP TS 32.422 [19] for further description of the values. It shall comply with the provisions defined in table 5.6.3.11-1.

Table 5.6.3.11-1: Enumeration EventForMdt

Enumeration value	Description
"OUT_OF_COVERAGE"	Out of coverage
"A2_EVENT"	A2 event

5.6.3.12 Enumeration: LoggingIntervalMdt

The enumeration LoggingIntervalMdt defines Logging Interval for MDT in the trace. See 3GPP TS 32.422 [19] for
further description of the values. It shall comply with the provisions defined in table 5.6.3.12-1.

Table 5.6.3.12-1: Enumeration LoggingIntervalMdt

Enumeration value	Description
"128"	1.28
"256"	2.56
"512"	5.12
"1024"	10.24
"2048"	20.48
"3072"	30.72
"4096"	40.96
"6144"	61.44

5.6.3.13 Enumeration: LoggingDurationMdt

The enumeration LoggingDurationMdt defines Logging Duration for MDT in the trace. See 3GPP TS 32.422 [19] for
further description of the values. It shall comply with the provisions defined in table 5.6.3.13-1.

Table 5.6.3.13-1: Enumeration LoggingDurationMdt

Enumeration value	Description
"600"	600 sec
"1200"	1200 sec
"2400"	2400 sec
"3600"	3600 sec
"5400"	5400 sec
"7200"	7200 sec

5.6.3.14 Enumeration: PositioningMethodMdt

The enumeration PositioningMethodMdt defines Positioning Method for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provions defined in table 5.6.3.14-1.

Table 5.6.3.14-1: Enumeration PositioningMethodMdt

Enumeration value	Description
"GNSS"	GNSS
"E_CELL_ID"	E-Cell ID

5.6.3.15 Enumeration: CollectionPeriodRmmLteMdt

The enumeration CollectionPeriodRmmLteMdt defines Collection period for RRM measurements LTE for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provions defined in table 5.6.3.15-1.

Table 5.6.3.15-1: Enumeration CollectionPeriodRmmLteMdt

Enumeration value	Description
"1024"	1024 ms
"1280"	1280 ms
"2048"	2048 ms
"2560"	2560 ms
"5120"	5120 ms
"10240"	10240 ms
"60000"	1 min

5.6.3.16 Enumeration: MeasurementPeriodLteMdt

The enumeration MeasurementPeriodLteMdt defines Measurement period LTE for MDT in the trace. See 3GPP TS 32.422 [19] for further description of the values. It shall comply with the provions defined in table 5.6.3.16-1.

Table 5.6.3.16-1: Enumeration MeasurementPeriodLteMdt

Enumeration value	Description
"1024"	1024 ms
"1280"	1280 ms
"2048"	2048 ms
"2560"	2560 ms
"5120"	5120 ms
"10240"	10240 ms
"60000"	1 min

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", "a" to "f" 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}$'
traceDepth	TraceDepth	M	1	Trace Depth (see 3GPP TS 32.422 [19]).
neTypeList	string	M	1	List of NE Types (see 3GPP TS 32.422 [19]). It shall be encoded as an octet string in hexadecimal representation. Each character in the string shall take a value of "0" to "9", "a" to "f" or "A" to "F" and shall represent 4 bits. The most significant character representing the 4 most significant bits shall appear first in the string, and the character representing the 4 least significant bit shall appear last in the string. Octets shall be coded according to 3GPP TS 32.422 [19]. Pattern: '^[A-Fa-f0-9]+$'
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", "a" to "f" 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", "a" to "f" 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]+$'

5.6.4.2   Type: MdtConfiguration

Table 5.6.4.2-1: Definition of type MdtConfiguration

Attribute name	Data type	P	Cardinality	Description
jobType	JobType	M	1	This IE shall indicate the Job type for MDT, see 3GPP TS 32.422 [19].
reportType	ReportTypeMdt	C	0..1	This IE shall be present for logged MDT. When present, this IE shall indicate the report type for logged MDT, see 3GPP TS 32.422 [19].
areaScope	AreaScope	O	0..1	When present, this IE shall contain the area in Cells or Tracking Areas where the MDT data collection shall take place, see 3GPP TS 32.422 [19].
measurementLteList	array(MeasurementLteForMdt)	C	1..N	This IE shall be present if the Job type is configured for Immediate MDT or combined Immediate MDT and Trace. When present, this IE shall contain a list of the measurements that shall be collected for LTE.
measurementNrList	array(MeasurementNrForMdt)	C	1..N	This IE shall be present if the Job type is configured for Immediate MDT or combined Immediate MDT and Trace. When present, this IE shall contain a list of the measurements that shall be collected for NR.
sensorMeasurementList	array(SensorMeasurement)	O	1..N	When present, this IE shall include a list o the sensor measurements to be collected for UE if they are available.
reportingTriggerList	array(ReportingTrigger)	C	1..N	This IE shall be present if MeasurementList is configured for UE side measurements (such as M1 measurement in LTE) and the jobType is configured for Immediate MDT or combined Immediate MDT and Trace. When present, this IE shall contain a list of the reporting triggers. For LTE, this IE shall not have the combination of periodical, event based and event based periodic reporting at the same time.
reportInterval	ReportIntervalMdt	C	0..1	This IE shall be present if the reportingTriggerList is configured for Periodic UE side measurements (such as M1 measurement in LTE) and the jobType is configured for Immediate MDT or combined Immediate MDT and Trace. When present, this IE shall indicate the interval between the periodical measurements to be taken when UE is in connected.
reportAmount	ReportAmountMdt	C	0..1	This IE shall be present if the reportingTriggerList is configured for Periodic UE side measurements (such as M1 measurement in LTE) and the jobType is configured for Immediate MDT or combined Immediate MDT and Trace. When present, this IE shall indicate the number of measurement reports that shall be taken for periodical reporting while UE is in connected.
eventThresholdRsrp	integer	C	0..1	This IE shall be present if the report trigger parameter is configured for A2 event reporting or A2 event triggered periodic reporting and the job type parameter is configured for Immediate MDT or combined Immediate MDT and Trace. When present, this IE shall indicate the Event Threshold for RSRP, and the value shall be between 0-97.
eventThresholdRsrq	integer	C	0..1	This IE shall be present if the report trigger parameter is configured for A2 event reporting or A2 event triggered periodic reporting and the job type parameter is configured for Immediate MDT or combined Immediate MDT and Trace. When present, this IE shall indicate the Event Threshold for RSRQ, and the value shall be between 0-34.
eventList	array(EventForMdt)	C	1..N	This IE shall be present for event triggered measurement in the case of logged MDT. When present, this IE shall contain a list of events triggered measurement.

