



## S-GW CDR Field Reference

This chapter provides a reference for CDR fields supported by the system for use in SGW-CDRs.

A complete list and descriptions of supported CDR fields is provided in the *S-GW CDR Field Descriptions* chapter of this reference.



### Important

This reference document contains information only on standard GTPP dictionaries. For information on custom dictionaries, contact your Cisco account representative.

The category column in all tables use keys described in the following table.

**Table 1: Dictionary Table Key 16**

Abbreviation	Meaning	Description
M	Mandatory	A field that must be present in the CDR.
C	Conditional	A field that must be present in a CDR if certain conditions are met.
OM	Operator Provisionable: Mandatory	A field that an operator has provisioned and must be included in the CDR for all conditions.
OC	Operator Provisionable: Conditional	A field that an operator has provisioned and must be included in the CDR if certain conditions are met.

- [CDR Fields Supported in SGW-CDRs, on page 1](#)

## CDR Fields Supported in SGW-CDRs

The tables in this section list the SGW-CDR fields present in the available GTPP dictionaries.

## custom6 Dictionary

CDR fields are based on 3GPP TS 32.298 v8.7.0, 3GPP TS 32.251 v8.8.0, and 3GPP TS 32.298 v9.6.0.

Field	Category	Description
Record Type	M	S-GW IP CAN bearer record
Served IMSI	M	IMSI of the served party (if Anonymous Access Indicator is FALSE or not supplied)
Served IMEISV	OC	IMEISV of the ME, if available
S-GW Address used	M	The control plane IP address of the S-GW used.
Charging ID	M	IP CAN bearer identifier used to identify this IP CAN bearer in different records created by PCNs
PDN Connection Id	OM	The PDN connection (IP-CAN session) identifier to identify different records belonging to same PDN connection.
Serving Node Address	M	List of serving node control plane IP addresses (e.g. SGSN, MME, etc.) used during this record.
Serving Node Type	M	List of serving node types in control plane. The serving node types listed here map to the serving node addresses listed in the field "Serving node Address" in sequence.
S-GW Change	OC	Present if this is the first record after S-GW change.
PGW PLMN Identifier	OM	PLMN identifier (MCC MNC) of the P-GW used.
Access Point Name Network Identifier	OM	The logical name of the connected access point to the external packet data network (network identifier part of APN).
PDP/PDN Type	OM	Indicates PDN type (i.e IPv4, IPv6 or IPv4v6).
Served PDP/PDN Address	OC	IP address allocated for the PDP context / PDN connection, i.e. IPv4 or IPv6, if available.

Field	Category	Description
Served PDP/PDN Address Extension	OC	This field holds IPv4 address of the served IMSI, if available, when PDN Type is IPv4v6.
Dynamic Address Flag	OC	Indicates whether served PDP/PDN address is dynamic, which is allocated during IP CAN bearer activation, initial attach (E-UTRAN or over S2x) and UE requested PDN connectivity. This field is missing if address is static.
List of Traffic Data Volumes	OM	A list of changes in charging conditions for this QCI/ARP pair, each change is time stamped. Charging conditions are used to categorize traffic volumes, such as per tariff period. Initial and subsequently changed QoS and corresponding data values are also listed.  Refer to the List of Data Traffic Volumes table in this chapter.
Record Opening Time	M	Time stamp when IP CAN bearer is activated in this S-GW or record opening time on subsequent partial records.
MS Time Zone	OC	Contains the MS Time Zone the MS is currently located as defined in TS 29.060, if available.
Duration	M	Duration of this record in the S-GW.
Cause for Record Closing	M	The reason for the release of record from this S-GW.
Diagnostics	OM	A more detailed reason for the release of the connection.
Record Sequence Number	C	Partial record sequence number, only present in case of partial records.
Node ID	OM	Name of the recording entity.

Field	Category	Description
Record Extensions	OC	A set of network operator/manufacturer specific extensions to the record. Conditioned upon the existence of an extension.
Local Record Sequence Number	OM	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.
APN Selection Mode	OM	An index indicating how the APN was selected.
Served MSISDN	OM	The primary MSISDN of the subscriber.
User Location Information	OC	Contains the User Location Information of the MS as defined in TS 29.060 for GPRS case, and in TS 29.274 for EPC case, if available.
Charging Characteristics	M	The Charging Characteristics applied to the IP CAN bearer.
Charging Characteristics Selection Mode	OM	Information about how Charging Characteristics were selected.
IMS Signalling Context	OC	Included if the IM-CN Subsystem Signalling Flag is set. IP CAN bearer is used for IMS signalling.
P-GW Address used	OC	The P-GW IP Address for the Control Plane.
Serving Node PLMN Identifier	OC	Serving node PLMN Identifier (MCC and MNC) used during this record, if available.
RAT Type	OC	Indicates the Radio Access Technology (RAT) type currently used by the Mobile Station, when available. This RAT type is defined in TS 29.060 for GTP case, in TS 29.274 for eGTP case and in TS 29.275 for PMIP case.
Start Time	OC	The time when User IP-CAN session starts, available in the CDR for the first bearer in an IP-CAN session.

Field	Category	Description
Stop Time	OC	The time when User IP-CAN session is terminated, available in the CDR for the last bearer in an IP-CAN session.
User CSG Information	OC	Contains the User CSG Information (UCI) status of the user accessing a CSG cell. It includes CSG ID within the PLMN, access mode, and indication on CSG membership for the user when hybrid access applies, as defined in TS 29.060 for GPRS case, and in TS 29.274 for EPC case.

Notes:

- All IP addresses are in ASCII format.

## List of Traffic Data Volumes

Traffic Data Volume	Category	Description
Change Of Charging Condition	M	Each traffic volume container contains details related to a charging condition as described in the following subsections. A new container is usually created for a QoS change and for tariff changes.
Data Volume GPRS Uplink	M	<p>The Data Volume GPRS Uplink field is a part of the ChangeOfCharCondition element in the List of Traffic Volumes. It includes the number of octets received in the uplink direction during the timeframe specified by the container. For each new container, the counter is reset and does not accumulate.</p> <p>The data counted already includes the IP PDP bearer protocols i.e. IP or PPP.</p>

Traffic Data Volume	Category	Description
Data volume GPRS Downlink	M	<p>The Data Volume GPRS Downlink field is a part of the ChangeOfCharCondition element in the List of Traffic Volumes. It includes the number of octets transmitted in the downlink direction during the timeframe specified by the container. For each new container, the counter is reset and does not accumulate.</p> <p>The data counted already includes the IP PDP bearer protocols i.e. IP or PPP.</p>
Change Condition	M	<p>The Change Condition field is part of the ChangeOfCharCondition element in the List of Traffic Volumes. It defines the reason for closing the container.</p>
Change time	M	<p>The Change Time field is part of the ChangeOfCharCondition element in the List of Traffic Volumes. It provides the local time when a change condition (e.g. record closure) occurred and the container was closed.</p>

Traffic Data Volume	Category	Description
User Location Information	OC	<p>This field contains the User Location Information as described in TS 29.274 for eGTP case (e.g. CGI, SAI, RAI TAI and ECGI).</p> <p>The field is provided by the SGSN/MME and transferred to the S-GW/P-GW during the IP-CAN bearer activation/modification.</p> <p>User Location Information contains the location (e.g. CGI/SAI, ECGI/TAI or RAI) where the UE is located and used during the transfer of the data volume captured by the container (applicable only to the SGW-CDR). This is included in the Traffic data container only if previous container's change condition is "user location change". Note the user location information in SGW-CDR main level contains the location where the UE was when CDR was opened.</p>
EPC Qos Requested	OC	<p>In case of IP-CAN bearer specific container this contains authorized QoS for the IP-CAN bearer. First container for each QCI/ARP pair includes this field. In following containers this field is present if previous change condition is "QoS change". This field is applicable only in SGW-CDR.</p>

