ERICSSON

Offline Charging Configuration

OPERATION DIRECTIONS

13/1543-AXB 250 10/4-V3 Uen JC

Contents

1 Introduction

This document describes how to configure Charging Data Record (CDR)-based and Rf charging on the EPG for GSM, WCDMA, LTE, trusted non-3GPP network, and untrusted non-3GPP network. The CDR-based charging interface connects the GGSN, PGW, and SGW to the Charging Gateway Function (CGF) and Billing System (BS). The Rf interface connects the EPG to the Charging Data Function (CDF).

To facilitate the understanding of this document, refer to CPI Library Readers' Guide.

1.1 Supported Nodes

This document describes functionality supported by the following logical nodes:

— GGSN

— PGW

— SGW

1.2 Scope

This document covers charging configuration tasks on the EPG.

For an overview of the charging functionality that the EPG offers and how the functionality works, refer to Offline Charging.

1.3 Target Groups

This document is intended for personnel performing configuration of the EPG. It assumes a basic knowledge of data communication and telecommunication.

1.4 Prerequisites

For billing, it is important that the time is synchronized in the GPRS and EPS networks. Unsynchronized time among the PGW Session Controllers (PSCs) and SGW Session Controllers (SSCs) can result in CDRs or Rf ACRs containing incorrect charging information.

For information about configuring time, refer to EPG Time Configuration.

2 Enable Offline Charging Directories

By default, the EPG stores CDRs and Rf ACRs in the directories listed in Table 1.

Table 1 Default Directories to Store CDRs and Rf ACRs

Charging Data File	Directory
CDRs	`/var/opt/services/epg/cdr`
GTP Prime CDRs	`/var/opt/services/epg/gtppcdr`
Rf ACRs	`/var/opt/services/epg/rfcdr`

To store the CDRs and Rf ACRs in separate directories based on the type of charging data file and the EPG role, include the following statement:

```
Ericsson(config)# epg node charging
   separate-offline-directories
```

After the configuration is enabled, new SGW CDRs and Rf ACRs, and GGSN/PGW CDRs are stored in the directories listed in Table 2.

Table 2 Separate Directories to Store CDRs and Rf ACRs

EPG Role	Charging Data File	Directory
SGW	CDRs	`/var/opt/services/epg/sgw_cdr`
	Rf ACRs	`/var/opt/services/epg/sgw_rfcdr`
GGSN/PGW	CDRs	`/var/opt/services/epg/pgw_cdr`
	GTP Prime CDRs	`/var/opt/services/epg/pgw_gtppcdr`
	Rf ACRs	`/var/opt/services/epg/pgw_rfcdr`

Note: The correct NACM group must be assigned to the user to access the directories. For more information on NACM groups, refer to Security Management.

3 GGSN/PGW Charging Configuration

The PGW supports both CDR-based and Rf charging, however, these charging types cannot be used simultaneously. By default, CDR-based charging is enabled.

This section covers the following charging configuration tasks on the GGSN/PGW:

— Configuring a GGSN/PGW Node Identifier

— Configuring Charging Characteristics

— Configuring Charging Characteristics (CC) Selection

— Configuring User Location Change Trigger

— Configuring CDR-Based Charging

— Configuring Rf Charging

Some configuration steps are common to both CDR-based charging and Rf charging. Figure 1 shows the chronological order in which the configuration steps must be performed while initially configuring either CDR-based charging or Rf charging.

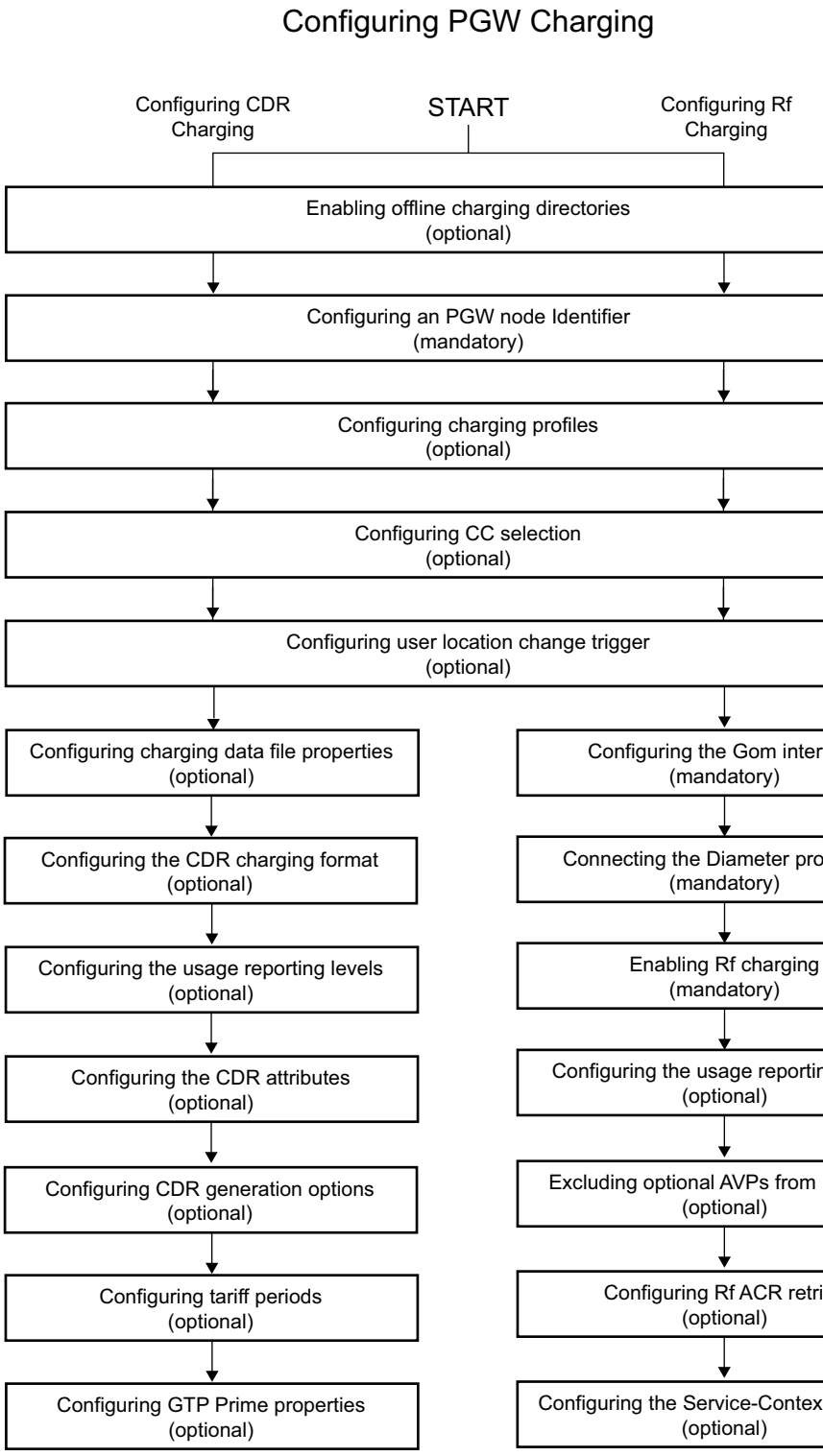

Figure 1 Configuring PGW Offline Charging

3.1 Configure GGSN/PGW Node Identifier

To configure an identifier for the GGSN and PGW that is included in the generated CDRs, include the following statement:

Note: For a combined EPG, the GGSN/PGW node identifier must be different from the SGW node identifier.

```
Ericsson(config)# epg pgw
   node <node-identifier>
```

By default, the GGSN and PGW node identifier is a string of up to 20 characters. When `long-node-id-allowed` is configured, the maximum length of GGSN and PGW node identifier is 32 characters. Spaces must not be used in the string.

For more information on the long node identifier configuration, refer to EPG Software Configuration Overview.