loggingInterval	LoggingIntervalM dt	C	0..1	This IE shall be present if the job type is configured for Logged MDT or Logged MBSFN MDT. When present, this IE shall contain the periodicity for logging MDT measurement results for periodic downlink pilot strength measurement when UE is in Idle.
loggingDuration	LoggingDuration Mdt	O	0..1	This IE shall be present if the job type parameter is configured for Logged MDT or Logged MBSFN MDT. When present, this IE shall indicate the validity time of MDT logged configuration for IDLE
positioningMethod	PositioningMetho dMdt	O	0..1	This IE may be present if the job type is set to Immediate MDT or Immediate MDT and Trace. When present, it shall indicate the positioning method that shall be used for the MDT job. The attribute is applicable only for LTE. The value "GNSS" may be selected only if the M1 measurement is selected in measurementList.
collectionPeriodRmm Lte	CollectionPeriod RmmLteMdt	C	0..1	This IE shall be present if the job type is set to Immediate MDT or Immediate MDT and Trace and any of the "M2" or "M3" is contained in measurementList attribute in LTE. When present, it shall contain the collection period that should be used to collect available measurement samples in case of RRM configured measurements. The same collection period should be used for all such measurements that are requested in the same MDT or combined Trace and MDT job.
measurementPeriod Lte	MeasurementPeri odLteMdt	C	0..1	This IE shall be present if the job type is set to Immediate MDT or Immediate MDT and Trace and either the value "M4_DL" or "M4_UL" or "M5_DL" or "M5_UL" is contained in measurementList attribute in LTE. When present, it shall contain the collection period that should be used for the Data Volume and Scheduled IP Throughput measurements made by the eNB. The same measurement period should be used for the UL and DL.
mdtAllowedPlmnIdLi st	array(PlmnId)	O	1..N	When present, this IE shall contain the PLMNs where measurement collection, status indication and log reporting is allowed. E.g. the UE performs these actions for Logged MDT when the RPLMN is part of this set of PLMNs. Maximum of 16 PLMNs can be contained.
mbsfnAreaList	array(MbsfnArea)	O	1..N	When present, this IE shall contain MBSFN Area(s) for MBSFN measurement logging. Maximum of 8 MBSFN area(s) can be contained. This parameter is applicable only if the job type is Logged MBSFN MDT and for eUTRAN only.

5.6.4.3 Type: AreaScope

Table 5.6.4.3-1: Definition of type AreaScope

Attribute name	Data type	P	Cardinality	Description
eutraCellIdList	array(EutraCellId)	O	1..N	When present, this IE shall contain a list of the E-UTRAN Cell Identifications where the MDT data collection shall take place.
nrCellIdList	array(NrCellId)	O	1..N	When present, this IE shall contain a list of the NR Cell Identities where the MDT data collection shall take place.
tacList	array(Tac)	O	1..N	When present, this IE shall contain a list of the tracking area codes where the MDT data collection shall take place.
tacInfoPerPlmn	map(TacInfo)	O	1..N	A map (list of key-value pairs where PlmnId converted to string serves as key; see clause 5.4.4.3) of TacInfo

5.6.4.4 Type: TacInfo

Table 5.6.4.4-1: Definition of type TacInfo

Attribute name	Data type	P	Cardinality	Description
tacList	array(Tac)	M	1..N	This IE shall contain a list of the tracking area codes.

5.6.4.5 Type: MbsfnArea

Table 5.6.4.5-1: Definition of type MbsfnArea

Attribute name	Data type	P	Cardinality	Description
mbsfnAreaId	integer	O	0..1	This IE shall contain the MBSFN Area ID. The range of the value is from 0 to 255, see 3GPP TS 36.331 [39].
carrierFrequency	integer	O	0..1	When present, this IE shall contain the Carrier Frequency (EARFCN). The range of the value is from 0 to 262143, see 3GPP TS 36.331 [39].
NOTE				If both mbsfnAreaId and carrierFrequency values are present, a specific MBSFN area is indicated. If carrierFrequency is present, but mbsfnAreaId is absent, all MBSFN areas on that carrier frequency are indicated. If both mbsfnAreaId and carrierFrequency are absent, any MBSFN area is indicated.

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

5.7.3.2   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 5.7.3.2-1.

Table 5.7.3.2-1: 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
ApplicationCharging Id	string	Application provided 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 a Git-based repository hosted in ETSI Forge, that uses the GitLab software version control system (see 3GPP TS 29.501 [2] clause 5.3.1 and 3GPP TR 21.900 [27] clause 5B)