## List of Secondary RAT Usage Reports

Traffic Data Volume	Category	Description
List Of RAN Secondary RAT Usage Reports	OC	Includes one or more containers reported from the RAN for a secondary RAT.
RAN Secondary RAT Usage Report	M	Includes one or more containers reported from the RAN for a secondary RAT.
Data Volume Uplink	M	Includes the number of octets transmitted during the use of the packet data services in the uplink direction reported from RAN. The

Traffic Data Volume	Category	Description
		counting and reporting from RAN of uplink data volumes is optional.
Data Volume Downlink	M	Includes the number of octets transmitted during the use of the packet data services in the downlink direction reported from RAN. The counting and reporting from RAN of downlink data volumes is optional.
RAN Start Time	M	Includes the number of octets transmitted during the use of the packet data services in the downlink direction reported from RAN. The counting and reporting from RAN of downlink data volumes is optional.
Secondary RAT Type	OC	This field contains the RAT type for the secondary RAT.

## ASN.1 Definition for Fields in custom6

The following section provides the complete ASN.1 definition of all SGW-CDR related fields in this dictionary.

```

GPRS-SGW-Charging-DataTypes-REL8 DEFINITIONS IMPLICIT TAGS ::=
BEGIN

-----
--
--      GPRS RECORDS
--
-----

GPRSRecord ::= CHOICE
--
-- Record values 20, 22..27 are specific
-- Record values 76..77 are MBMS specific
-- Record values 78..79 are EPC specific
{
    sGWRecord[78] SGWRecord
}

SGWRecord ::= SET
{
    recordType                [0] RecordType,
    servedIMSI                [3] IMSI,
    s-GWAddress                [4] GSNAddress,
    chargingID                 [5] ChargingID,
    servingNodeAddress         [6] SEQUENCE OF GSNAddress,
    accessPointNameNI         [7] AccessPointNameNI OPTIONAL,
    pdpPDNType                 [8] PDPTYPE OPTIONAL,
    servedPDPDNAddress         [9] PDPAddress OPTIONAL,
    dynamicAddressFlag         [11] DynamicAddressFlag OPTIONAL,
}

```



```

listOfTrafficVolumes [12] SEQUENCE OF ChangeOfCharCondition OPTIONAL,

recordOpeningTime [13] TimeStamp,
duration [14] CallDuration,
causeForRecClosing [15] CauseForRecClosing,
diagnostics [16] Diagnostics OPTIONAL,
recordSequenceNumber [17] INTEGER OPTIONAL,
nodeID [18] NodeID OPTIONAL,
recordExtensions [19] ManagementExtensions OPTIONAL,
localSequenceNumber [20] LocalSequenceNumber OPTIONAL,
apnSelectionMode [21] APNSelectionMode OPTIONAL,
servedMSISDN [22] MSISDN OPTIONAL,
chargingCharacteristics [23] ChargingCharacteristics,
chChSelectionMode [24] ChChSelectionMode OPTIONAL,
imsSignalingContext [25] NULL OPTIONAL,
servingNodePLMNIdentifier [27] PLMN-Id OPTIONAL,
servedIMEISV [29] IMEI OPTIONAL,
rATType [30] RATType OPTIONAL,
mSTimeZone [31] MSTimeZone OPTIONAL,
userLocationInformation [32] OCTET STRING OPTIONAL,
sGWChange [34] SGWChange OPTIONAL,
servingNodeType [35] SEQUENCE OF ServingNodeType,
p-GWAddressUsed [36] GSNAddress OPTIONAL,
p-GWPLMNIdentifier [37] PLMN-Id OPTIONAL,
startTime [38] TimeStamp OPTIONAL,
stopTime [39] TimeStamp OPTIONAL,
pdnConnectionID [40] ChargingID OPTIONAL,
servedPDPAddressExt [43] PDPAddress OPTIONAL
listOfFRANSecondaryRATUsageReports [64] SEQUENCE OF RANSecondaryRATUsageReport OPTIONAL
}
RANSecondaryRATUsageReport ::= SEQUENCE
--]
{
    dataVolumeUplink [1] DataVolumeGPRS,
    dataVolumeDownlink [2] DataVolumeGPRS,
    rANStartTime [3] TimeStamp,
    rANEndTime [4] TimeStamp,
    secondaryRATType [5] SecondaryRATType OPTIONAL
}

SecondaryRATType ::= INTEGER
{
    reserved (0),
    nR (1) -- New Radio 5G
}

AccessPointNameNI ::= IA5String (SIZE(1..63))
--
-- Network Identifier part of APN in dot representation.
-- For example, if the complete APN is 'apn1a.apn1b.apn1c.mnc022.mcc111.gprs'
-- NI is 'apn1a.apn1b.apn1c' and is presented in this form in the CDR.

APNSelectionMode ::= ENUMERATED
{
    --
    -- See Information Elements TS 29.060, TS 29.274 or TS 29.275
    --
    mSorNetworkProvidedSubscriptionVerified (0),
    mSProvidedSubscriptionNotVerified (1),
    networkProvidedSubscriptionNotVerified (2)
}

CallDuration ::= INTEGER

```

```

--
-- The call duration is counted in seconds.
-- For successful calls /sessions / PDP contexts, this is the chargeable
duration.
-- For call attempts this is the call holding time.
--

```

```
CauseForRecClosing ::= INTEGER
```

```

{
  --
  -- In PGW-CDR and SGW-CDR the value servingNodeChange is used for partial record
  -- generation due to Serving Node Address list Overflow
  -- In SGSN servingNodeChange indicates the SGSN change
  --
  -- LCS related causes belong to the MAP error causes acc. TS 29.002
  --
  -- cause codes 0 to 15 are defined 'CauseForTerm' (cause for termination)
  -- All cause values are not relevant to SGW. Refer the spec to find out the
  -- cause values for SGW.
  normalRelease (0),
  abnormalRelease (4),
  cAMELInitCallRelease (5),
  volumeLimit (16),
  timeLimit (17),
  servingNodeChange (18),
  maxChangeCond (19),
  managementIntervention (20),
  intraSGSNIntersystemChange (21),
  rATChange (22),
  mSTimeZoneChange (23),
  sGSNPLMNIDChange (24),
  unauthorizedRequestingNetwork (52),
  unauthorizedLCSCClient (53),
  positionMethodFailure (54),
  unknownOrUnreachableLCSCClient (58),
  listOfDownstreamNodeChange (59)
}

```

```
ChangeCondition ::= ENUMERATED
```

```

{
  qosChange (0),
  tariffTime (1),
  recordClosure (2),
  cgi-SAICChange (6), -- bearer modification. CGI-SAI Change
  rAICChange (7), -- bearer modification. RAI Change
  dT-Establishment (8),
  dT-Removal (9),
  eCGICChange (10), -- bearer modification. ECGI Change
  tAICChange (11), -- bearer modification. TAI Change
  apnAmbrChange (50) -- apn-ambr change
}