3.2 Configure Charging Characteristics

This section describes the configuration of charging profiles for the GGSN and the PGW.

The EPG uses a profile index (`profile0`, `profile1`, … , `profile15`) to refer to individual charging profiles.

The charging profiles are not assigned a standard behavior; the behavior of each charging profile can be configured in the EPG. All charging profiles have the same default values.

If no configured charging profile is matched by the selected CC, the default settings are used according to Section 3.2.5 on page 12. Since the default setting is to always generate CDRs for bearers, if no CDR generation is desired, CDR generation must be disabled for all charging profiles.

The profile level configuration takes precedence over the charging characteristics level configuration.

For full flexibility, it is recommended to configure all 16 charging profiles.

3.2.1 Configure CC Mask

To configure a CC mask, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> user-category
   cc-mask <mask>
```

By default, the CC mask is `000F`, indicating that bits 4–7 of octet 1 are significant.

3.2.2 Configure Transfer Type

The transfer type to use can be configured for the GGSN and PGW, and be overridden by configuration per charging profile as described in Section 3.2.4.10 on page 11.

To configure the transfer type, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
   transfer-type (ftp-pull | gtp-prime | gtpp-ftp | rf)
```

The default transfer type is `ftp-pull`.

The transfer types `ftp-pull`, `gtp-prime`, and `gtpp-ftp` are only valid for CDR-based charging.

The transfer type `rf` can only be configured if the `charging-rf` feature is activated. See Section 3.5.3 on page 39 for information on activating the `charging-rf` feature in the PGW.

The SFTP protocol is used for CDR transfer when `ftp-pull` or `gtpp-ftp` is configured.

When `rf` is configured, the SFTP protocol is used for ACR file transfer even though the `ftp-pull` parameter is not configurable for Rf charging.

If the transfer type is set to `gtp-prime` or `gtpp-ftp`, at least one charging gateway server must be configured under `gtp-prime` for all charging profiles. For instructions on configuring the charging gateway server, see Section 3.2.4.11 on page 12.

The transfer type can be reconfigured in runtime for `ftp-pull`, `gtp-prime`, or `gtpp-ftp`.

To change the transfer type from `ftp-pull`, `gtp-prime`, and `gtpp-ftp` to `rf` or the other way around, do the following beforehand:

1. Block the creation of new sessions on the PGW.
2. Terminate all active sessions on the PGW.
3. Stop the PGW on the node level.

3.2.3 Associate a DAS with a Profile

A Diameter Application System (DAS) must previously be configured to associate the DAS with charging profiles. For information on configuring DAS, refer to Diameter Configuration.

A DAS can be associated with each profile as described in Section 3.2.4.12 on page 12.

To associate a DAS with all charging profiles that have not explicitly configured the parameter, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
   diameter-application-system <das-id>
```

The DAS can be reconfigured in runtime. New Rf ACRs, for both new and existing Rf sessions, are sent using the new DAS.

3.2.4 Configure Charging Profile Parameters

This section describes how to configure the different parameters associated with a charging profile, such as limits and transfer type.

Note: When configuring limits, lower limits have a higher impact on the capacity and performance of the EPG because of increased CDR or Rf ACR message generation, while higher limits consume more memory on the EPG because of increased accumulation of CDR or Rf ACR data.

3.2.4.1 Disable CDR or Rf ACR Generation

To disable CDR or Rf ACR generation for the bearers associated with a specific charging profile, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics <profile-name>
   no-call-detail
```

By default, CDR or Rf ACR generation is enabled for all charging profiles.

Configuring `no-call-detail` disables CDR or Rf ACR generation for new bearers and deactivates CDR or Rf ACR generation for existing bearers created when `no-call-detail` was not configured. If a bearer is created when `no-call-detail` is configured, it is not possible to later start CDR or Rf ACR generation for that bearer. If a CDR is closed when `no-call-detail` is configured, the closing CDR is dropped and the recorded data is lost.

3.2.4.2 Configure Time Limit

To configure the time limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics <profile-name>
   time-limit <minutes>
```

The default time limit is 60 minutes. The value range is 5–1440 minutes.

The CDR or Rf ACR Interim generation time limit can be configured in runtime. For existing charging sessions, reconfiguration takes effect when the next partial CDR is generated.

3.2.4.3 Configure Volume Limit

To configure the volume limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics <profile-name>
   volume-limit <kilobytes>
```

The default volume limit is 5,000 KB. The configurable range is 100–1,000,000 KB.

3.2.4.4 Configure Bearer Condition Change Limit

To configure the bearer condition change limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics <profile-name>
   change-limit <number>
```

The default bearer condition change limit is 5 changes. The configurable range is 1–5.

3.2.4.5 Configure Serving Node Change Limit

To configure the serving node change limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics <profile-name>
   sgsn-change-limit <number>
```

The default serving node change limit is 5 changes. The configurable range is 1–5.

3.2.4.6 Configure Service Condition Change Limit

To configure the service condition change limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
<profile-name> service-data
   change-limit <number>
```

The default service condition change limit takes the same value as the bearer condition change limit, see Section 3.2.4.4 on page 10, and the configured limit can be between 1 and 15 changes.

3.2.4.7 Configure Tracked URI Limit

Note: This parameter is only valid for CDR-based charging.

To configure the tracked URI limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
<profile-name> service-data
   uri-limit <number>
```

The default tracked URI limit is 10. The configurable range is 5–50.

3.2.4.8 Configure Tracked Event Limit

To configure the tracked event limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
<profile-name> service-data
   charge-event-limit <number>
```

The default tracked event limit is 10. The configurable range is 1–50.

3.2.4.9 Configure Tracked Transaction Limit

To configure the tracked transaction limit, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
<profile-name> service-data
   transaction-report-limit <number>
```

The default tracked transaction limit is 4. The configurable range is 1–10.

Note: The tracked transaction limit may be overridden by the tracked event limit. To make the tracked transaction limit take precedence over the tracked event limit, Ericsson recommends setting the value of the tracked transaction limit to less than half of that of the tracked event limit.

3.2.4.10 Configure Transfer Type

To change the type of transfer the GGSN and PGW use to transfer CDRs or Rf ACRs to external nodes, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics <profile-name>
   transfer-type (ftp-pull | gtp-prime | gtpp-ftp | rf)
```

The default transfer type is `ftp-pull`.

Note: The transfer types `ftp-pull`, `gtp-prime`, and `gtpp-ftp` are only valid for CDR-based charging.

The SFTP protocol is used for CDR transfer when `ftp-pull` or `gtpp-ftp` is configured.

When `rf` is configured, the SFTP protocol is used for ACR file transfer even though the `ftp-pull` parameter is not configurable for Rf charging.

If the transfer type is set to `gtp-prime` or `gtpp-ftp`, at least one charging gateway server must be configured under `gtp-prime` for all charging profiles. For instructions on configuring the charging gateway server, see Section 3.2.4.11 on page 12.

Note: Transfer type `ftp-pull`, `gtp-prime`, and `gtpp-ftp` cannot be set if the transfer type in Section 3.2.2 on page 7 is set to `rf`. Transfer type `rf` can only be set if the transfer type in Section 3.2.2 on page 7 is set to `rf`.

The transfer type can be reconfigured in runtime for `ftp-pull`, `gtp-prime`, or `gtpp-ftp`.

To change the transfer type from `ftp-pull`, `gtp-prime`, and `gtpp-ftp` to `rf` or the other way around, do the following beforehand:

1. Block the creation of new sessions on the PGW.
2. Terminate all active sessions on the PGW.
3. Stop the PGW on the node level.

3.2.4.11 Configure GTP Prime Gateway Addresses

Note: This parameter is only valid for CDR-based charging.

To specify an IPv4 address of a charging gateway server for GTP Prime, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
<profile-name> gtp-prime
   gateway <ipv4-address>
```

Up to three IPv4 addresses can be specified for each charging profile. The precedence order of the charging gateway servers is the order in which they are configured, with the first configured server being the primary charging gateway server.