A.2 Data related to Common Data Types

```
openapi: 3.0.0

info:
  version: '1.2.1'
  title: 'Common Data Types'
  description: |
    Common Data Types for Service Based Interfaces.
    © 2020, 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 16.5.0
  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
      Ipv4AddrMask:
        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])(\/([0-9]|[1-2][0-9]|3[0-2]))$'
        example: '198.51.0.0/16'
      Ipv4AddrMaskRm:
        type: string
        pattern: '^(([0-9]|[1-9][0-9]|1[0-9][0-9]|2[0-4][0-9]|25[0-5])\.){3}([0-9]|[1-9][0-9]|1[0-
9][0-9]|2[0-4][0-9]|25[0-5])(\/([0-9]|[1-2][0-9]|3[0-2]))$'
        example: '198.51.0.0/16'
        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]*$'
    Uinteger:
      type: integer
      minimum: 0
    UintegerRm:
      type: integer
      minimum: 0
      nullable: true
    Uint16:
      type: integer
      minimum: 0
      maximum: 65535
    Uint16Rm:
      type: integer
      minimum: 0
      maximum: 65535
      nullable: true
    Uint32:
      type: integer
      minimum: 0
      maximum: 4294967295 #(2^32)-1
    Uint32Rm:
      format: int32
      type: integer
      minimum: 0
      maximum: 4294967295 #(2^32)-1
      nullable: true
    Uint64:
      type: integer
      minimum: 0
      maximum: 18446744073709551615 #(2^64)-1
    Uint64Rm:
      type: integer
      minimum: 0
      maximum: 18446744073709551615 #(2^64)-1
      nullable: true
    Uri:
      type: string
    UriRm:
      type: string
      nullable: true
    VarUeId:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|gci-.+|gli-.+|.+)$'
    VarUeIdRm:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|msisdn-[0-9]{5,15}|extid-[^@]+@[^@]+|gci-.+|gli-.+|.+)$'
      nullable: true
```

```
    TimeZone:
      type: string
    TimeZoneRm:
      type: string
      nullable: true
    StnSr:
      type: string
    StnSrRm:
      type: string
      nullable: true
    CMsisdn:
      type: string
      pattern: '^[0-9]{5,15}$'
    CMsisdnRm:
      type: string
      pattern: '^[0-9]{5,15}$'
      nullable: true
    DayOfWeek:
      type: integer
      minimum: 1
      maximum: 7
      description: integer between and including 1 and 7 denoting a weekday. 1 shall indicate
Monday, and the subsequent weekdays shall be indicated with the next higher numbers. 7 shall
indicate Sunday.
    TimeOfDay:
      type: string
      description: String with format partial-time or full-time as defined in clause 5.6 of IETF RFC
3339. Examples, 20:15:00, 20:15:00-08:00 (for 8 hours behind UTC).
#
#    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
    HttpMethod:
      anyOf:
        - type: string
          enum:
            - GET
            - POST
            - PUT
            - DELETE
            - PATCH
            - OPTIONS
            - HEAD
            - CONNECT
            - TRACE
        - type: string
    NullValue:
      enum:
        - null

#
```

```
#   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'
        targetScp:
          $ref: '#/components/schemas/Uri'
    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: {}
      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
```

```
    PatchResult:
      type: object
      required:
        - report
      properties:
       report:
        type: array
        items:
          $ref: '#/components/schemas/ReportItem'
        minItems: 1
    ReportItem:
      type: object
      required:
        - path
      properties:
        path:
          type: string
    HalTemplate:
      type: object
      required:
        - method
      properties:
        title:
          type: string
        method:
          $ref: '#/components/schemas/HttpMethod'
        contentType:
          type: string
        properties:
          type: array
          items:
            $ref: '#/components/schemas/Property'
          minItems: 1
    Property:
      type: object
      required:
        - name
      properties:
        name:
          type: string
        required:
          type: boolean
        regex:
          type: string
        value:
          type: string



#
# 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
    WildcardDnn:
      type: string
      pattern: '^[*]$'
    WildcardDnnRm:
      type: string
      pattern: '^[*]$'
      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
    ExternalGroupId:
      type: string
      pattern: '^extgroupid-[^@]+@[^@]+$'
    ExternalGroupIdRm:
      type: string
      pattern: '^extgroupid-[^@]+@[^@]+$'
      nullable: true
    Pei:
      type: string
      pattern: '^(imei-[0-9]{15}|imeisv-[0-9]{16}|mac((-[0-9a-fA-F]{2}){6})(-untrusted)?|eui((-[0-
9a-fA-F]{2}){8})|.+)$'
    PeiRm:
      type: string
      pattern: '^(imei-[0-9]{15}|imeisv-[0-9]{16}|mac((-[0-9a-fA-F]{2}){6})(-untrusted)?|eui((-[0-
9a-fA-F]{2}){8})|.+)$'
      nullable: true
    Supi:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|gci-.+|gli-.+|.+)$'
    SupiRm:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|gci-.+|gli-.+|.+)$'
      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}$'
    RfspIndex:
      type: integer
      minimum: 1
      maximum: 256
    RfspIndexRm:
      type: integer
      minimum: 1
      maximum: 256
      nullable: true
    NfGroupId:
      type: string
    MtcProviderInformation:
      type: string
    CagId:
      type: string
      pattern: '^[A-Fa-f0-9]{8}$'
    SupiOrSuci:
      type: string
      pattern: '^(imsi-[0-9]{5,15}|nai-.+|gli-.+|gci-.+|suci-(0-[0-9]{3}-[0-9]{2,3}|[1-7]-.+)-[0-
9]{1,4}-(0-0-.+|[a-fA-F1-9]-([1-9]|[1-9][0-9]|1[0-9]{2}|2[0-4][0-9]|25[0-5])-[a-fA-F0-9]+)|.+)$'

#
# STRUCTURED DATA TYPES
#
    Guami:
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnIdNid'
        amfId:
          $ref: '#/components/schemas/AmfId'
      required:
        - plmnId
        - amfId
    GuamiRm:
      anyOf:
        - $ref: '#/components/schemas/Guami'
        - $ref: '#/components/schemas/NullValue'
```

```
    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:
      $ref: '#/components/schemas/Uinteger'
    AmfName:
      type: string
    AreaCode:
      type: string
    AreaCodeRm:
      type: string
      nullable: true
    N3IwfId:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
    WAgfId:
```

```
      type: string
      pattern: '^[A-Fa-f0-9]+$'
    TngfId:
      type: string
      pattern: '^[A-Fa-f0-9]+$'
    NgeNbId:
      type: string
      pattern: '^(MacroNGeNB-[A-Fa-f0-9]{5}|LMacroNGeNB-[A-Fa-f0-9]{6}|SMacroNGeNB-[A-Fa-f0-9]{5})$'
    Nid:
      type: string
      pattern: '^[A-Fa-f0-9]{11}$'
    NidRm:
      type: string
      pattern: '^[A-Fa-f0-9]{11}$'
      nullable: true
    NfSetId:
      type: string
    NfServiceSetId:
      type: string
    PlmnAssiUeRadioCapId:
      $ref: '#/components/schemas/Bytes'
    ManAssiUeRadioCapId:
      $ref: '#/components/schemas/Bytes'
    TypeAllocationCode:
      type: string
      pattern: '^[0-9]{8}$'
    HfcNId:
      type: string
      maxLength: 6
    HfcNIdRm:
      type: string
      maxLength: 6
      nullable: true
    ENbId:
      type: string
      pattern: '^(MacroeNB-[A-Fa-f0-9]{5}|LMacroeNB-[A-Fa-f0-9]{6}|SMacroeNB-[A-Fa-f0-9]{5}|HomeeNB-
[A-Fa-f0-9]{7})$'
    Gli:
      $ref: '#/components/schemas/Bytes'
    Gci:
      type: string

#
# ENUMERATED DATA TYPES
#

    AccessType:
      type: string
      enum:
        - 3GPP_ACCESS
        - NON_3GPP_ACCESS
    AccessTypeRm:
      anyOf:
        - $ref: '#/components/schemas/AccessType'
        - $ref: '#/components/schemas/NullValue'
    RatType:
      anyOf:
        - type: string
          enum:
            - NR
            - EUTRA
            - WLAN
            - VIRTUAL
            - NBIOT
            - WIRELINE
            - WIRELINE_CABLE
            - WIRELINE_BBF
            - LTE-M
            - NR_U
            - EUTRA_U
            - TRUSTED_N3GA
            - TRUSTED_WLAN
            - UTRA
            - GERA
        - type: string
    RatTypeRm:
      anyOf:
        - $ref: '#/components/schemas/RatType'
```

```
            - $ref: '#/components/schemas/NullValue'
      PduSessionType:
        anyOf:
        - type: string
          enum:
            - IPV4
            - IPV6
            - IPV4V6
            - UNSTRUCTURED
            - ETHERNET
        - type: string
      PduSessionTypeRm:
        anyOf:
        - $ref: '#/components/schemas/PduSessionType'
        - $ref: '#/components/schemas/NullValue'
      UpIntegrity:
        anyOf:
        - type: string
          enum:
            - REQUIRED
            - PREFERRED
            - NOT_NEEDED
        - type: string
      UpIntegrityRm:
        anyOf:
        - $ref: '#/components/schemas/UpIntegrity'
        - $ref: '#/components/schemas/NullValue'
      UpConfidentiality:
        anyOf:
        - type: string
          enum:
            - REQUIRED
            - PREFERRED
            - NOT_NEEDED
        - type: string
      UpConfidentialityRm:
        anyOf:
        - $ref: '#/components/schemas/UpConfidentiality'
        - $ref: '#/components/schemas/NullValue'
      SscMode:
        anyOf:
        - type: string
          enum:
            - SSC_MODE_1
            - SSC_MODE_2
            - SSC_MODE_3
        - type: string
      SscModeRm:
        anyOf:
        - $ref: '#/components/schemas/SscMode'
        - $ref: '#/components/schemas/NullValue'
      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:
        - $ref: '#/components/schemas/DnaiChangeType'
        - $ref: '#/components/schemas/NullValue'
      RestrictionType:
        anyOf:
        - type: string
          enum:
            - ALLOWED_AREAS
```

```
                - NOT_ALLOWED_AREAS
            - type: string
    RestrictionTypeRm:
      anyOf:
        - $ref: '#/components/schemas/RestrictionType'
        - $ref: '#/components/schemas/NullValue'
    CoreNetworkType:
      anyOf:
        - type: string
          enum:
            - 5GC
            - EPC
        - type: string
    CoreNetworkTypeRm:
      anyOf:
        - $ref: '#/components/schemas/CoreNetworkType'
        - $ref: '#/components/schemas/NullValue'
    PresenceState:
      anyOf:
        - type: string
          enum:
            - IN_AREA
            - OUT_OF_AREA
            - UNKNOWN
            - INACTIVE
        - type: string
    StationaryIndication:
      anyOf:
       - type: string
          enum:
            - STATIONARY
            - MOBILE
       - 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
           - STATIONARY: Identifies the UE is stationary
           - MOBILE: Identifies the UE is mobile
    StationaryIndicationRm:
      anyOf:
        - $ref: '#/components/schemas/StationaryIndication'
        - $ref: '#/components/schemas/NullValue'
    ScheduledCommunicationType:
      anyOf:
        - type: string
          enum:
            - DOWNLINK_ONLY
            - UPLINK_ONLY
            - BIDIRECTIONAL
        - type: string
    ScheduledCommunicationTypeRm:
      anyOf:
        - $ref: '#/components/schemas/ScheduledCommunicationType'
        - $ref: '#/components/schemas/NullValue'
    TrafficProfile:
      anyOf:
       - type: string
          enum:
            - SINGLE_TRANS_UL
            - SINGLE_TRANS_DL
            - DUAL_TRANS_UL_FIRST
            - DUAL_TRANS_DL_FIRST
            - MULTI_TRANS
       - 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
           - SINGLE_TRANS_UL: Uplink single packet transmission.
           - SINGLE_TRANS_DL: Downlink single packet transmission.
           - DUAL_TRANS_UL_FIRST: Dual packet transmission, firstly uplink packet transmission with
subsequent downlink packet transmission.
```

```
                - DUAL_TRANS_DL_FIRST: Dual packet transmission, firstly downlink packet transmission with
subsequent uplink packet transmission.
    TrafficProfileRm:
      anyOf:
        - $ref: '#/components/schemas/TrafficProfile'
        - $ref: '#/components/schemas/NullValue'
    LcsServiceAuth:
      anyOf:
        - type: string
          enum:
            - "LOCATION_ALLOWED_WITH_NOTIFICATION"
            - "LOCATION_ALLOWED_WITHOUT_NOTIFICATION"
            - "LOCATION_ALLOWED_WITHOUT_RESPONSE"
            - "LOCATION_RESTRICTED_WITHOUT_RESPONSE"
            - "NOTIFICATION_ONLY"
            - "NOTIFICATION_AND_VERIFICATION_ONLY"
        - 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
        - "LOCATION_ALLOWED_WITH_NOTIFICATION": Location allowed with notification
        - "LOCATION_ALLOWED_WITHOUT_NOTIFICATION": Location allowed without notification
        - "LOCATION_ALLOWED_WITHOUT_RESPONSE": Location with notification and privacy verification;
location allowed if no response
        - "LOCATION_RESTRICTED_WITHOUT_RESPONSE": Location with notification and privacy
verification; location restricted if no response
        - "NOTIFICATION_ONLY": Notification only
        - "NOTIFICATION_AND_VERIFICATION_ONLY": Notification and privacy verification only
    UeAuth:
      anyOf:
        - type: string
          enum:
            - AUTHORIZED
            - NOT_AUTHORIZED
        - type: string
    DlDataDeliveryStatus:
      anyOf:
        - type: string
          enum:
            - BUFFERED
            - TRANSMITTED
            - DISCARDED
        - 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
        - BUFFERED: The first downlink data is buffered with extended buffering matching the source
of the downlink traffic.
        - TRANSMITTED: The first downlink data matching the source of the downlink traffic is
transmitted after previous buffering or discarding of corresponding packet(s) because the UE of the
PDU Session becomes ACTIVE, and buffered data can be delivered to UE.
        - DISCARDED: The first downlink data matching the source of the downlink traffic is
discarded because the Extended Buffering time, as determined by the SMF, expires or the amount of
downlink data to be buffered is exceeded.
    DlDataDeliveryStatusRm:
      anyOf:
        - $ref: '#/components/schemas/DlDataDeliveryStatus'
        - $ref: '#/components/schemas/NullValue'
    AuthStatus:
      anyOf:
        - type: string
          enum:
            - EAP_SUCCESS
            - EAP_FAILURE
            - PENDING
        - 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
```

```
                - "EAP_SUCCESS": The NSSAA status is EAP-Success.
                - "EAP_FAILURE": The NSSAA status is EAP-Failure.
                - "PENDING": The NSSAA status is Pending.

#
# 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:
      anyOf:
        - $ref: '#/components/schemas/PlmnId'
        - $ref: '#/components/schemas/NullValue'
    Tai:
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        tac:
          $ref: '#/components/schemas/Tac'
        nid:
          $ref: '#/components/schemas/Nid'
      required:
        - plmnId
        - tac
    TaiRm:
      anyOf:
        - $ref: '#/components/schemas/Tai'
        - $ref: '#/components/schemas/NullValue'
    Ecgi:
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
          # PLMN Identity
        eutraCellId:
          $ref: '#/components/schemas/EutraCellId'
        nid:
          $ref: '#/components/schemas/Nid'
      required:
        - plmnId
        - eutraCellId
    EcgiRm:
      anyOf:
        - $ref: '#/components/schemas/Ecgi'
        - $ref: '#/components/schemas/NullValue'
    Ncgi:
      type: object
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        nrCellId:
          $ref: '#/components/schemas/NrCellId'
        nid:
          $ref: '#/components/schemas/Nid'
      required:
```

```
          - plmnId
          - nrCellId
      NcgiRm:
        anyOf:
          - $ref: '#/components/schemas/Ncgi'
          - $ref: '#/components/schemas/NullValue'
      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'
          ignoreEcgi:
            type: boolean
            default: false
          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'
          globalENbId:
            $ref: '#/components/schemas/GlobalRanNodeId'
        required:
          - tai
          - ecgi
      EutraLocationRm:
        anyOf:
          - $ref: '#/components/schemas/EutraLocation'
          - $ref: '#/components/schemas/NullValue'
      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:
       anyOf:
          - $ref: '#/components/schemas/NrLocation'
          - $ref: '#/components/schemas/NullValue'
      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'
        tnapId:
          $ref: '#/components/schemas/TnapId'
        twapId:
          $ref: '#/components/schemas/TwapId'
        hfcNodeId:
          $ref: '#/components/schemas/HfcNodeId'
        gli:
          $ref: '#/components/schemas/Gli'
        w5gbanLineType:
          $ref: '#/components/schemas/LineType'
        gci:
          $ref: '#/components/schemas/Gci'
    UpSecurity:
      type: object
      properties:
        upIntegr:
          $ref: '#/components/schemas/UpIntegrity'
        upConfid:
          $ref: '#/components/schemas/UpConfidentiality'
      required:
        - upIntegr
        - upConfid
    UpSecurityRm:
      anyOf:
        - $ref: '#/components/schemas/UpSecurity'
        - $ref: '#/components/schemas/NullValue'
    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:
      anyOf:
        - $ref: '#/components/schemas/RefToBinaryData'
        - $ref: '#/components/schemas/NullValue'
    RouteToLocation:
      type: object
      properties:
        dnai:
          $ref: '#/components/schemas/Dnai'
        routeInfo:
          $ref: '#/components/schemas/RouteInformation'
```