```

```
ChangeOfCharCondition ::= SEQUENCE
```

```

{
  --
  -- qosRequested and qosNegotiated are used in S-CDR only
  -- ePCQoSInformation used in SGW-CDR only
  --
  qosRequested [1] QoSInformation OPTIONAL,
  qosNegotiated [2] QoSInformation OPTIONAL,
}

```

```

        dataVolumeGPRSUplink          [3] DataVolumeGPRS OPTIONAL,
        dataVolumeGPRSDownlink        [4] DataVolumeGPRS OPTIONAL,
        changeCondition                [5] ChangeCondition,
        changeTime                     [6] TimeStamp,
        userLocationInformation        [8] OCTET STRING OPTIONAL,
        ePCQoSInformation              [9] EPCQoSInformation OPTIONAL
    }

ChargingCharacteristics ::= OCTET STRING (SIZE(2))

ChargingID ::= INTEGER (0..4294967295)
--
-- Generated in P-GW, part of IP CAN bearer
-- 0..4294967295 is equivalent to 0..2**32-1
--

ChChSelectionMode ::= ENUMERATED
{
    servingNodeSupplied          (0), -- For S-GW/P-GW
    subscriptionSpecific         (1), -- For SGSN only
    aPNSpecific                  (2), -- For SGSN only
    homeDefault                  (3), -- For SGSN, S-GW and P-GW
    roamingDefault               (4), -- For SGSN, S-GW and P-GW
    visitingDefault              (5) -- For SGSN, S-GW and P-GW
}

DataVolumeGPRS ::= INTEGER
--
-- The volume of data transferred in octets.
--

DynamicAddressFlag ::= BOOLEAN

EPCQoSInformation ::= SEQUENCE
{
    --
    -- See TS 29.212 for more information
    --
    qCI                           [1] INTEGER,
    maxRequestedBandwidthUL        [2] INTEGER OPTIONAL,
    maxRequestedBandwidthDL        [3] INTEGER OPTIONAL,
    guaranteedBitrateUL            [4] INTEGER OPTIONAL,
    guaranteedBitrateDL            [5] INTEGER OPTIONAL,
    arP                            [6] INTEGER OPTIONAL
        apnAmbrUplink              [7] INTEGER OPTIONAL,
        apnAmbrDownlink            [8] INTEGER OPTIONAL
    extendedMaxRequestedBWUL       [9] INTEGER OPTIONAL,
    extendedMaxRequestedBWDL       [10] INTEGER OPTIONAL,
    extendedGBRUL                  [11] INTEGER OPTIONAL,
    extendedGBRDL                  [12] INTEGER OPTIONAL,
    extendedAPNAMBRUL              [13] INTEGER OPTIONAL,
    extendedAPNAMBRDL              [14] INTEGER OPTIONAL
}

ETSIAddress ::= AddressString
--
-- First octet for nature of address, and numbering plan indicator (3 for X.121)
-- Other octets TBCD
-- See TS 29.002
--

GSNAddress ::= IPAddress

```

```

IA5String ::= OCTET STRING

MSNetworkCapability ::= OCTET STRING (SIZE(1..8))
-- see TS 24.008

NetworkInitiatedPDPContext ::= BOOLEAN
--
-- Set to true if PDP context was initiated from network side
--

NodeID ::= IA5String (SIZE(1..20))

NumberOfDPEncountered ::= INTEGER

PDPAddress ::= CHOICE
{
    ipAddress          [0] IPAddress,
    eTSIAddress         [1] ETSIAddress
}

PDPTType ::= OCTET STRING (SIZE(2))
--
-- OCTET 1: PDP Type Organization
-- OCTET 2: PDP Type Number
-- See TS 29.060 for GTP, TS 29.274 for eGTP and TS 29.275 for PMIP
--

PLMN-Id ::= OCTET STRING (SIZE (3))
--
-- This is a 1:1 copy from the Routing Area Identity (RAI) IE specified in TS 29.060
-- as follows:
-- OCTET 1 of PLMN-Id = OCTET 2 of RAI
-- OCTET 2 of PLMN-Id = OCTET 3 of RAI
-- OCTET 3 of PLMN-Id = OCTET 4 of RAI
--

QoSInformation ::= OCTET STRING (SIZE (4..255))
--
-- This octet string
-- is a 1:1 copy of the contents (i.e. starting with octet 5) of the "Bearer Quality of
-- Service" information element specified in TS 29.274
--

RATType ::= INTEGER (0..255)
--
-- This integer is 1:1 copy of the RAT type value as defined in TS 29.060 for GTP,
-- TS 29.274 for eGTP and TS 29.275 for PMIP.
--

RecordType ::= INTEGER
{
    -- Record values 0..17 are CS specific.
    -- The contents are defined in TS 32.250

    sGWRecord          (84)
}

ResultCode ::= INTEGER
-- charging protocol return value, range of 4 byte (0...4294967259)
-- see Result-Code AVP as used in 3GPP 32.299
--

```

```

ServingNodeType ::= ENUMERATED
{
    sGSN                (0),
    pMIPSGW             (1),
    gTPSGW              (2),
    ePDG                (3),
    hSGW                (4),
    mME                 (5)
}

SGWChange ::= BOOLEAN
--
-- present if first record after inter S-GW change
--

Diagnostics ::= CHOICE
{
    gsm0408Cause                [0] INTEGER,
    -- See TS 24.008
    gsm0902MapErrorValue        [1] INTEGER,
    -- Note: The value to be stored here corresponds to
    -- the local values defined in the MAP-Errors and
    -- MAP-DialogueInformation modules, for full details
    -- see TS 29.002
    itu-tQ767Cause              [2] INTEGER,
    -- See ITU-T Q.767
    networkSpecificCause        [3] ManagementExtension,
    -- To be defined by network operator
    manufacturerSpecificCause   [4] ManagementExtension,
    -- To be defined by manufacturer
    positionMethodFailureCause  [5] PositionMethodFailure-Diagnostic,
    -- see TS 29.002
    unauthorizedLCSCClientCause [6] UnauthorizedLCSCClient-Diagnostic
    -- see TS 29.002
}

IPAddress ::= CHOICE
{
    ipBinaryAddress             IPBinaryAddress,
    ipTextRepresentedAddress    IPTextRepresentedAddress
}

IPBinaryAddress ::= CHOICE
{
    ipBinV4Address             [0] OCTET STRING (SIZE(4)),
    ipBinV6Address             [1] OCTET STRING (SIZE(16))
}

IPTextRepresentedAddress ::= CHOICE
{
    --
    -- IP address in the familiar "dot" notation
    --
    ipTextV4Address            [2] IA5String (SIZE(7..15)),
    ipTextV6Address            [3] IA5String (SIZE(15..45))
}

PositionMethodFailure-Diagnostic ::= ENUMERATED
{
    congestion                                (0),
    insufficientResources                     (1),
    insufficientMeasurementData               (2),