3.2.4.12 Associate a DAS to a Profile

Note: This parameter is only valid for Rf charging.

A DAS must previously be configured for the Rf application. For information on configuring DASs, refer to Diameter Configuration.

To associate a DAS to a profile, include the following statement:

```
Ericsson(config)# epg pgw charging characteristic
s <profile-name> rf
   diameter-application-system <das-id>
```

The DAS can be reconfigured in runtime. New Rf ACRs, for both new and existing Rf sessions, are sent using the new DAS.

3.2.5 Configure Default Charging Profile

It is possible to configure one of the charging profiles to be the default charging profile used when no CC value is available at bearer activation. To configure a default charging profile, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
   default <profile-name>
```

If no default profile is configured, the GGSN and PGW use the values for `profile0`. If `profile0` is not configured, the GGSN and PGW use the default values for the charging parameters.

3.2.6 Configure Charging Profiles for Roaming Users

A roaming profile can be configured to override the charging profile based on the selected CC for roaming users. To configure the GGSN and PGW to use a roaming profile for an APN, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging characteristics
   roaming-profile <profile-number>
```

A roaming profile points to an already configured charging profile, described in Section 3.2.4 on page 9. If no charging profile is configured, the default values are used.

To use roaming profiles, the EPG home PLMN Identifier (ID) must be configured, as described in APN Configuration.

For more information on roaming profiles, refer to Offline Charging.

3.2.7 Configure Charging Profiles Based on Roaming Class and CC Value

A charging profile based on roaming class and CC value can be configured to override the charging profile based on the selected CC. To configure the GGSN and PGW to use a charging profile based on the roaming class and CC value for an APN, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging characteristics
charging-profile <profile-number>
   roaming-class <value>
   cc-value <value>
```

The charging profile based on roaming class and CC value points to an already configured charging profile, described in Section 3.2.4 on page 9. If no charging profile is configured, the default values are used.

Note: If a roaming profile is configured, described in Section 3.2.6 on page 13, the roaming profile overrides the selected charging profile.

For more information on roaming class and CC value profiles, refer to Offline Charging.

3.3 Configure CC Selection for the GGSN/PGW

This section describes the configuration of Charging Characteristics (CC) selection for the GGSN and PGW. For detailed information on the CC selection procedure, refer to Offline Charging.

Several different CC can be configured, as described in the following sections:

— Enabling CC based on roaming class, as described in Section 3.3.1 on page 14.

— Ignoring CC from the SGSN, Serving Gateway (SGW), Trusted WLAN Access Network (TWAN), and Evolved Packet Data Gateway (ePDG), as described in Section 3.3.2 on page 14.

— Enabling IMSI-based charging profile, as described in Section 3.3.3 on page 15.

— Enabling default APN CC, as described in Section 3.3.4 on page 16.

— Enabling CC from Remote Authentication Dial In User Service (RADIUS), as described in RADIUS Configuration.

— Enabling CC based on credit control query, as described in Credit Control Configuration.

3.3.1 Configure CC Based on Roaming Class

To associate a roaming class with a CC value for CC selection based on roaming class for an APN, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging characteristics
roaming-class-based cc-value <value>
   roaming-class <number>
```

— Several roaming classes can be mapped to the same CC

— Each roaming class can only map to one CC

— Valid CC value range: 0–65,535

— Maximum number of CC: 24

— Valid roaming class range: 1–24

To configure a roaming class for a user, refer to APN Configuration.

3.3.2 Ignore CC Sent by Serving Node

If the selection of CC by roaming class is not enabled, then the EPG applies the charging profile based on the CC from the serving node by default. The PGW can be configured ignore the CC received from the serving node at PGW level or at APN level.

To ignore CC received from the serving node at PGW level, include the following statement:

```
Ericsson(config)# epg pgw charging characteristics
   ignore-profile-from-serving-node
```

To ignore CC received from the serving node for an APN, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging characteristics
   ignore-profile-from-serving-node
```

The configuration can be changed in runtime. The reconfiguration takes effect for new bearers.

3.3.3 Configure IMSI-Based Charging Profile

If no CC element is received from the SGSN, TWAN, ePDG, or SGW, or if the GGSN and PGW are configured to ignore it, IMSI-based analysis can be used to determine a charging profile for a user.

The GGSN and PGW can be configured to select charging profile based on an IMSI. A well-formed IMSI regular expression or a set of IMSI values can be associated with each of the 16 available charging profiles. At bearer activation, the GGSN or PGW searches for all profiles with configured IMSI values for a match. By default, IMSI values are not used to select a charging profile.

To associate an IMSI regular expression or value with a charging profile (`profile0, profile1, ..., profile15`), include the following statement:

```
Ericsson(config)# epg pgw charging imsi-based-charac
teristics <profile-name>
   imsi (<regexp> | <value>)
```

The following restrictions apply to the configuration:

— A maximum of 512 IMSI filters can be configured per profile.

— Each filter can have a maximum length of 100 characters.

Consider the following before configuring IMSI-based charging profiles:

— It is recommended to enter digits and `[]` groups to match IMSI digits.

— It is not recommended to use the . , * or + operator. A warning in the node log is generated if the . , * or + operator is used in an IMSI filter.

— If a regular expression pattern is configured to match IMSIs with 16 or more digits, a warning is generated in the node log.

3.3.3.1 Configure Forced IMSI Analysis for an APN

If the CC element received from an SGSN, TWAN, ePDG, or SGW is to be ignored for users accessing a certain APN, IMSI analysis can be forced for these users. To let IMSI analysis override the SGSN, TWAN, ePDG, or SGW CC for an APN, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging
characteristics imsi-based
   override
```

3.3.3.2 Disable IMSI Analysis for an APN

To disable IMSI analysis for users accessing a certain APN, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging
characteristics imsi-based
   disable
```

3.3.4 Configure a Default APN CC

To configure a default CC value for an APN, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging characteristics
   apn-default <value>
```

Note: Only the first 8 bits, of which 4 bits selects the charging profile and 4 behavior bits, are included in a CDR.

3.4 Configure CDR-Based Charging

This section describes the configuration of CDR-based charging for the PGW.

3.4.1 Configure Charging Data File Properties

This section gives instructions for configuring charging data file properties.

For more information on charging data files, refer to CDR-Based Charging Interface Description.

3.4.1.1 GTP Prime Data File Properties

To enable creation of charging data files for GTP Prime when all configured CGFs are unreachable, the GTP Prime internal buffer is full, or the GTP Prime data record size exceeds the limit of 12,800 bytes, include the following statement:

```
Ericsson(config)# epg pgw charging charging-data-file
gtp-prime-data-file
   activate-on-failure
```

The charging data files for GTP Prime are stored in the directories listed in Table 1 and Table 2.

To access the folder, the user must be assigned to NACM groups `epg-charging-admin` or `epg-gtppcdr-admin`. For more information regarding NACM groups, refer to Security Management.

3.4.1.2 Enable Compression of Charging Data Files

To configure the GGSN and PGW to compress all charging data files using `gzip`, include the following statement:

```
Ericsson(config)# epg pgw charging charging-data-file
   compression
```

3.4.1.3 Enable Creation of Empty Charging Data Files

To configure the GGSN and PGW to create charging data files periodically, even if the files are empty, include the following statement:

```
Ericsson(config)# epg pgw charging charging-data-f
ile local-data-file
   force-empty-files
```

By default, the GGSN or PGW does not save any empty charging data files if no CDRs have been generated. Generation of empty charging data files is not applicable for GTP Prime data files.

3.4.1.4 Configure Maximum Charging Data File Size

To configure the maximum size of charging data files for the GGSN and PGW, include the following statement:

```
Ericsson(config)# epg pgw charging charging-data-file
   maximum-size <size>
```

The default maximum size of GGSN and PGW charging data files is 102,400 KB. The value range is 1024 KB to 102,400 KB (1 MB through 100 MB).