ETSI

```
            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 ]
WirelineArea:
  type: object
  properties:
    globalLineIds:
      type: array
      items:
        $ref: '#/components/schemas/Gli'
      minItems: 1
    hfcNIds:
      type: array
      items:
        $ref: '#/components/schemas/HfcNId'
      minItems: 1
    areaCodeB:
      $ref: '#/components/schemas/AreaCode'
    areaCodeC:
      $ref: '#/components/schemas/AreaCode'
WirelineServiceAreaRestriction:
  type: object
  properties:
    restrictionType:
      $ref: '#/components/schemas/RestrictionType'
    areas:
      type: array
      items:
        $ref: '#/components/schemas/WirelineArea'
PresenceInfo:
  type: object
  properties:
    praId:
      type: string
    additionalPraId:
      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
    globaleNbIdList:
      type: array
      items:
        $ref: '#/components/schemas/GlobalRanNodeId'
      minItems: 1
```

```
    PresenceInfoRm:
      type: object
      properties:
        praId:
          type: string
        additionalPraId:
          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'
        globaleNbIdList:
          type: array
          items:
            $ref: '#/components/schemas/GlobalRanNodeId'
          minItems: 1
      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'
        wagfId:
          $ref: '#/components/schemas/WAgfId'
        tngfId:
          $ref: '#/components/schemas/TngfId'
        nid:
          $ref: '#/components/schemas/Nid'
        eNbId:
          $ref: '#/components/schemas/ENbId'
      oneOf:
        - required: [ n3IwfId ]
        - required: [ gNbId ]
        - required: [ ngeNbId ]
        - required: [ wagfId ]
        - required: [ tngfId ]
        - required: [ eNbId ]
      required:
        - plmnId
    GNbId:
      type: object
      properties:
        bitLength:
          type: integer
          minimum: 22
          maximum: 32
        gNBValue:
          type: string
          pattern: '^[A-Fa-f0-9]{6,8}$'
      required:
        - bitLength
        - gNBValue
    AtsssCapability:
      type: object
      properties:
```

```
        atsssLL:
          type: boolean
          default: false
        mptcp:
          type: boolean
          default: false
        rttWithoutPmf:
          type: boolean
          default: false
    PlmnIdNid:
      type: object
      required:
        - mcc
        - mnc
      properties:
        mcc:
          $ref: '#/components/schemas/Mcc'
        mnc:
          $ref: '#/components/schemas/Mnc'
        nid:
          $ref: '#/components/schemas/Nid'
    SmallDataRateStatus:
      type: object
      properties:
        remainPacketsUl:
          type: integer
          minimum: 0
        remainPacketsDl:
          type: integer
          minimum: 0
        validityTime:
          $ref: '#/components/schemas/DateTime'
        remainExReportsUl:
          type: integer
          minimum: 0
        remainExReportsDl:
          type: integer
          minimum: 0
    ApnRateStatus:
      type: object
      properties:
        remainPacketsUl:
          type: integer
          minimum: 0
        remainPacketsDl:
          type: integer
          minimum: 0
        validityTime:
          $ref: '#/components/schemas/DateTime'
        remainExReportsUl:
          type: integer
          minimum: 0
        remainExReportsDl:
          type: integer
          minimum: 0
    HfcNodeId:
      type: object
      required:
        - hfcNId
      properties:
        hfcNId:
          $ref: '#/components/schemas/HfcNId'
    HfcNodeIdRm:
     anyOf:
        - $ref: '#/components/schemas/HfcNodeId'
        - $ref: '#/components/schemas/NullValue'
    ScheduledCommunicationTime:
      type: object
      properties:
        daysOfWeek:
          type: array
          items:
            $ref: '#/components/schemas/DayOfWeek'
          minItems: 1
          maxItems: 6
          description: Identifies the day(s) of the week. If absent, it indicates every day of the
week.
        timeOfDayStart:
```

```
              $ref: '#/components/schemas/TimeOfDay'
            timeOfDayEnd:
              $ref: '#/components/schemas/TimeOfDay'
    ScheduledCommunicationTimeRm:
      anyOf:
        - $ref: '#/components/schemas/ScheduledCommunicationTime'
        - $ref: '#/components/schemas/NullValue'
    BatteryIndication:
      type: object
      properties:
        batteryInd:
          type: boolean
        replaceableInd:
          type: boolean
        rechargeableInd:
          type: boolean
    BatteryIndicationRm:
      anyOf:
        - $ref: '#/components/schemas/BatteryIndication'
        - $ref: '#/components/schemas/NullValue'
    AcsInfo:
      type: object
      properties:
        acsUrl:
          $ref: '#/components/schemas/Uri'
        acsIpv4Addr:
          $ref: '#/components/schemas/Ipv4Addr'
        acsIpv6Addr:
          $ref: '#/components/schemas/Ipv6Addr'
    AcsInfoRm:
      anyOf:
        - $ref: '#/components/schemas/AcsInfo'
        - $ref: '#/components/schemas/NullValue'
    NrV2xAuth:
      type: object
      properties:
        vehicleUeAuth:
          $ref: '#/components/schemas/UeAuth'
        pedestrianUeAuth:
          $ref: '#/components/schemas/UeAuth'
    LteV2xAuth:
      type: object
      properties:
        vehicleUeAuth:
          $ref: '#/components/schemas/UeAuth'
        pedestrianUeAuth:
          $ref: '#/components/schemas/UeAuth'
    Pc5QoSPara:
      type: object
      required:
        - pc5QosFlowList
      properties:
        pc5QosFlowList:
          type: array
          items:
            $ref: '#/components/schemas/Pc5QosFlowItem'
        pc5LinkAmbr:
          $ref: '#/components/schemas/BitRate'
    Pc5QosFlowItem:
      type: object
      required:
        - pqi
      properties:
        pqi:
          $ref: '#/components/schemas/5Qi'
        pc5FlowBitRates:
          $ref: '#/components/schemas/Pc5FlowBitRates'
        range:
          $ref: '#/components/schemas/Uinteger'
    Pc5FlowBitRates:
      type: object
      properties:
        guaFbr:
          $ref: '#/components/schemas/BitRate'
        maxFbr:
          $ref: '#/components/schemas/BitRate'
    UtraLocation:
      type: object
```

```
        oneOf:
          - required:
            - cgi
          - required:
            - sai
          - required:
            - rai
        properties:
          cgi:
            $ref: '#/components/schemas/CellGlobalId'