```

```

        inconsistentMeasurementData (3),
        locationProcedureNotCompleted (4),
        locationProcedureNotSupportedByTargetMS (5),
        qosNotAttainable (6),
        positionMethodNotAvailableInNetwork (7),
        positionMethodNotAvailableInLocationArea (8)
    }

LocalSequenceNumber ::= INTEGER (0..4294967295)
--
-- Sequence number of the record in this node
-- 0.. 4294967295 is equivalent to 0..2**32-1, unsigned integer in four octets

ManagementExtension ::= SEQUENCE
{
    identifier OBJECT IDENTIFIER,
    significance [1] BOOLEAN DEFAULT FALSE,
    information [2] ANY DEFINED BY identifier
}

ManagementExtensions ::= SET OF ManagementExtension

MSISDN ::= ISDN-AddressString
--
-- See TS 23.003

MSTimeZone ::= OCTET STRING (SIZE (2))
--
-- 1.Octet: Time Zone and 2. Octet: Daylight saving time, see TS 29.060

TimeStamp ::= OCTET STRING (SIZE(9))
--
-- The contents of this field are a compact form of the UTCTime format
-- containing local time plus an offset to universal time. Binary coded
-- decimal encoding is employed for the digits to reduce the storage and
-- transmission overhead
-- e.g. YMMDDhhmmssShhmm
-- where
-- YY = Year 00 to 99 BCD encoded
-- MM = Month 01 to 12 BCD encoded
-- DD = Day 01 to 31 BCD encoded
-- hh = hour 00 to 23 BCD encoded
-- mm = minute 00 to 59 BCD encoded
-- ss = second 00 to 59 BCD encoded
-- S = Sign 0 = "+", "-" ASCII encoded
-- hh = hour 00 to 23 BCD encoded
-- mm = minute 00 to 59 BCD encoded
--

UnauthorizedLCSCClient-Diagnostic ::= ENUMERATED
{
    noAdditionalInformation (0),
    clientNotInMSPrivacyExceptionList (1),
    callToClientNotSetup (2),
    privacyOverrideNotApplicable (3),
    disallowedByLocalRegulatoryRequirements (4),
    unauthorizedPrivacyClass (5),
    unauthorizedCallSessionUnrelatedExternalClient (6),
    unauthorizedCallSessionRelatedExternalClient (7)
}

```

```

TBCDSTRING ::= OCTET STRING
ISDN-AddressString ::= OCTET STRING
IMEI ::= TBCDSTRING (SIZE(8))
IMSI ::= TBCDSTRING (SIZE(3..8))
maxAddressLength INTEGER ::= 20
AddressString ::= OCTET STRING (SIZE (1..maxAddressLength))
END

```

## custom24 Dictionary

In releases prior to 16, CDR fields in this dictionary are compliant to 3GPP TS 32.298 v8.7.0 and 3GPP TS 32.251 v8.8.0, and also partially compliant to 3GPP TS 32.298 v10.11.0. In release 16 and later, the CDR fields are fully compliant to 3GPP spec 32.298 v10.11.0.

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Record Type	0	M	S-GW IP CAN bearer record.	Integer	1	0x80
Served IMSI	3	M	IMSI of the served party.	BCD encoded octet string	3-8	0x83
S-GW Address	4	M	The control plane IP address of the S-GW used.	Choice	6 (IPv4) or 18 (IPv6)	0xa4
S-GW BINARY IPV4 ADDRESS	4-0	M	The octet string includes the Gn address of the GGSN service in binary coding.	Octet string	4	0x80
S-GW BINARY IPV6 ADDRESS	4-0	M	The octet string included in the field described includes the Gn address of the GGSN service in binary coding.	Octet string	16	0x81

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Charging ID	5	M	IP CAN bearer identifier used to identify IP CAN bearer in different records created by PCNs.	Integer	1-5	0x85
List of Serving Node Address	6	M	List of serving node control plane IP addresses (e.g. SGSN, MME ) used during this record.	Sequence	6 to 90	0xa6
Serving Node BINARY IPV4 ADDRESS	6-0	M	The octet string included in the field described above includes the IPV4 address of the MME.	Octet string	4	0x80
Serving Node BINARY IPV6 ADDRESS	6-0	M	The octet string included in the field described above includes the IPV6 address of the MME.	Octet string	16	0x81
Access Point Name Network Identifier	7	M	The logical name of the connected access point to the external packet data network (network identifier part of APN).	IA5 string	1-63	0x87



Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
PDP/PDN Type	8	M	This field indicates PDN type (i.e IPv4, IPv6 or IPv4v6).	Octet string (SIZE(2))	2	0x88
Served PDP/PDN Address	9	M	IP address allocated for the PDP context / PDN connection, if available, i.e. IPv4 when PDN Type is IPv4 or IPv6 when PDN Type is IPv6 or IPv4v6.	Choice	8 (IPv4) or 20 (IPv6)	0xa9
PDP IP Address	9-0	M	This field contains the IP address for the PDP context.	Choice	6 (IPv4) or 18 (IPv6)	0xa0
PDP IPV4 Address	9-0-0	M	The octet string included in the field described above includes the IPv4 address assigned to the subscriber by the S-GW in binary coding.	Octet string	4	0x80

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
PDP IPV6 Address	9-0-0	M	The octet string included in the field described above includes the IPv6 address assigned to the subscriber by the S-GW in binary coding.	Octet string	16	0x81
Dynamic Address Flag	11	O	Indicates whether served PDP/PDN address is dynamic, which is allocated during IP CAN bearer activation, initial attach (E-UTRAN or over S2x) and UE requested PDN connectivity. This field is missing if address is static.	Boolean	1	0x8b

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
List of Traffic Data Volumes	12	M	A list of changes in charging conditions for this QCI/ARP pair, each change is time stamped. Charging conditions are used to categorize traffic volumes, such as per tariff period. Initial and subsequently changed QoS and corresponding data values are also listed.	Sequence		0xac
Change of charging condition	12-0	M	Each traffic volume container contains details related to a charging condition. A new container is usually created for a QoS change and for tariff changes.	Sequence		0x30

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Data Volume GPRS Uplink	12-0-3	M	The Data Volume GPRS Uplink field is a part of the <del>ChgOfChCm</del> element in the List of Traffic Volumes. It includes the number of octets received in the uplink direction during the timeframe specified by the container. For each new container, the counter is reset and does not accumulate.	Integer	1-5	0x83

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Data Volume GPRS Downlink	12-0-4	M	The Data Volume GPRS Downlink field is a part of the <del>ChangeCondition</del> element in the List of Traffic Volumes. It includes the number of octets transmitted in the downlink direction during the timeframe specified by the container. For each new container, the counter is reset and does not accumulate.	Integer	1-5	0x84
Change Condition	12-0-5	M	The Change Condition field is part of the <del>ChangeCondition</del> element in the List of Traffic Volumes. It defines the change in user plane to UE.	Enumerated	1	85 01

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Change Time	12-0-6	M	The Change Time field is part of the <del>Change Time</del> element in the List of Traffic Volumes. It provides the local time when a change condition (e.g. record closure) occurred and the container was closed.	BCD encoded octet string	9	0x86
User Location Information	12-0-8	O	This field contains the User Location Information.	Octet string	8-33	0x88

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
EPC QoS Information	12-0-9	O	In case of IP-CAN bearer specific container this contains authorized QoS for the IP-CAN bearer. First container for each QCI/ARP pair includes this field. In the following containers this field is present if previous change condition is "QoS change". This field is applicable only in SGW-CDR.	Octet string	18-42	0xa9

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
CP CIoT EPS Optimisation Indicator	12-0-19	O	The CP CIoT EPS Optimisation Indicator field indicates whether Control Plane CIoT EPS optimisation is used for the transfer of the data volume captured by the container. This is included in the Traffic data container only if previous container's change condition is "change in user plane to UE". Note, the CP CIoT EPS Optimisation indicator field in SGW-CDR main level contains the CP CIoT EPS optimisation indicator value when SGW-CDR was opened.	Boolean	1	93 01
QCI	12-9-1	M		Integer	1-5	0x81
Uplink MBR	12-9-2	O		Integer	1-5	0x82
Down link MBR	12-9-3	O		Integer	1-5	0x83
Uplink GBR	12-9-4	O		Integer	1-5	0x84
Down link GBR	12-9-5	O		Integer	1-5	0x85



Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
arp	12-9-6	O		Integer	1-5	0x86
APN AMBR Uplink	12-9-7	O		Integer	1-5	0x87
APN AMBR Downlink	12-9-8	O		Integer	1-5	0x88
Extended Maximum Requested BW UL	12-9-9	O		Integer	1-5	0x89
Extended Maximum Requested BW DL	12-9-10	O		Integer	1-5	0x8a
Extended GBR UL	12-9-11	O		Integer	1-5	0x8b
extendedGBRDL	12-9-12	O		Integer	1-5	0x8c
Extended APN AMBR UL	12-9-13	O		Integer	1-5	0x8d
Extended APN AMBR DL	12-9-14	O		Integer	1-5	0x8e
Record Opening Time	13	M	Time stamp when IP CAN bearer is activated in this S-GW or record opening time on subsequent partial records.	BCD encoded octet string	9	0x8d
Duration	14	M	This field contains the duration in seconds for the record.	Integer	1-5	0x8e

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Cause for Record Closing	15	M	This field contains a reason for the closure of the CDR.	Integer	1	0x8f
Diagnostics	16	O	This field is included in the CDR when the bearer context is released and when the option <b>gtp attribute diagnostics</b> is configured.	Choice	3	0xb0
gsm408cause	16-0	M		Integer	1	0x80
Record Sequence Number	17	O	Partial record sequence number, only present in case of partial records.	Integer	1-5	0x91
Node ID	18	O	Name of the recording entity.	IA5 string	5-20	0x92
Record Extensions	19	O	A set of network <del>operator</del> specific extensions to the record. Conditioned upon the existence of an extension.	Sequence	N/A	0xb3

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Local Record Sequence Number	20	O	Consecutive record number created by this node. The number is allocated sequentially including all CDR types.	Integer	1-5	0x94
APN Selection Mode	21	M	An index indicating how the APN was selected.	Enumerated	1	0x95
Served MSISDN	22	M	The primary MSISDN of the subscriber.	Integer	1-9	0x96
Charging Characteristics	23	M	The Charging Characteristics applied to the IP CAN bearer.	Hex Value Octet string	2	0x97
Charging Characteristics Selection Mode	24	O	Holds information about how Charging Characteristics were selected.	Enumerated	1	0x98
IMS Signaling Context	25	O	Included if the IM-CN Subsystem Signalling Flag is set, see [201] IP CAN bearer is used for IMS signalling.	Null	0	0x99

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Serving Node PLMN Identifier	27	O	Serving node PLMN Identifier (MCC and MNC) used during this record, if available.	Octet string	3	0x9b
Served IMEISV	29	O	IMEISV of the ME, if available.	BCD encoded octet string	8	0x9d
RAT Type	30	O	This field indicates the Radio Access Technology (RAT) type currently used by the Mobile Station, when available.	Integer	1	9e
MS Time Zone	31	O	The "Time Zone" IE that the MME may provide to the S-GW during the PDN context activation/modification procedure.	Octet string (SIZE (2))	2	9f1f

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
User Location Information	32	O	<p>This field contains the User Location Information as described in TS 29.274 for eGTP case (e.g. CGI, SAI, RAI TAI and ECGI).</p> <p>This field is provided by the SGSN/MME and transferred to the S-GW/P-GW during the IP-CAN bearer activation/modification.</p>	Octet string	8-33	9f20
S-GW Change	34	O	<p>This field is present only in the SGW-CDR to indicate that this is the first record after an S-GW change. In this case, it is set to TRUE ("FF").</p>	Boolean	1	9f22

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Serving Node Type	35	M	These fields contain one or several serving node types in control plane of S-GW or P-GW, which have been connected during the record. The serving node types listed here map to the serving node addresses listed in the field "Serving node Address" in sequence.	Sequence		bf23
Serving Node Type enum	35-1	M		Sequence: Enumerated		0x0a
P-GW Address Used	36	M	This field is the P-GW IP Address for the Control Plane.	Choice	6 (IPv4) or 18 (IPv6)	bf24
P-GW Binary IPV4 Address	36-0	M	The octet string included in the field described above includes the IPv4 address assigned to the subscriber by of the P-GW in binary coding.	Octet String	4	0x80

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
P-GW Binary IPV6 Address	36-0	M	The octet string included in the field described above includes the IPv6 address assigned to the subscriber by of the P-GW in binary coding.	Octet String	16	0x81
P-GW PLMN Identifier	37	O		Octet string	3	9f25
Start Time	38	O	This field holds the time when User IP-CAN session starts, available in the CDR for the first bearer in an IP-CAN session.	BCD encoded octet string	9	9f26
Stop Time	39	O	This field holds the time when User IP-CAN session is terminated, available in the CDR for the last bearer in an IP-CAN session.	BCD encoded octet string	9	9f27

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
PDN Connection ID	40	O	This field holds the PDN connection (IP-CAN session) identifier to identify different records belonging to same PDN connection.	Integer	1-5	9f28
Unauthorized	41	O	This field indicates the provided served IMSI is not authenticated (emergency bearer service situation).	Null	0	9f29
User CSG Information	42	O	This field contains the "User CSG Information" status of the user accessing a CSG cell. It comprises CSG ID within the PLMN, Access mode and indication on CSG membership for the user when hybrid access applies, as defined in TS 29.060 for GPRS case, and in TS 29.274 for EPC case.	Sequence		bf2a



Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
cSGId	42-0	O	A CSG ID is a unique identifier within the scope of PLMN which identifies a Closed Subscriber Group (CSG) in the PLMN associated with a CSG cell or group of CSG cells.	Octet string	4	80
cSGAccessMode	42-1	O	cSGAccessMode will be either CLOSED or HYBRID.	Enumerated	1	81
<del>cSMultiplicity</del>	42-2	O	This field provides an indication on CSG membership for the user.	Null	0	82
Served PDP PDN Address Extension	43	O	This field contains the IPv4 address for the PDN connection (PDP context, IP-CAN bearer) when dual-stack IPv4 IPv6 is used, and the IPv6 address is included in Served PDP Address or Served PDP/PDN Address.	Choice	8 (IPv4)	bf2b

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
PDP IP Address	43-0	M	This field contains the IP address for the PDP context.	Choice	6 (IPv4)	0xa0
PDP IPV4 Address	43-0-0	M	The octet string included in the field described above includes the IPv4 address assigned to the subscriber by S-GW in binary coding.	Octet String	4 (IPv4)	0x80
Low Priority	44	O	This field indicates if the PDN connection has a low priority, i.e. for Machine Type Communication.	Null	0	9f2c

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
Dynamic IP Address	47	O	This field indicates whether served IPv4 PDP/PDN address is dynamic, which is allocated during IP CAN bearer activation, initial attach (E-UTRAN or over S2x) and UE requested PDN connectivity with PDP/PDN type IPv4v6. This field is missing if IPv4 address is static.	Boolean	1	9f2f
sGWIPv6Address	48	O	The control plane IPv6 address, in case of IPv4v6 dual stack, of the S-GW.	Choice	18(IPv6)	bf 30
SGW BINARY IPV6 ADDRESS	48-0	O	The octet string in this field includes the Gn address of the GGSN service in binary coding.	Octet string	16(IPv6)	0x81