3.4.1.5 Configure Maximum Charging Data File Age

To configure the maximum age of charging data files for the GGSN and PGW, include the following statement:

```
Ericsson(config)# epg pgw charging charging-data-file
   maximum-age <minutes>
```

The default maximum age of GGSN and PGW charging data files is 120 minutes. The value range is 5–1440 minutes (24 hours).

3.4.2 Configure CDR Charging Format

If the GGSN or PGW is to generate CDRs, the charging format, that specifies the version of the charging format for the CDRs, must be configured.

Note: For PMIPv6-based S2a access, only Release 8 is supported.

To configure the charging format for the GGSN and PGW, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-encoding
   charging-format (6 | 7 | 8 | 13 | 15)
```

The format can be Rel-6, Rel-7, Rel-8, Rel-13, or Rel-15.. The default format is Rel-7.

The formats are further specified in CDR Format for the GGSN and PGW.

Note: If the charging format is changed during node operation, the change takes effect immediately, so the first GTP' CDR after the changes uses the new charging format in the date record format version.

For information about which 3GPP release to use together with GGSN APNs or PGW APNs, see Table 3.

Table 3 Type of APN Configured in the EPG and the Applicable 3GPP Releases

Type of APN Configured in the EPG	Applicable 3GPP Releases
Only PGW APNs	Release 6, 7, 8, 13, or 15
Both GGSN APNs and PGW APNs	Release 6, 7, 8, 13, or 15
Only GGSN APNs	Any release can be used

3.4.2.1 Configure the CDR Size

CDRs have a default size limit of 512,000 bytes, but can be configured to be 64,000 bytes. To change the CDR size limit to 64,000 bytes, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-encoding
   maximum-size-64-kilo-bytes
```

3.4.3 Configure CDR Usage Reporting Levels

The following sections give detailed instructions for configuring the available CDR usage reporting levels on the GGSN and PGW.

3.4.3.1 Configure Bearer Level Reporting

By default, usage is reported on bearer level by the GGSN. No bearer level reporting configuration is required. Optionally, usage can be reported on bearer level by the PGW in PGW-CDRs, see Section 3.4.5.3 on page 33.

Alternatively, bearer usage can be reported on a default RG level in service data containers by the PGW using either of the following options:

— By specifying the RG for bearer usage for an APN with SACC disabled, see Section 3.4.5.4.4 on page 35.

— By enabling SACC and disabling packet inspection for an APN, refer to SACC Configuration.

3.4.3.2 Configure RG Level Reporting

By default, usage is reported on Rating Group (RG) level if SACC is applied. No RG level reporting configuration is required.

Optionally, to configure RG level reporting on node level for packet flows that are not configured for SI level reporting on rule space level, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanc
ed-cdr service-data-attributes
   reporting-level <rating-group>
```

3.4.3.3 Configure SI Level Reporting

SI level reporting can be configured on node level or per SI on rule space level. SI level reporting configuration on rule space level is applicable only if RG level reporting is configured on node level.

To configure SI level reporting on node level, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanc
ed-cdr service-data-attributes
   reporting-level <service-id>
```

Including this statement enables SI level reporting for all rule spaces.

To configure SI level reporting for one or several SIs in a rule space, do the following:

1. Configure RG level reporting on node level by including the following statement:

   ```
   Ericsson(config)# epg pgw charging cdr-attribute enhan
   ced-cdr service-data-attributes
      reporting-level <rating-group>
   ```

2. Configure SI level reporting on rule space level for an SI or a consecutive range of SIs separated by - by including the following statement:

   ```
   Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
   service-data-attributes rule-space <rule-space-name>
      service-id-level-reporting (<si-id> | <si-id>-<si-id>)
   ```

Including these statements enables SI level reporting for the configured rules spaces and SIs. Usage in other rule spaces and SIs is reported on RG level.

3.4.3.4 Configure URI Tracking

Note: URI tracking is resource consuming and can have an impact on the capacity and performance of the EPG.

The following subsections describe how to activate URI tracking for each type of deep inspection rule supporting URI level reporting.

3.4.3.4.1 Activate URI Tracking for a Rule Classifying HTTP, WSP, or MMS Traffic

To activate URI tracking for a term in a deep inspection rule classifying Hypertext Transfer Protocol (HTTP), Wireless Session Protocol (WSP), or Multimedia Messaging System (MMS), traffic, include the following statement:

```
Ericsson(config)# epg pgw service-identification http-wsp-rule
<rule-name> term <term-id> then
   activate-uri-tracking
```

3.4.3.4.2 Activate URI Tracking for a Rule Classifying RTSP Traffic

To activate URI tracking for a term in a deep inspection rule classifying Real Time Streaming Protocol (RTSP) traffic, include the following statement:

```
Ericsson(config)# epg pgw service-identification rtsp-rule
<rule-name> term <term-id> then
   activate-uri-tracking
```

3.4.3.4.3 Activate URI Tracking for a Rule Classifying SIP Traffic

To activate URI tracking for a term in a deep inspection rule classifying Session Initiation Protocol (SIP) traffic, include the following statement:

```
Ericsson(config)# epg pgw service-identification sip-rule
<rule-name> term <term-id> then
   activate-uri-tracking
```

3.4.3.5 Configure URI Level Reporting

Note: Configuring URI level reporting requires optional record extensions to be included in the CDR, see Section 3.4.4.8 on page 30.

To include a textual URI identifier of tracked URIs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
record-extension-attributes
   include-uri
```

By default, the textual URI identifier of tracked URIs is truncated at 256 characters. Optionally, to change the length at which a URI is truncated in the interval from 10 to 1025 characters, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute record-
extension-attributes include-uri
   max-uri-length <length>
```

To configure the reporting of a numerical URI identifier of tracked URIs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute record-
extension-attributes include-uri
   identifier
```

To configure the reporting of volume associated with tracked URIs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute record-
extension-attributes include-uri
   volume
```

To configure the reporting of the number of times a URI is accessed, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute record-
extension-attributes include-uri
   count
```

To configure the reporting of timestamps of when a URI is accessed, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute record-
extension-attributes include-uri
   timestamp
```

3.4.3.6 Configure IP Flow Level Volume Reporting

To activate IP flow level volume reporting, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
record-extension-attributes
   include-ip-flow
```

To configure the maximum number of IP flows per CDR, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute record-e
xtension-attributes include-ip-flow
   max-flows <max-flows>
```

Note: CDRs are dropped if the configured max-flows value results in the CDR size limit being exceeded.

If the maximum number of IP flows is not configured, a default value of 500 flows applies. The value range is 1–1000 flows.

For information how to report a Uniform Resource Locator (URL) domain for IP flow level volume reporting, refer to Charging Methods Configuration.

3.4.4 Configure CDR Fields

This section describes configuration of several GGSN and PGW CDR attributes.

3.4.4.1 MSISDN Options

Charging gateways often depend on the Mobile Subscriber ISDN Number (MSISDN) address to accurately track and charge customers. By default, the GGSN and PGW include the MSISDN address in the CDRs only when there is a change, such as when the customer is roaming or begins a connection (the MSISDN is always in the first CDR). The GGSN and PGW can be configured to exclude the MSISDN address in the CDRs, or to always include the MSISDN address even if there is no change.

To exclude the MSISDN from all CDRs except the first, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   no-msisdn
```

To always include the MSISDN in CDRs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   msisdn-always
```

Both options cannot be configured at the same time. The `msisdn-always` option overrides the reduced partial CDR configuration. For more information on CDR formats, see Section 3.4.2 on page 18.

To exclude the Number Plan Indicator from all the MSISDNs in CDRs, include the following statement:

```
Ericsson(config)#epg pgw charging cdr-attribute
no-msisdn-number-plan-indicator
```

The command excludes the first octet of the information in the served MSISDN field. For more information about the format, see CDR Format for the GGSN and PGW

The MSISDN attribute is optional for PMIPv6-based S2a access. The effect of configuring the MSISDN options on CDRs for PMIPv6-based S2a access is described in Table 4.