          sai:
            $ref: '#/components/schemas/ServiceAreaId'
          lai:
            $ref: '#/components/schemas/LocationAreaId'
          rai:
            $ref: '#/components/schemas/RoutingAreaId'
          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}$'
    GeraLocation:
      type: object
      oneOf:
        - required:
          - cgi
        - required:
          - sai
        - required:
          - rai
      properties:
        locationNumber:
          type: string
        cgi:
          $ref: '#/components/schemas/CellGlobalId'
        sai:
          $ref: '#/components/schemas/ServiceAreaId'
        lai:
          $ref: '#/components/schemas/LocationAreaId'
        vlrNumber:
          type: string
        mscNumber:
          type: string
        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}$'
    CellGlobalId:
      type: object
      required:
        - plmnId
        - lac
        - cellId
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        lac:
          type: string
        cellId:
          type: string
          pattern: '^[A-Fa-f0-9]$'
    ServiceAreaId:
      type: object
```

```
        required:
          - plmnId
          - lac
          - sac
        properties:
          plmnId:
            $ref: '#/components/schemas/PlmnId'
          lac:
            type: string
            pattern: '^[A-Fa-f0-9]$'
          sac:
            type: string
            pattern: '^[A-Fa-f0-9]$'
    LocationAreaId:
      type: object
      required:
        - plmnId
        - lac
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        lac:
          type: string
          pattern: '^[A-Fa-f0-9]$'
    RoutingAreaId:
      type: object
      required:
        - plmnId
        - lac
        - rac
      properties:
        plmnId:
          $ref: '#/components/schemas/PlmnId'
        lac:
          type: string
          pattern: '^[A-Fa-f0-9]$'
        rac:
          type: string
          pattern: '^[A-Fa-f0-9]$'
    DddTrafficDescriptor:
      type: object
      properties:
        ipv4Addr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv4Addr'
        ipv6Addr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Ipv6Addr'
        portNumber:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/Uinteger'
        macAddr:
          $ref: 'TS29571_CommonData.yaml#/components/schemas/MacAddr48'
    MoExpDataCounter:
      type: object
      required:
        - counter
      properties:
        counter:
          type: integer
        timeStamp:
          $ref: '#/components/schemas/DateTime'
    NssaaStatus:
      type: object
      required:
        - snssai
        - status
      properties:
        snssai:
          $ref: '#/components/schemas/Snssai'
        status:
          $ref: '#/components/schemas/AuthStatus'
    NssaaStatusRm:
      anyOf:
        - $ref: '#/components/schemas/NssaaStatus'
        - $ref: '#/components/schemas/NullValue'
    TnapId:
      type: object
      properties:
        ssId:
          type: string
```

```
            bssId:
              type: string
            civicAddress:
              $ref: '#/components/schemas/Bytes'
    TnapIdRm:
      anyOf:
        - $ref: '#/components/schemas/TnapId'
        - $ref: '#/components/schemas/NullValue'
    TwapId:
      type: object
      required:
        - ssid
      properties:
        ssId:
          type: string
        bssId:
          type: string
        civicAddress:
          $ref: '#/components/schemas/Bytes'
    TwapIdRm:
      anyOf:
        - $ref: '#/components/schemas/TwapId'
        - $ref: '#/components/schemas/NullValue'
    LineType:
      anyOf:
      - type: string
        enum:
          - DSL
          - PON
      - 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
          - DSL: Identifies a DSL line
          - PON: Identifies a PON line
    LineTypeRm:
      anyOf:
        - $ref: '#/components/schemas/LineType'
        - $ref: '#/components/schemas/NullValue'

    SnssaiExtension:
      description: Extensions to the Snssai data type
      type: object
      properties:
        sdRanges:
          type: array
          items:
            $ref: '#/components/schemas/SdRange'
          minItems: 1
        wildcardSd:
          type: boolean
          default: false

    SdRange:
      description: A range of SDs (Slice Differentiators)
      type: object
      properties:
        start:
          type: string
          pattern: '^[A-Fa-f0-9]{6}$'
        end:
          type: string
          pattern: '^[A-Fa-f0-9]{6}$'

#
# Data types describing alternative data types or combinations of data types
#
    ExtSnssai:
      allOf:
        - $ref: '#/components/schemas/Snssai'
        - $ref: '#/components/schemas/SnssaiExtension'

#
# 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
    SamplingRatio:
      type: integer
      minimum: 1
      maximum: 100
    SamplingRatioRm:
      type: integer
      minimum: 1
      maximum: 100
      nullable: true
    RgWirelineCharacteristics:
      $ref: '#/components/schemas/Bytes'
    RgWirelineCharacteristicsRm:
      anyOf:
        - $ref: '#/components/schemas/RgWirelineCharacteristics'
        - $ref: '#/components/schemas/NullValue'
    ExtMaxDataBurstVol:
      type: integer
      minimum: 4096
      maximum: 2000000
    ExtMaxDataBurstVolRm:
      type: integer
      minimum: 4096
      maximum: 2000000
      nullable: true
    ExtPacketDelBudget:
      type: integer
      minimum: 1
    ExtPacketDelBudgetRm:
      type: integer
      minimum: 1
      nullable: true

#
# ENUMERATED DATA TYPES
#

    PreemptionCapability:
      anyOf:
        - type: string
          enum:
            - NOT_PREEMPT
            - MAY_PREEMPT
        - type: string
    PreemptionCapabilityRm:
      anyOf:
        - $ref: '#/components/schemas/PreemptionCapability'
        - $ref: '#/components/schemas/NullValue'
    PreemptionVulnerability:
      anyOf:
        - type: string
          enum:
            - NOT_PREEMPTABLE
            - PREEMPTABLE
        - type: string
    PreemptionVulnerabilityRm:
      anyOf:
        - $ref: '#/components/schemas/PreemptionVulnerability'
        - $ref: '#/components/schemas/NullValue'
    ReflectiveQoSAttribute:
      anyOf:
        - type: string
          enum:
            - RQOS
```

```
              - NO_RQOS
          - type: string
    ReflectiveQoSAttributeRm:
      anyOf:
        - $ref: '#/components/schemas/ReflectiveQoSAttribute'