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
List of Serving Node IPv6Address	49	O	List of serving node control plane IPv6 addresses, in case of IPv4v6 dual stack, (e.g. S4-SGSN, MME) used during this record.	Sequence	18 to 270	bf31
Serving Node BINARY IPV6 ADDRESS	49-0	M	The octet string in this field includes the IPV6 address of the MME.	Octet string	16(ipv6)	0x81
<del>P-GW IPv6 Address</del>	50	O	This field is the P-GW IPv6 Address, in case of IPv4v6 dual stack, for the Control Plane.	Choice	18(IPv6)	bf32
PGW BINARY IPV6 ADDRESS	50-0	O	The octet string in this field includes the IPV6 address assigned to the subscriber by of the P-GW in binary coding.	Octet string	16(IPv6)	0x81
lastUserLocation Information	55	O	Indicates the UE's last user location information during bearer deactivation or session release.	Octet string	13	9f39

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
lastMSTimeZone	56	O	Indicates the Latest timezone of UE while bearer deactivation or session release.	Octet string	2	9f3a
CP CIoT EPS Optimisation Indicator	59	O	The <del>CP CIoT EPS Optimisation Indicator</del> field indicates whether Control Plane CIoT EPS optimisation is used by the PDN connection during data transfer with the UE (that is, Control Plane NAS PDU via S11-U between S-GW and MME) or not (that is, User Plane via S1-U between S-GW and eNB).	Boolean	1	9f3b

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
UNI PDU CP Only Flag	60	O	The <del>UNI PDU CP</del> field indicates whether this PDN connection is applied with "Control Plane Only flag", that is, transferred using Control Plane NAS PDUs only, when Control Plane CIoT EPS Optimisation is enabled. This field is not flagged when both user plane and control plane UNI for PDU transfer (that is, S1-U and S11-U from S-GW) are allowed, when Control Plane CIoT EPS Optimisation is enabled.	Boolean	1	9f3c
List of RAN Secondary RAT Usage Reports	64	OC	This field includes one or more containers reported from the RAN for a secondary RAT.	Sequence of RAN Secondary RAT Usage Report	Variable	0xbf40

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
RAN Secondary RAT Usage Report	64-0	M	This field includes one or more containers reported from the RAN for a secondary RAT.	Sequence	Variable	0x30
Data Volume Uplink	64-0-1	M	This field includes the number of octets transmitted during the use of the packet data services in the uplink direction reported from RAN. The counting and reporting from RAN of uplink data volumes is optional.	Integer	9	0x81
Data Volume Downlink	64-0-2	M	This field includes the number of octets transmitted during the use of the packet data services in the downlink direction reported from RAN. The counting and reporting from RAN of downlink data volumes is optional.	Integer	9	0x82

Field Name	Tag Number	Category	Description	Format	Size (in bytes)	ASN1 code
RAN Start Time	64-0-3	M	This field is a time stamp, which defines the moment when the volume container is opened by the RAN.	Timestamp	9	0x83
RAN End Time	64-0-4	M	This field is a time stamp, which defines the moment when the volume container is closed by the RAN.	Timestamp	9	0x84
Secondary RAT Type	64-0-5	OC	This field contains the RAT type for the secondary RAT.	Integer	1	0x85
UE Local IP Port Info	253	O	This field includes the S2b user local IP port information.	Sequence	34	0xbf817d
UE Local IP Address	253-0	O	This field includes the UWAN user IP address.	IP Address	32	0xa0
UDP Source Port	253-1	O	This field includes the UWAN user source port.	Integer	2	0x81

Notes:

- All IP addresses are encoded in binary format.

## ASN.1 Definition for Fields in custom24

The following section provides the complete ASN.1 definition of all SGW-CDR related fields in this dictionary.



```

GPRS-SGW-Charging-DataTypes-REL8 DEFINITIONS IMPLICIT TAGS ::=
BEGIN

-----
--
--      GPRS RECORDS
--
-----

GPRSRecord ::= CHOICE
--
-- Record values 20, 22..27 are specific
-- Record values 76..77 are MBMS specific
-- Record values 78..79 are EPC specific
{
    sGWRecord[78] SGWRecord
}

SGWRecord ::= SET
{
    recordType                [0] RecordType,
    servedIMSI                [3] IMSI,
    s-GWAddress               [4] GSNAddress,
    chargingID                [5] ChargingID,
    servingNodeAddress        [6] SEQUENCE OF GSNAddress,
    accessPointNameNI         [7] AccessPointNameNI OPTIONAL,
    pdpPDNType                [8] PDNType OPTIONAL,
    servedPDPDNAddress        [9] PDPAddress OPTIONAL,
    dynamicAddressFlag        [11] DynamicAddressFlag OPTIONAL,
    listOfTrafficVolumes      [12] SEQUENCE OF ChangeOfCharCondition
OPTIONAL,
    recordOpeningTime         [13] TimeStamp,
    duration                  [14] CallDuration,
    causeForRecClosing        [15] CauseForRecClosing,
    diagnostics                [16] Diagnostics OPTIONAL,
    recordSequenceNumber      [17] INTEGER OPTIONAL,
    nodeID                    [18] NodeID OPTIONAL,
    recordExtensions          [19] ManagementExtensions OPTIONAL,
    localSequenceNumber       [20] LocalSequenceNumber OPTIONAL,
    apnSelectionMode          [21] APNSelectionMode OPTIONAL,
    servedMSISDN              [22] MSISDN OPTIONAL,
    chargingCharacteristics    [23] ChargingCharacteristics,
    chChSelectionMode         [24] ChChSelectionMode OPTIONAL,
    iMSSignalingContext       [25] NULL OPTIONAL,
    servingNodePLMNIdentifier [27] PLMN-Id OPTIONAL,
    servedIMEISV              [29] IMEI OPTIONAL,
    rATType                   [30] RATType OPTIONAL,
    mSTimeZone                [31] MSTimeZone OPTIONAL,
    userLocationInformation    [32] OCTET STRING OPTIONAL,
    sGWChange                  [34] SGWChange OPTIONAL,
    servingNodeType           [35] SEQUENCE OF ServingNodeType,
    p-GWAddressUsed           [36] GSNAddress OPTIONAL,
    p-GWPLMNIdentifier        [37] PLMN-Id OPTIONAL,
    startTime                 [38] TimeStamp OPTIONAL,
    stopTime                  [39] TimeStamp OPTIONAL,
    pdnConnectionID          [40] ChargingID OPTIONAL,
    servedPDPDNAddressExt     [43] PDPAddress OPTIONAL,
    lowAccessPriorityIndicator [44] NULL OPTIONAL,
    dynamicAddressFlagExt     [47] DynamicAddressFlag OPTIONAL,
    s-GWiPv6Address           [48] GSNAddress OPTIONAL,
    servingNodeiPv6Address    [49] SEQUENCE OF GSNAddress OPTIONAL,
    p-GWiPv6AddressUsed       [50] GSNAddress OPTIONAL,
    lastUserLocationInformation [55] OCTET STRING OPTIONAL,
    lastMSTimeZone           [56] MSTimeZone OPTIONAL,
}