Table 4 Effect of Configuring MSISDN Options on CDRs for PMIPv6-based S2a Access

`no-msisdn` **Configured**	`msisdn-always` **Configured**	**MSISDN Attribute Included**(1)	**Effect**
No	No	No	None
No	No	Yes	The MSISDN is included in the CDRs only when there is a change, such as when the customer is roaming or begins a connection (the MSISDN is always in the first CDR).
Yes	-	No/Yes	The MSISDN is not included in the CDR for the session.
-	Yes	No	The MSISDN is not included in the CDR for the session.
-	Yes	Yes	The MSISDN is included in the CDR for the session.

(1) If the MSISDN attribute is included in one or more PBU messages received by the PGW, the MSISDN is included in the CDR depending on the configuration.

3.4.4.2 Exclude Fields from CDRs

The GGSN and PGW can be configured to exclude certain fields to keep the size of the CDRs as small as possible.

For information on what fields are supported in each CDR release, refer to CDR Format for the GGSN and PGW.

3.4.4.2.1 Exclude Bearer Level Fields

The CDR fields that can be excluded on bearer level are configured under the following hierarchy level:

```
epg pgw charging cdr-attribute
```

For example, to exclude the APN network identifier field from CDRs, enter the following:

```
Ericsson(config)# epg pgw charging cdr-attribute no-apn-network-identifier
```

Table 5 shows the configuration statements to use to exclude a certain CDR field.

Table 5 Bearer Level Fields

Field to Exclude	Attribute
3GPP2 User Location Information	`no-threegpp2-uli`
APN Network Identifier	`no-apn-network-identifier`
APN Selection Mode	`no-apn-selection-mode`
Charging Characteristics Selection Mode	`no-cc-selection-mode`
Dynamic Address Flag	`no-dynamic-address-flag`
IMS Signalling Context	`no-ims-signaling-context`
List of Traffic Volumes QoS Information - APN AMBR (1)	`no-qos-apn-ambr`
List of Traffic Volumes QoS Information - Extended Bit Rates(1)	`no-qos-extended-bitrates`
List of RAN Secondary RAT Usage Reports	`no-list-of-ran-secondary-rat-usage-reports`
Local Record Sequence Number	`no-local-record-sequence-number`
Low Priority Indicator	`no-low-priority-indicator`

Field to Exclude	Attribute
MSISDN	`no-msisdn`
MSISDN-NPI	`no-msisdn-number-plan-indicator`
MS Time Zone	`no-ms-time-zone`
Node ID	`no-node-identifier`
PDN Connection ID	`no-pdn-connection-id`
PDP Type	`no-pdp-type`
PDP/PDN Type	`no-pdp-pdn-type`
PDP/PDN Type Extension	`no-pdn-type-extension`
SCS/AS Address	`no-scs-as-address`
PGW PLMN ID	`no-pgw-plmn-id`
RAT Type	`no-rat-type`
Served IMEISV	`no-imei-sv`
Served PDP/PDN Address, Served PDP/PDN Address Extension - IPv4(2)	`no-pdp-pdn-address-ipv4`
Served PDP/PDN Address, Served PDP/PDN Address Extension - IPv6(3)	`no-pdp-pdn-address-ipv6`
Served PDP Address - IPv4	`no-pdp-address-ipv4`
Served PDP Address - IPv6	`no-pdp-address-ipv6`
Serving Node PLMN ID	`no-serv-node-plmn-id`
SGi PtP Tunneling Method	`no-sgi-ptp-tunneling-method`
SGSN PLMN ID	`no-sgsn-plmn-id`
Start Time	`no-start-time`
Stop Time	`no-stop-time`

Field to Exclude	Attribute
User Location Information	`no-user-location-information`
UNI-PDU-CP-Only-Flag	`no-uni-pdu-cp-only-flag`

(1) QoS information varies according to the combination of fields that are included. For more information, refer to Section 3.4.4.13 on page 32
(2) When set and Dual Stack IPv4v6 is used, only the Served PDP/PDN Address field is included with the IPv6 address.
(3) When set and Dual Stack IPv4v6 is used, only the Served PDP/PDN Address Extension field is included with the IPv4 address.

3.4.4.2.2 Exclude Service Containers

The service containers that can be excluded from a CDR are configured under the following hierarchy level:

```
epg pgw charging cdr-attribute enhanced-cdr
```

For example, to exclude the PS Furnish Charging Information service container from CDRs, enter the following:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
no-ps-furnish-charging-information
```

Table 6 shows the configuration statements to use to exclude a certain service container from a CDR.

Table 6 Container Fields

Field to Exclude	Attribute
PS Furnish Charging Information for all bearers(1)	`no-ps-furnish-charging-information`
PS Furnish Charging Information for dedicated bearers only(2)	`no-ps-fci-dedicated-bearer-rec-level`
List of Service Data	`no-service-data`
List of Traffic Volumes(3)	`no-traffic-volumes`

(1) Affects record and service level.
(2) Affects dedicated bearers and record level.
(3) Not applicable for PGW-CDRs. List of Traffic Volumes is excluded from PGW-CDRs by default.

3.4.4.2.3 Exclude Service Data Fields

The fields that can be excluded from the service data container are configured under the following hierarchy level:

```
epg pgw charging cdr-attribute enhanced-cdr servi
ce-data-attributes
```

For example, to exclude the QoS Information field from the service data container in CDRs, enter the following:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
service-data-attributes no-qos-information
```

Table 7 shows the configuration statements to use to exclude a certain field from the service data container in a CDR.

Table 7 Service Data Container Fields

Field to Exclude	Attribute
3GPP2 User Location Information	`no-threegpp2-uli`
List of Service Data QoS Information - APN AMBR(1)	`no-qos-apn-ambr`
List of Service Data QoS Information- Extended Bit Rates(1)	`no-qos-extended-bitrates`
QoS Information	`no-qos-information`
RAT Type	`no-rat-type`
Serving Node Address	`no-serv-node-address`
SGSN Address	`no-sgsn-address`
SGSN PLMN ID	`no-sgsn-plmn-id`
User Location Information	`no-user-location-information`

(1) QoS information varies according to the combination of fields that are included. For more information, refer to Section 3.4.4.13 on page 32

3.4.4.2.4 Exclude ULI from the Traffic Volumes Container

To exclude the ULI field from the Traffic Volumes container in CDRs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute traffic-volumes
   no-user-location-information
```

3.4.4.3 SI Level Options

By default, the GGSN and PGW suppress certain fields of information from SI level service data containers and service data extension containers that are by default included in associated RG level service data containers and service data extension containers. The GGSN and PGW can be configured to include certain fields on SI level. The information that can be included is shown in Table 8.

The SI level service data container fields that can be included are configured under the following hierarchy level:

```
epg pgw charging cdr-attribute enhanced-cdr service-data-attributes service-id
```

The SI level service data extension container fields that can be included are configured under the following hierarchy level:

```
epg pgw charging cdr-attribute record-extension-attributes service-id
```

Table 8 SI Level Includible Fields

Information to Include	Attribute	Service Level
Result code	`result-code`	SI
QoS information	`qos-information`	SI
SGSN address	`sgsn-address`	SI
Serving node address	`serv-node-address`	SI
SGSN PLMN identifier	`sgsn-plmn-id`	SI
RAT type	`rat-type`	SI
Failure handling continue	`failure-handling-cont`	SI
User location information	`user-location-information`	SI
CC request number	`cc-request-number`	SI extension

Note: Information cannot be included on SI level if excluded from service data according to Table 7.

By default, the 3GPP2 User Location Information is included in SI level of the List of service data field in PGW-CDR. To exclude the 3GPP2 User Location Information from SI level of the List of service data field, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
enhanced-cdr service-data-attributes service-id
   no-threegpp2-uli
```

3.4.4.3.1 Exclude RG Level Service Data Container

Some CDR mediation systems cannot decode RG level service data containers with zero usage. The GGSN or PGW can be configured to not generate RG level service data containers if the usage is zero.