        - $ref: '#/components/schemas/NullValue'
    NotificationControl:
      anyOf:
        - type: string
          enum:
            - REQUESTED
            - NOT_REQUESTED
        - type: string
    NotificationControlRm:
      anyOf:
        - $ref: '#/components/schemas/NotificationControl'
        - $ref: '#/components/schemas/NullValue'
    QosResourceType:
      anyOf:
        - type: string
          enum:
            - NON_GBR
            - NON_CRITICAL_GBR
            - CRITICAL_GBR
        - type: string
    QosResourceTypeRm:
      anyOf:
        - $ref: '#/components/schemas/QosResourceType'
        - $ref: '#/components/schemas/NullValue'
    AdditionalQosFlowInfo:
      anyOf:
        - anyOf:
            - type: string
              enum:
                - MORE_LIKELY
            - type: string
        - $ref: '#/components/schemas/NullValue'
#

#
# 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:
      anyOf:
        - $ref: '#/components/schemas/Arp'
        - $ref: '#/components/schemas/NullValue'
    Ambr:
      type: object
      properties:
        uplink:
          $ref: '#/components/schemas/BitRate'
        downlink:
          $ref: '#/components/schemas/BitRate'
      required:
        - uplink
        - downlink
    AmbrRm:
      anyOf:
        - $ref: '#/components/schemas/Ambr'
        - $ref: '#/components/schemas/NullValue'
    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'
          extMaxDataBurstVol:
              $ref: '#/components/schemas/ExtMaxDataBurstVol'
          extPacketDelBudget:
              $ref: '#/components/schemas/ExtPacketDelBudget'
          cnPacketDelayBudgetDl:
              $ref: '#/components/schemas/ExtPacketDelBudget'
          cnPacketDelayBudgetUl:
              $ref: '#/components/schemas/ExtPacketDelBudget'
        required:
          - resourceType
          - priorityLevel
          - packetDelayBudget
          - packetErrRate
    NonDynamic5Qi:
      type: object
      properties:
        priorityLevel:
            $ref: '#/components/schemas/5QiPriorityLevel'
        averWindow:
            $ref: '#/components/schemas/AverWindow'
        maxDataBurstVol:
            $ref: '#/components/schemas/MaxDataBurstVol'
        extMaxDataBurstVol:
            $ref: '#/components/schemas/ExtMaxDataBurstVol'
        cnPacketDelayBudgetDl:
            $ref: '#/components/schemas/ExtPacketDelBudget'
        cnPacketDelayBudgetUl:
            $ref: '#/components/schemas/ExtPacketDelBudget'
      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:
        - $ref: '#/components/schemas/TraceDepth'
        - $ref: '#/components/schemas/NullValue'
    JobType:
      anyOf:
        - type: string
          enum:
            - IMMEDIATE_MDT_ONLY
            - LOGGED_MDT_ONLY
            - TRACE_ONLY
            - IMMEDIATE_MDT_AND_TRACE
            - RLF_REPORTS_ONLY
            - RCEF_REPORTS_ONLY
            - LOGGED_MBSFN_MDT
```

```
            - type: string
    ReportTypeMdt:
      anyOf:
        - type: string
          enum:
            - PERIODICAL
            - EVENT_TRIGGED
        - type: string
    MeasurementLteForMdt:
      anyOf:
        - type: string
          enum:
            - M1
            - M2
            - M3
            - M4_DL
            - M4_UL
            - M5_DL
            - M5_UL
        - type: string
    MeasurementNrForMdt:
      anyOf:
        - type: string
          enum:
            - M1
            - M2
            - M3
            - M4_DL
            - M4_UL
            - M5_DL
            - M5_UL
            - M6_DL
            - M6_UL
            - M7_DL
            - M7_UL
            - M8
            - M9
        - type: string
    SensorMeasurement:
      anyOf:
        - type: string
          enum:
            - BAROMETRIC_PRESSURE
            - UE_SPEED
            - UE_ORIENTATION
        - type: string
    ReportingTrigger:
      anyOf:
        - type: string
          enum:
            - PERIODICAL
            - EVENT_A2
            - EVENT_A2_PERIODIC
            - EVENT_A2_PERIODIC
        - type: string
    ReportIntervalMdt:
      anyOf:
        - type: string
          enum:
            - 120
            - 240
            - 480
            - 640
            - 1024
            - 2048
            - 5120
            - 10240
            - 60000
            - 360000
            - 720000
            - 1800000
            - 3600000
        - type: string
    ReportAmountMdt:
      anyOf:
        - type: string
          enum:
            - 1
```

```
              - 2
              - 4
              - 8
              - 16
              - 32
              - 64
              - infinity
          - type: string
    EventForMdt:
      anyOf:
        - type: string
          enum:
              - OUT_OF_COVERAG
              - A2_EVENT
        - type: string
    LoggingIntervalMdt:
      anyOf:
        - type: string
          enum:
              - 128
              - 256
              - 512
              - 1024
              - 2048
              - 3072
              - 4096
              - 6144
        - type: string
    LoggingDurationMdt:
      anyOf:
        - type: string
          enum:
              - 600
              - 1200
              - 2400
              - 3600
              - 5400
              - 7200
        - type: string
    PositioningMethodMdt:
      anyOf:
        - type: string
          enum:
              - GNSS
              - E_CELL_ID
        - type: string
    CollectionPeriodRmmLteMdt:
      anyOf:
        - type: string
          enum:
              - 1024
              - 1280
              - 2048
              - 2560
              - 5120
              - 10240
              - 60000
        - type: string
    MeasurementPeriodLteMdt:
      anyOf:
        - type: string
          enum:
              - 1024
              - 1280
              - 2048
              - 2560
              - 5120
              - 10240
              - 60000
        - type: string
#
# 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
    MdtConfiguration:
      type: object
      required:
        - jobType
      properties:
        jobType:
          $ref: '#/components/schemas/JobType'
        reportType:
          $ref: '#/components/schemas/ReportTypeMdt'
        areaScope:
          $ref: '#/components/schemas/AreaScope'
        measurementLteList:
          type: array
          items:
            $ref: '#/components/schemas/MeasurementLteForMdt'
        measurementNrList:
          type: array
          items:
            $ref: '#/components/schemas/MeasurementNrForMdt'
          minItems: 1
        sensorMeasurementList:
          type: array
          items:
            $ref: '#/components/schemas/SensorMeasurement'
          minItems: 1
        reportingTriggerList:
          type: array
          items:
            $ref: '#/components/schemas/ReportingTrigger'
          minItems: 1
        reportInterval:
          $ref: '#/components/schemas/ReportIntervalMdt'
        reportAmount:
          $ref: '#/components/schemas/ReportAmountMdt'
        eventThresholdRsrp:
          type: integer
          minimum: 0
          maximum: 97
        eventThresholdRsrq:
          type: integer
          minimum: 0
          maximum: 34
        eventList:
          type: array
          items:
            $ref: '#/components/schemas/EventForMdt'
          minItems: 1
        loggingInterval:
          $ref: '#/components/schemas/LoggingIntervalMdt'
        loggingDuration:
          $ref: '#/components/schemas/LoggingDurationMdt'
        positioningMethod:
          $ref: '#/components/schemas/PositioningMethodMdt'
        collectionPeriodRmmLte:
          $ref: '#/components/schemas/CollectionPeriodRmmLteMdt'
        measurementPeriodLte:
```

```
              $ref: '#/components/schemas/MeasurementPeriodLteMdt'
          mdtAllowedPlmnIdList:
            type: array
            items:
              $ref: '#/components/schemas/PlmnId'
            minItems: 1
            maxItems: 16
          mbsfnAreaList:
            type: array
            items:
              $ref: '#/components/schemas/MbsfnArea'
            minItems: 1
            maxItems: 8
    AreaScope:
      type: object
      properties:
        eutraCellIdList:
          type: array
          items:
            $ref: '#/components/schemas/EutraCellId'
          minItems: 1
        nrCellIdList:
          type: array
          items:
            $ref: '#/components/schemas/NrCellId'
          minItems: 1
        tacList:
          type: array
          items:
            $ref: '#/components/schemas/Tac'
          minItems: 1
        tacInfoPerPlmn:
          type: object
          additionalProperties:
            $ref: '#/components/schemas/TacInfo'
    TacInfo:
      type: object
      required:
        - tacList
      properties:
        tacList:
          type: array
          items:
            $ref: '#/components/schemas/Tac'
          minItems: 1
    MbsfnArea:
      type: object
      properties:
        mbsfnAreaId:
          type: integer
          minimum: 0
          maximum: 255
        carrierFrequency:
          type: integer
          minimum: 0
          maximum: 262143


# 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:
        - anyOf:
```

```
              - type: string
                enum:
                   - ALL_PACKET_SERVICES
                   - ROAMER_ACCESS_HPLMN_AP
                   - ROAMER_ACCESS_VPLMN_AP
              - type: string
          - $ref: '#/components/schemas/NullValue'


#
# 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'

    ApplicationChargingId:
      type: string

    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

Date	Meeting	TDoc	CR	Rev	Cat	Subject/Comment	New version
						Change history	
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
2018-12	CT#82	CP-183161	0064	2	F	NgRanIdentifier and PresenceInfo	15.2.0
2018-12	CT#82	CP-183024	0068		F	Addition of HTTP status code "412 Precondition Failed"	15.2.0
2018-12	CT#82	CP-183024	0051	3	F	Introduction of Barring of Roaming in 5GC	15.2.0
2018-12	CT#82	CP-183024	0066	1	F	Service Area Restriction	15.2.0

2018-12	CT#82	CP-183024	0067	1	F	Charging related types	15.2.0
2018-12	CT#82	CP-183024	0070		F	Correction of the reference for the SupportedFeatures Data Type	15.2.0
2018-12	CT#82	CP-183024	0072	1	F	Update open API version	15.2.0
2018-12	CT#82	CP-183024	0073		F	ExternalDoc update	15.2.0
2019-03	CT#83	CP-190029	0075	3	F	Corrections on subscribed Priority	15.3.0
2019-03	CT#83	CP-190029	0076	1	F	AmfRegionId and AmfSetId	15.3.0
2019-03	CT#83	CP-190029	0077	2	F	Supported features	15.3.0
2019-03	CT#83	CP-190029	0078	2	F	Corrections on n3iwf Id	15.3.0
2019-03	CT#83	CP-190029	0079	2	F	Corrections on the encoding of bit string	15.3.0
2019-03	CT#83	CP-190029	0081	2	F	Corrections on Type RouteToLocation	15.3.0
2019-03	CT#83	CP-190029	0082	1	F	ODB correction	15.3.0
2019-03	CT#83	CP-190029	0083		F	3GPP TS 29.571 API version update	15.3.0
2019-06	CT#84	CP-191041	0077	3	F	CR not implemented – Supported Features	15.4.0
2019-06	CT#84	CP-191041	0084	1	F	Service Area Restriction	15.4.0
2019-06	CT#84	CP-191041	0087	1	F	ChangeItem Indicating Complete Resource Creation or Removal	15.4.0
2019-06	CT#84	CP-191041	0089	2	F	Storage of OpenAPI specification files	15.4.0
2019-06	CT#84	CP-191041	0090	1	F	Clarificaiton on Universal Matching Pattern Schema	15.4.0
2019-06	CT#84	CP-191041	0086	2	F	Correct the discription of 5qi in SubscribedDefaultQos	15.4.0
2019-06	CT#84	CP-191041	0097		F	AreaCode	15.4.0
2019-06	CT#84	CP-191041	0094	1	F	Required attributes in NotifyItem	15.4.0
2019-06	CT#84	CP-191041	0095	1	F	Regular Expression Pattern of DiameterIdentity	15.4.0
2019-06	CT#84	CP-191041	0096	1	F	Secondary RAT Usage reporting at PDU session level	15.4.0
2019-06	CT#84	CP-191041	0099	2	F	Copyright Note in YAML file	15.4.0
2019-06	CT#84	CP-191048	0100	1	B	3GPP TS 29.571 API version update	16.0.0
2019-06	CT#84	CP-191050	0093		B	Definition of MTC provider Information	16.0.0
2019-06	CT#84	CP-191050	0098	1	B	Extend value of RAT Type to add NBIOT	16.0.0
2019-06	CT#84	CP-191051	0088	3	B	Common Data Type for ATSSS Capability	16.0.0
2019-06	CT#84	CP-191052	0085	1	B	Addition of Event Reporting Information Parameters for network data analytics	16.0.0
2019-06	CT#84	CP-191055	0091	2	B	NF discovery factors	16.0.0
2019-09	CT#85	CP-192194	0102	3	B	NF Set and NF Service Set	16.1.0
2019-09	CT#85	CP-192133	0103		B	PlmnId	16.1.0
2019-09	CT#85	CP-192133	0104	1	B	Closed Access Group	16.1.0
2019-09	CT#85	CP-192028	0113	2	B	Network Identifier for SNPN	16.1.0
2019-09	CT#85	CP-192211	0105	2	B	Common Data Type for 5G SRVCC	16.1.0
2019-09	CT#85	CP-192115	0107	1	A	PRA ID encoding	16.1.0
2019-09	CT#85	CP-192123	0108	1	F	DNN Format correction	16.1.0
2019-09	CT#85	CP-192123	0111	2	B	PatchResult data type	16.1.0
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History

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