```

```

        cPCIoTEFPOptimisationIndicator          [59] BOOLEAN OPTIONAL,
        uNIPDUCOnlyFlag                        [60] BOOLEAN OPTIONAL,
        listOfRANSecondaryRATUsageReports      [64] SEQUENCE OF RANSecondaryRATUsageReport
OPTIONAL,
        uELocalIPAddressPort                   [253] SEQUENCE OF UELocalIPPortInfo OPTIONAL
    }

AccessPointNameNI ::= IA5String (SIZE(1..63))
--
-- Network Identifier part of APN in dot representation.
-- For example, if the complete APN is 'apn1a.apn1b.apn1c.mnc022.mcc111.gprs'
-- NI is 'apn1a.apn1b.apn1c' and is presented in this form in the CDR.

APNSelectionMode ::= ENUMERATED
{
--
-- See Information Elements TS 29.060, TS 29.274 or TS 29.275
--
    mSorNetworkProvidedSubscriptionVerified    (0),
    mSProvidedSubscriptionNotVerified          (1),
    networkProvidedSubscriptionNotVerified     (2)
}

CallDuration ::= INTEGER
--
-- The call duration is counted in seconds.
-- For successful calls /sessions / PDP contexts, this is the chargeable
duration.
-- For call attempts this is the call holding time.
--

CauseForRecClosing ::= INTEGER
{
--
-- In PGW-CDR and SGW-CDR the value servingNodeChange is used for partial record
-- generation due to Serving Node Address list Overflow
-- In SGSN servingNodeChange indicates the SGSN change
--
-- LCS related causes belong to the MAP error causes acc. TS 29.002
--
-- cause codes 0 to 15 are defined 'CauseForTerm' (cause for termination)
-- All cause values are not relevant to SGW. Refer the spec to find out the
-- cause values for SGW.
    normalRelease                          (0),
    abnormalRelease                         (4),
    cAMELInitCallRelease                    (5),
    volumeLimit                             (16),
    timeLimit                              (17),
    servingNodeChange                       (18),
    maxChangeCond                           (19),
    managementIntervention                  (20),
        intraSGSNIntersystemChange          (21),
    rATChange                               (22),
    mSTimeZoneChange                        (23),
    sGSNPLMNIDChange                       (24),
    unauthorizedRequestingNetwork           (52),
    unauthorizedLCSCClient                  (53),
    positionMethodFailure                   (54),
    unknownOrUnreachableLCSCClient         (58),
    listofDownstreamNodeChange              (59)
}

```

```

ChangeCondition ::= ENUMERATED
{
    qosChange                (0),
    tariffTime               (1),
    recordClosure            (2),
    cgi-SAIChange            (6),    -- bearer modification. CGI-SAI Change
    rAIChange                (7),    -- bearer modification. RAI Change
    dT-Establishment        (8),
    dT-Removal               (9),
    eCGIChange              (10),   -- bearer modification. ECGI Change
    tAIChange                (11),   -- bearer modification. TAI Change
    apnAmbrChange           (50)    -- apn-ambr change
}

ChangeOfCharCondition ::= SEQUENCE
{
    --
    -- qosRequested and qosNegotiated are used in S-CDR only
    -- ePCQoSInformation used in SGW-CDR, PGW-CDR, IPE-CDR, TWAG-CDR and ePDG-CDR only
    -- userLocationInformation is used only in S-CDR, SGW-CDR and PGW-CDR
    -- chargingID used in PGW-CDR only when Charging per IP-CAN session is active
    -- accessAvailabilityChangeReason and relatedChangeOfCharCondition applicable only
in PGW-CDR
    -- cPCIoToptimisationIndicator is used in SGW-CDR only
    --
    qosRequested              [1] QoSInformation OPTIONAL,
    qosNegotiated            [2] QoSInformation OPTIONAL,
    dataVolumeGPRSUplink     [3] DataVolumeGPRS OPTIONAL,
    dataVolumeGPRSDownlink  [4] DataVolumeGPRS OPTIONAL,
    changeCondition         [5] ChangeCondition,
    changeTime               [6] TimeStamp,
    userLocationInformation  [8] OCTET STRING OPTIONAL,
    ePCQoSInformation       [9] EPCQoSInformation OPTIONAL,
    chargingID               [10] ChargingID OPTIONAL,
    userCSGInformation       [12] UserCSGInformation OPTIONAL,
    diagnostics              [13] Diagnostics OPTIONAL,
    rATType                  [15] RATType OPTIONAL,
    uWANUserLocationInformation [17] UWANUserLocationInfo OPTIONAL,
    cPCIoTEPSOptimisationIndicator [19] CPCIoTEPSOptimisationIndicator OPTIONAL
}

ChargingCharacteristics ::= OCTET STRING (SIZE(2))

ChargingID ::= INTEGER (0..4294967295)
--
-- Generated in P-GW, part of IP CAN bearer
-- 0..4294967295 is equivalent to 0..2**32-1
--

ChChSelectionMode ::= ENUMERATED
{
    servingNodeSupplied      (0), -- For S-GW/P-GW
    subscriptionSpecific     (1), -- For SGSN only
    aPNSpecific              (2), -- For SGSN only
    homeDefault              (3), -- For SGSN, S-GW and P-GW
    roamingDefault           (4), -- For SGSN, S-GW and P-GW
    visitingDefault          (5) -- For SGSN, S-GW and P-GW
}

```

```

DataVolumeGPRS ::= INTEGER
--
-- The volume of data transferred in octets.
--

DynamicAddressFlag ::= BOOLEAN

EPCQoSInformation ::= SEQUENCE
{
  --
  -- See TS 29.212 for more information
  --
  qCI [1] INTEGER,
  maxRequestedBandwithUL [2] INTEGER OPTIONAL,
  maxRequestedBandwithDL [3] INTEGER OPTIONAL,
  guaranteedBitrateUL [4] INTEGER OPTIONAL,
  guaranteedBitrateDL [5] INTEGER OPTIONAL,
  aRP [6] INTEGER OPTIONAL,
  apnAmbrUplink [7] INTEGER OPTIONAL,
  apnAmbrDownlink [8] INTEGER OPTIONAL,
  extendedMaxRequestedBWUL [9] INTEGER OPTIONAL,
  extendedMaxRequestedBWDL [10] INTEGER OPTIONAL,
  extendedGBRUL [11] INTEGER OPTIONAL,
  extendedGBRDL [12] INTEGER OPTIONAL,
  extendedAPNAMBRUL [13] INTEGER OPTIONAL,
  extendedAPNAMBRDL [14] INTEGER OPTIONAL
}

ETSIAddress ::= AddressString
--
-- First octet for nature of address, and numbering plan indicator (3 for X.121)
-- Other octets TBCD
-- See TS 29.002
--

GSNAddress ::= IPAddress

MSNetworkCapability ::= OCTET STRING (SIZE(1..8))
-- see TS 24.008

NetworkInitiatedPDPContext ::= BOOLEAN
--
-- Set to true if PDP context was initiated from network side
--

NodeID ::= IA5String (SIZE(1..20))

NumberOfDPENcounTered ::= INTEGER

PDPAddress ::= CHOICE
{
  iPAddress [0] IPAddress,
  eTsiAddress [1] ETSIAddress
}

PDPTyPe ::= OCTET STRING (SIZE(2))
--
-- OCTET 1: PDP Type Organization
-- OCTET 2: PDP Type Number
-- See TS 29.060 for GTP, TS 29.274 for eGTP and TS 29.275 for PMIP