To configure the GGSN or PGW to not generate RG level service data containers with zero usage, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
service-data-attributes rating-group
   no-zero-usage-container
```

If the GGSN or PGW is configured to not generate RG level service data containers with zero usage, the fields present in the RG level service data containers but suppressed in the SI level service data containers are missing. To include these fields in the SI level service data containers, see Section 3.4.4.3 on page 27.

3.4.4.4 APN Encoding Options

It is possible to specify how the GGSN and PGW encode APN names in CDRs. APN names contain embedded dots between its components, much like IP addresses or internet host and domain names. The GGSN and PGW can generate CDRs with the dots intact (dot notation) or replace the dots with a length indicator before each component (digit notation), depending on the expectation of the charging gateway.

By default, the GGSN and PGW represent APNs in digit notation. To configure the GGSN and PGW to explicitly use digit notation or dot notation for encoding APN names, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   apn-encoding (digit-notation | dot-notation)
```

3.4.4.5 Include Requested APN in the CDR

To configure which APN name to include in the `Access Point Name/Access Point Name Network Identifier` field in the CDR, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging
   select-apn (used | logical | requested)
```

The `select-apn` configuration has three options. Page 30 describes how the selected option determines the APN name in the `Access Point Name/Access Point Name Network Identifier` field in the CDR.

Table 9 The APN Name in Access Point Name/Access Point Name Network Identifier Field in the CDR

Option	The APN Name in `Access Point Name/Access Point Name Network Identifier` Field in the CDR
`used`	Same as the configured APN name for the selected APN. The GGSN and PGW apply the `used` option by default.
`logical`	Same as the configured APN name for the requested APN(1).
`requested`	Same as the requested APN name in the GTP message, if the APN was changed by Radius Assisted Selection of APN (RAAS) or the PCRF-Assisted APN Selection. Same as the configured APN name for the requested APN(1), if the APN was not changed by RAAS or the PCRF-Assisted APN Selection.

(1) The requested APN means the APN that was received over the Gn/Gp, S5/S8, GTP-based S2a, GTP-based S2b, or PMIPv6-based S2a interface.

3.4.4.6 Always Include QoS Information

By default, the GGSN and PGW only include QoS information in traffic volume containers if there is a change. To configure the GGSN and PGW to always include QoS information, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute traffic-volumes
   qos-always
```

Note: `qos-always` cannot be configured at the same time as the `no-traffic-volumes` statement.

3.4.4.7 Include MBR and GBR for non-GBR Bearers

To configure the GGSN or PGW to include Maximum Bit Rate (MBR) and Guaranteed Bit Rate (GBR) in Release 8 CDRs for non-GBR bearers, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   qos-bitrate-for-nongbr
```

The MBR and GBR are included in the `EPC QoS Information` subfields in Release 8, Release 13, and Release 15 CDRs.

3.4.4.8 Record Extensions

By default, the GGSN and PGW do not include record extensions in CDRs. To configure the GGSN and PGW to include record extensions in CDRs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   record-extension
```

The record extensions consist of several fields, some of which are excluded from the CDRs by default. The following subsections describe the record extension fields.

3.4.4.8.1 Applied User Category

To configure the GGSN and PGW to include the applied user category, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
record-extension-attributes
   user-category
```

3.4.4.8.2 URI

By default, the GGSN and PGW do not include the URI information in CDRs.

For information on including URI information, see Section 3.4.3.4 on page 20 and Section 3.4.3.5 on page 21.

3.4.4.9 Record Sequence Numbers

By default, the GGSN and PGW do not include record sequence numbers in CDRs when only one record is produced. To configure the GGSN and PGW to always include record sequence numbers in single CDRs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   record-seq-number-single-cdr
```

It is possible to reconfigure the inclusion of record sequence numbers in runtime. For existing charging sessions, reconfiguration takes effect when the next single CDR is generated.

3.4.4.10 Configure 31 Bits Charging ID

To ensure that the charging ID cannot exceed 4 bytes, include the following statement:

```
Ericsson(config)# epg pgw charging
   use-31bits-charging-id
```

The charging ID is presented as an integer between 0 and 2147483647 (2^{31}-1).

Note: The new charging ID range applies only after a node restart.

3.4.4.11 Configure GGSN and PGW to Add New Serving Node Addresses

By default the new serving node address is not added to the CDR when the CDR is closed by a serving node change `sgsn-change` and the SGSN Address List or Serving Node Address List is full.

To configure the GGSN and PGW to add the new serving node address to the CDR, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   include-new-sgsn-address
```

3.4.4.12 Configure Start Time

To configure the GGSN and PGW to include the start time in all the CDRs for the bearer, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   start-time-always
```

3.4.4.13 Including QoS Extended Bit Rate and AMBR Information

The List of Traffic Volumes QoS Information - APN AMBR, List of Traffic Volumes QoS Information - Extended Bit Rates, List of Service Data QoS Information - APN AMBR, and List of Service Data QoS Information - Extended Bit Rates fields are enabled by default, but can be disabled on the `cdr-attribute` level, as described in Table 5, and the `service-data-attributes` level as described in Table 7.

Table 10 shows the information included in CDRs depending on which fields are enabled.

Table 10 Data Received in CDRs Depending on QoS Information Configuration

	Both sets of fields are included	**Only the Extended Bit Rate fields are included**	**Only the APN AMBR fields are included**	**Neith inclu**
Extended Bit Rate	Included	Excluded(1)	Included	Exclu
Normal Bit Rates	Included	Included	Included	Inclu
Extended APN AMBR	Included	Excluded	Included	Exclu
Normal APN AMBR	Included	Included(2)	Excluded	Exclu

(1) If extended bit rates are received from the PCRF, the PGW converts the bit rates and includes them as normal bit rates in the CDR. If the value is greater than 2^32-1, then normal bit rates are included with the value 2^32-1.
(2) If the APN AMBR has a value of zero, then the CDR includes the APN AMBR fields with value `0` (zero).

3.4.5 Configure CDR Generation Options

The following subsections give instructions for configuring options related to CDR generation.

3.4.5.1 Disable Generation of Reduced Partial CDRs

By default, the GGSN and PGW generate reduced partial CDRs. To configure the GGSN and PGW to always generate fully qualified CDRs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   no-reduced-partial
```

3.4.5.2 Configure Record Data Options

The following subsections give instructions for configuring options related to record data.

3.4.5.2.1 Suppress Initial Partial CDR Closure

By default, the EPG generates an initial partial CDR at bearer creation that only includes static information, and closes the record immediately. To configure the EPG to suppress the record closure of the initial partial CDR and to record data in the record until the record is closed for other reasons, include the following statement:

```
Ericsson(config)# epg pgw charging
   no-initial-cdr
```

3.4.5.2.2 Configure Incremental Time Limit Measurement

By default, the time limit condition is measured from the opening of the current record. To configure the EPG to measure the time limit condition in increments since the creation of the bearer, that is, to not reset the time limit when a record is closed for another reason, include the following statement:

```
Ericsson(config)# epg pgw charging time-limit-measurement
   ctx-creation
```

3.4.5.2.3 Suppress Record Closure without Usage

By default, the EPG closes the record and resets all record-related limits when the time limit of the record is reached regardless of usage. To configure the EPG to suppress record closure and reset only the time limit when the time limit of the record is reached if there is no reported usage, include the following statement:

```
Ericsson(config)# epg pgw charging
   no-empty-cdr
```

3.4.5.3 Configure Bearer Data Options

The following subsections give instructions for configuring options related to bearer data.

3.4.5.3.1 Include Traffic Volume Container

By default, PGW-CDRs do not contain traffic volume containers.

To configure the EPG to include traffic volume containers in PGW-CDRs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute
   traffic-volumes
```

To configure the EPG to include traffic volume containers in PGW-CDRs if SACC is enabled, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
   traffic-volumes
```

This option is not applicable for G-CDRs or eG-CDRs.

3.4.5.4 Configure Service Data Options

The following subsections give instructions for configuring options related to service data.

3.4.5.4.1 Configure User Location Change Triggers

By default, the GGSN and PGW do not close service data containers at user location change. To configure the GGSN and PGW to close service data containers at specific types of changes in user location, include the following statement:

```
Ericsson(config)# epg pgw charging user-location-change-trigger
(bsid | cgi-sai | ecgi | rai | tai)
```

3.4.5.4.2 Include Service Data Container without Usage

By default, the EPG opens a service data container at first use, that is, volume, time, or event, of a service and records service data until any condition is met. To configure the EPG to open and immediately close a service data container if there is no usage recorded but a service-related service condition or `PDP Context Release` condition is met, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanc
ed-cdr service-data-attributes
   allow-zero
```

3.4.5.4.3 Local Sequence Number

By default, the EPG restarts the local sequence number for each new partial CDR. To configure the EPG to increment the local sequence number throughout the lifetime of a bearer, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanc
ed-cdr service-data-attributes
   continuous-local-seq-number
```

The reconfiguration takes effect for the next generated CDR.

3.4.5.4.4 Include Bearer Usage in Service Data Container with SACC Disabled

By default, G-CDRs and PGW-CDRs do not contain service data containers if SACC is disabled. To configure the EPG to record bearer usage, that is, volume, and conditions in service data containers on a specified RG for an APN with SACC disabled, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging cdr-at
tribute enhanced-cdr service-data
   rating-group <rating-group-id>
```

3.4.5.4.5 Suppress Service Data Container Closure for Service-Related Causes

By default, the EPG records service data in service data containers until a service-related, bearer-related, or record-related condition is met. To configure the EPG to suppress service data container closure when service-related conditions other than `Tariff Time Switch` are met, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
   accumulate-service-data
```

3.4.5.4.6 Configure PS Furnish Charging Information Recording

By default, if `no-reduced-partial` is configured and `PS Furnish Charging Information` is received from the OCS, the GGSN and PGW present the `PS Furnish Charging Information` in the CDR only once, unless the GGSN and PGW receive the `PS Furnish Charging Information` again from the OCS.

To configure the GGSN and PGW to keep presenting the `PS Furnish Charging Information` in every CDR at the root level after receiving `PS Furnish Charging Information` from the OCS, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
   keep-ps-fci-after-recording
```

Note: This parameter is only applicable when `no-reduced-partial` is configured.

The value of `PS Furnish Charging Information` in CDRs is only changed when a new value is received. The `PS Furnish Charging Information` is not presented if the Credit-Control-Answer (CCA) message from the OCS has timed out.

If the PGW receives an error result code from the OCS, and if the GGSN or PGW is configured to continue the session with failure handling, the GGSN or PGW can be configured to remove `PS Furnish Charging Information` from all partial CDRs.

To configure the GGSN and PGW to remove the `PS Furnish Charging Information` from the partial CDRs, include the following statement:

```
Ericsson(config)# epg pgw charging cdr-attribute enhanced-cdr
   remove-ps-fci-offline
```

For information on configuring the failure actions in an OCS failure, refer to Credit Control Configuration.

3.4.6 Configure Tariff Periods

The GGSN and PGW can be configured to support up to 24 different tariff periods based on time of day in increments of 15 minutes during a 24-hour period.

To configure the start of a tariff period, include the following statement:

```
Ericsson(config)# epg pgw charging tariff-activation
<tariff-activation-id>
   starts <time>
```

`tariff-activation` is a number between 1 and 24.

`starts` is specified in the format `hh:mm`, where `hh` can be between `00`–23, and `mm` can be `00`, 15, 30, or 45. For example, midnight is specified as `00:00` and 2:15 PM is specified as 14:15.

Each tariff period lasts until the start of the next tariff period.

If the EPG is configured to use Daylight Savings Time (DST), the following rules apply:

— When DST begins, an hour is skipped. For example, in areas that use Central European Time (CET), at `01:59:59` the local time changes to `03:00:00`. If tariff periods are configured to begin during the skipped hour, the CDR container `List of Traffic Volumes` is closed with cause `Tariff-Time-Change`.

  Only one CDR container is closed regardless of how many tariff periods are configured, because only 1 second passes in real time.

— When DST ends, an hour is added. For example, in areas that use CET, at `02:59:59` the local time changes to `02:00:00`. If tariff periods are configured to begin during the additional hour, the tariffs are not repeated.

3.4.7 Configure GTP Prime Properties

This section gives instructions for configuring GTP prime properties.

For more information on CDR transfer using GTP prime, refer to CDR-Based Charging Interface Description.

3.4.7.1 Configure GTP Prime IP Addresses

If GTP Prime is used for CDR transfer, a single IP address for the Ga interface must also be configured. For information about configuring this address, refer to EPG Board Configuration.

3.4.7.2 Configure the GTP Prime Version

To configure the GTP prime version, include the following statement:

```
Ericsson(config)# epg pgw charging gtp-prime
   version <version>
```

The default GTP prime version is `v0-6`. The supported values are `v0-6`, `v0-20`, and `v2`.

3.4.7.3 Configure GTP Prime Path Management

This section describes how to configure path management and associated parameters for GTP prime.

3.4.7.3.1 Enable Path Management

To enable path management between the GGSN/PGW and the CGF, include the following statement:

```
Ericsson(config)# epg pgw charging gtp-prime
   path-management
```

Path management is disabled by default.

3.4.7.3.2 Configure the Echo Request Interval

When path management is enabled, each established path is supervised by a timer. When the timer reaches its expiry time (`keepalive-interval`), an `Echo Request` message is sent to the CGF.

To modify the expiry time for path management from the GGSN/PGW to the CGF, include the following statement:

```
Ericsson(config)# epg pgw charging gtp-prime
   keepalive-interval <seconds>
```

The default expiry time is `60` seconds. The value range is `60`–`200` seconds.

3.4.7.3.3 Configure the Resending of GTP Prime Requests

The GGSN and PGW can resend GTP Prime requests towards the CGF for which no response is received. To configure the number of attempts to send a request message, including the initial sending, include the following statement:

```
Ericsson(config)# epg pgw charging gtp-prime
   n3-requests <number>
```

The default number of attempts is 5. The value range is 1–8.

To configure the wait time (T3 timer) before resending a GTP Prime request to the CGF, include the following statement:

```
Ericsson(config)# epg pgw charging gtp-prime
   t3-response-time <seconds>
```

The default wait time is 20 seconds. The value range is 1–30 seconds.

3.4.7.3.4 Configure Echo Request Interval to Unavailable CGFs

To enable periodical sending of `Echo Request` messages to unavailable CGFs, include the following statement:

```
Ericsson(config)# epg pgw charging gtp-prime
   checkalive-interval <seconds>
```

The `Echo Request` message is resent until an `Echo Response` or `Node Alive Request` message is received. The value range is 60–600 seconds.

3.4.7.4 Configure Limited Support for Duplicate Prevention

To use GTP Prime for prevention of duplicate CDR PDUs, GTP Prime version **v2** must be configured as described in Section 3.4.7.2 on page 37. When a CDR PDU is sent to the primary CGF but is unacknowledged, the same CDR PDU is sent to the secondary CGF. To partially prevent duplicate CDR PDUs from appearing unnoticed in the BS, the CDR sent to the secondary CGF is tagged as a possible duplicate. To enable limited prevention of duplicate CDR PDUs, include the following statement:

```
Ericsson(config)# epg pgw charging gtp-prime duplicate-prevention
   partial
```

3.4.7.5 Configure the QoS Class for GTP Prime Traffic

For information on how to configure the QoS class for GTP prime traffic, refer to Quality of Service Configuration.