```

```

--
PLMN-Id ::= OCTET STRING (SIZE (3))
--
-- This is a 1:1 copy from the Routing Area Identity (RAI) IE specified in TS 29.060
-- as follows:
-- OCTET 1 of PLMN-Id = OCTET 2 of RAI
-- OCTET 2 of PLMN-Id = OCTET 3 of RAI
-- OCTET 3 of PLMN-Id = OCTET 4 of RAI
--

QoSInformation ::= OCTET STRING (SIZE (4..255))
--
-- This octet string
-- is a 1:1 copy of the contents (i.e. starting with octet 5) of the "Bearer Quality of
-- Service" information element specified in TS 29.274
--

RANSecondaryRATUsageReport ::= SEQUENCE
-- ]
{
    dataVolumeUplink [1] DataVolumeGPRS,
    dataVolumeDownlink [2] DataVolumeGPRS,
    rANStartTime [3] TimeStamp,
    rANEndTime [4] TimeStamp,
    secondaryRATType [5] SecondaryRATType OPTIONAL
}

SecondaryRATType ::= INTEGER
{
    reserved (0),
    nR (1) -- New Radio 5G
}

RATType ::= INTEGER (0..255)
--
-- This integer is 1:1 copy of the RAT type value as defined in TS 29.060 for GTP,
-- TS 29.274 for eGTP and TS 29.275 for PMIP.
--

UWANUserLocationInfo ::= SEQUENCE
{
    uELocalIPAddress [0] IPAddress,
    uDPSourcePort [1] OCTET STRING (SIZE(2)) OPTIONAL,
    sSID [2] OCTET STRING OPTIONAL, -- see format in IEEE Std 802.11-2012
[408]
    bSSID [3] OCTET STRING OPTIONAL -- see format in IEEE Std 802.11-2012
[408]
}

RecordType ::= INTEGER
{
    -- Record values 0..17 are CS specific.
    -- The contents are defined in TS 32.250

    sGWRecord (84)
}

ResultCode ::= INTEGER
-- charging protocol return value, range of 4 byte (0...4294967259)
-- see Result-Code AVP as used in 3GPP 32.299
--

```

```

ServingNodeType ::= ENUMERATED
{
    sGSN                (0),
    pMIPSGW             (1),
    gTPSGW              (2),
    ePDG                (3),
    hSGW                (4),
    mME                 (5)
}

SGWChange ::= BOOLEAN
--
-- present if first record after inter S-GW change
--

Diagnostics ::= CHOICE
{
    gsm0408Cause                [0] INTEGER,
    -- See TS 24.008
    gsm0902MapErrorValue        [1] INTEGER,
    -- Note: The value to be stored here corresponds to
    -- the local values defined in the MAP-Errors and
    -- MAP-DialogueInformation modules, for full details
    -- see TS 29.002
    itu-tQ767Cause              [2] INTEGER,
    -- See ITU-T Q.767
    networkSpecificCause        [3] ManagementExtension,
    -- To be defined by network operator
    manufacturerSpecificCause   [4] ManagementExtension,
    -- To be defined by manufacturer
    positionMethodFailureCause  [5] PositionMethodFailure-Diagnostic,
    -- see TS 29.002
    unauthorizedLCSCClientCause [6] UnauthorizedLCSCClient-Diagnostic
    -- see TS 29.002
}

IPAddress ::= CHOICE
{
    iPBinaryAddress            IPBinaryAddress,
    iPTextRepresentedAddress   IPTextRepresentedAddress
}

CPCIoTEPSOptimisationIndicator ::= BOOLEAN

IPBinaryAddress ::= CHOICE
{
    iPBinV4Address            [0] OCTET STRING (SIZE(4)),
    iPBinV6Address            [1] OCTET STRING (SIZE(16))
}

IPTextRepresentedAddress ::= CHOICE
{
    --
    -- IP address in the familiar "dot" notation
    --
    iPTextV4Address          [2] IA5String (SIZE(7..15)),
    iPTextV6Address          [3] IA5String (SIZE(15..45))
}

PositionMethodFailure-Diagnostic ::= ENUMERATED
{
    congestion                (0),
    insufficientResources      (1),
    insufficientMeasurementData (2),
}

```

```

        inconsistentMeasurementData          (3),
        locationProcedureNotCompleted        (4),
        locationProcedureNotSupportedByTargetMS (5),
        qoSNotAttainable                     (6),
        positionMethodNotAvailableInNetwork   (7),
        positionMethodNotAvailableInLocationArea (8)
    }

LocalSequenceNumber ::= INTEGER (0..4294967295)
--
-- Sequence number of the record in this node
-- 0.. 4294967295 is equivalent to 0..2**32-1, unsigned integer in four octets

ManagementExtension ::= SEQUENCE
{
    identifier OBJECT IDENTIFIER,
    significance [1]          BOOLEAN DEFAULT FALSE,
    information [2]          ANY DEFINED BY identifier
}

ManagementExtensions ::= SET OF ManagementExtension

MSISDN ::= ISDN-AddressString
--
-- See TS 23.003

MSTimeZone ::= OCTET STRING (SIZE (2))
--
-- 1.Octet: Time Zone and 2. Octet: Daylight saving time, see TS 29.060

TimeStamp ::= OCTET STRING (SIZE(9))
--
-- The contents of this field are a compact form of the UTCTime format
-- containing local time plus an offset to universal time. Binary coded
-- decimal encoding is employed for the digits to reduce the storage and
-- transmission overhead
-- e.g. YMMDDhhmmssShhmm
-- where
-- YY      =          Year 00 to 99          BCD encoded
-- MM      =          Month 01 to 12         BCD encoded
-- DD      =          Day 01 to 31           BCD encoded
-- hh      =          hour 00 to 23          BCD encoded
-- mm      =          minute 00 to 59        BCD encoded
-- ss      =          second 00 to 59        BCD encoded
-- S       =          Sign 0 = "+", "-"      ASCII encoded
-- hh      =          hour 00 to 23          BCD encoded
-- mm      =          minute 00 to 59        BCD encoded
--
--
UELocalIPPortInfo ::= SEQUENCE
{
    --
    -- The S2b user Local IP Port Information
    --
    uELocalIPAddress [0] IPADDRESS OPTIONAL,
    uDPSourcePort [1] INTEGER OPTIONAL
}

UELocalIPAddress ::= IPADDRESS
UDPSourcePort ::= INTEGER

```

```

UnauthorizedLCSCClient-Diagnostic ::= ENUMERATED
{
    noAdditionalInformation (0),
    clientNotInMSPrivacyExceptionList (1),
    callToClientNotSetup (2),
    privacyOverrideNotApplicable (3),
    disallowedByLocalRegulatoryRequirements (4),
    unauthorizedPrivacyClass (5),
    unauthorizedCallSessionUnrelatedExternalClient (6),
    unauthorizedCallSessionRelatedExternalClient (7)
}

CSGAccessMode ::= ENUMERATED
{
    closedMode (0),
    hybridMode (1)
}

CSGId ::= OCTET STRING (SIZE(4))
--
-- Defined in 23.003. Coded according to TS 29.060 for GTP, and in TS
29.274
-- for eGTP.
-- 24.008
--

UserCSGInformation ::= SEQUENCE
{
    cSGId [0] CSGId,
    cSGAccessMode [1] CSGAccessMode,
    cSGMembershipIndication [2] NULL OPTIONAL
}

TBCDSTRING ::= OCTET STRING
ISDN-AddressString ::= OCTET STRING
IMEI ::= TBCDSTRING (SIZE(8))
IMSI ::= TBCDSTRING (SIZE(3..8))
maxAddressLength INTEGER ::= 20
AddressString ::= OCTET STRING (SIZE (1..maxAddressLength))
END

```