3.4.8 Configure CDR Charging Data Handling

To configure the offset values that are applied to `record-sequence-number` and `local-sequence-number` after a PGW ICR switchover, issue the following commands:

```
Ericsson(config)# epg pgw charging icr switchover
   record-sequence-number-jump <value>
   local-sequence-number-jump <value>
```

The `record-sequence-number-jump` and `local-sequence-number-jump` have default values of `0`, with a range of `0`–`65,000`.

3.5 Configure Rf Charging

To configure Rf charging in the PGW, use the steps detailed in the following sections.

3.5.1 Configure Gom Interface

To configure Rf charging, the Gom control plane interface must first be configured. Refer to EPG Board Configuration for configuring the Gom interface.

For detailed information about configuring the Rf interface, refer to Diameter Configuration.

3.5.2 Configure Diameter Properties

Diameter properties must be configured before configuring Rf charging.
For information on configuring the Diameter properties, refer to Diameter Configuration.

3.5.3 Enable Rf Charging

To enable Rf charging in the PGW, include the following statement:

```
Ericsson(config)# epg pgw feature-activation
   charging-rf
```

Note: Enabling Rf charging disables CDR-based charging.

Do!

Before enabling Rf charging, ensure that a DAS has been configured. For information about configuring a DAS, refer to Diameter Configuration.

By default, the license for Rf charging is not configured. To enable Rf charging in runtime, all sessions in the node must be terminated. For instructions on starting and stopping the node, refer to EPG Software Configuration Overview.

3.5.4 Include Requested APN in the Rf

To configure which APN name to include in the `Called-Station-Id` AVP, include the following statement:

```
Ericsson(config)# epg pgw apn <apn-name> charging
   select-apn (used | logical | requested)
```

The `select-apn` configuration has three options. Page 40 describes how the selected option determines which APN name is included in the `Called-Station-Id` AVP.

Table 11 The APN Name in Called-Station-Id AVP

Option	The APN Name in `Called-Station-Id` AVP
used	Same as the configured APN name for the selected APN. The GGSN and PGW apply the `used` option by default.
logical	Same as the configured APN name for the requested APN(1).
requested	Same as the requested APN name in the GTP message, if the APN was changed by Radius Assisted Selection of APN (RAAS) or the PCRF-Assisted APN Selection. Same as the configured APN name for the requested APN(1), if the APN was not changed by RAAS or the PCRF-Assisted APN Selection.

(1) The requested APN means the APN that was received over the Gn/Gp, S5/S8, GTP-based S2a, GTP-based S2b, or PMIPv6-based S2a interface.

3.5.5 Configure Usage Reporting Levels

PDN connection level reporting is supported for Rf charging on the PGW. No configuration is required for PDN connection level reporting. In a PDN connection,

volume is reported on the RG level by default. Optionally, SI level reporting can be configured for volume reporting.

3.5.5.1 Configure RG Level Reporting

To configure RG level reporting, include the following statement:

```
Ericsson(config)# epg pgw charging rf service-reporting
   reporting-level rating-group
```

3.5.5.2 Configure SI Level Reporting

To configure SI level reporting, include the following statement:

```
Ericsson(config)# epg pgw charging rf service-reporting
   reporting-level service-id
```

3.5.5.3 Configure SI Measurement

The SDF-ID of a packet flow can be used as SI.

Note: SI level reporting must be configured, before SIs can be specified.

To configure which SIs are subjected to SI level reporting, include the following statement:

```
Ericsson(config)# epg pgw charging rf service-reporti
ng service-id-level-reporting
   service-id (<si-id> | <si-id>-<si-id>)
```

If SI measurement is configured, the SDC for the relevant SI reports RG and SI while the other SDCs only report RG. If SI measurement is not configured, the SDCs report both SI and RG.

3.5.5.4 Configure Number of Service Data Container Limit in the ACR Messages

To configure the number of SDC limits in ACR messages, include the following statement:

```
Ericsson(config)# epg pgw charging rf service-reporting sdc-limit
   limit <value>
   no-change-condition
```

The value range for the SDC limit is 5–15, and the default value is 5.

3.5.5.5 Enable Multiple Change-Condition Values in Rf SDCs

To enable multiple `Change-Condition` values to be included in Rf SDCs, include the following statement:

```
Ericsson(config)# epg pgw charging rf service-reporting
   multiple-service-change-condition
```

Support for multiple `Change-Condition` values in Rf SDCs is disabled by default, and can be configured in runtime.

3.5.6 Configure Optional AVPs in Rf ACR Messages

The following subsections describe how to configure optional AVPs in Rf ACR messages.

3.5.6.1 Configure AVP Profile

To configure an AVP profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf
   avp-profile <profile-name>
```

An AVP profile can be configured to include optional AVPs in Rf ACR start, Rf ACR interim, or Rf ACR stop messages. Optional AVPs can be grouped into two categories:

— AVPs that are included by default in Rf ACR messages and can be configured to be excluded. See Table 12 and Table 14.

— AVPs that are excluded by default from Rf ACR messages and can be configured to be included. See Table 13 and Table 15.

AVPs can be included or excluded from AVPs by configuring the attribute for the AVP followed by `true` for inclusion or `false` for exclusion. For example, to exclude the `Called-Station-Id` AVP, which is included by default, from Rf ACR start messages for the profile `profile1`, enter the following:

```
Ericsson(config)# epg pgw diameter rf avp-profile profile1
acr-start called-station-id false
```

For detailed information on the AVPs included in Rf ACR messages, refer to PGW Rf Interface Description.

Optional AVPs in Rf ACR Start/Interim/Stop Messages

Table 12 AVPs Included by Default in Rf ACR Messages

AVP	Attribute	Rf ACR Messages		
		Start	Interim	Stop
3GPP2-BSID (Under PS-Information)	bs-id	X	X	X

AVP	Attribute	Rf ACR Messages		
		Start	Interim	Stop
Called-Station-Id	called-station-id	X	X	X
Charging-Characteristics-Selection-Mode	cc-selection-mode	X	X	X
Change-Condition (Under PS-Information)	change-condition	–	X	X
3GPP-Charging-Characteristics	charging-characteristics	X	X	X
Charging-Gateway-Function-Host[1]	charging-gateway-function-host	X	X	X
Charging-Group-Id[1]	charging-group-id	X	X	X
3GPP-Charging-Id	charging-id	X	X	X
Diagnostics	diagnostics	–	–	X
Dynamic-Address-Flag	dynamic-address-flag	X	X	X
Event-Timestamp	event-timestamp	X	X	X
GGSN-Address	ggsn-address	X	X	X
3GPP-GGSN-MCC-MNC	ggsn-mcc-mnc	X	X	X
3GPP-IMSI-MCC-MNC	imsi-mcc-mnc	X	X	X
IMS-Information	ims-information	X	X	X
IMSI-Unauthenticated-Flag	imsi-unauthenticated-flag	X	X	X
3GPP-MS-TimeZone	ms-time-zone	X	X	X
Node-Id	node-id	X	X	X
PDP-Address	pdp-address	X	X	X
3GPP-PDP-Type	pdp-type	X	X	X
QoS-Information[2] (Under PS-Information)	qos-information	X	X	X
3GPP-RAT-Type	rat-type	X	X	X
3GPP-Selection-Mode	selection-mode	X	X	X
Service-Context-Id	service-context-id	X	X	X
Serving-Node-Type	serving-node-type	X	X	X
SGSN-Address (Under PS-Information)	sgsn-address	X	X	X

AVP	Attribute	Rf ACR Messages		
		Start	Interim	Stop
3GPP-SGSN-MCC-MNC	sgsn-mcc-mnc	X	X	X
Start-Time	start-time	X	–	–
Stop-Time	stop-time	–	–	X
Subscription-Id	subscription-id	X	X	X
User-Equipment-Info	user-equipment-info	X		
3GPP-User-Location-Info (Under PS-Information)	user-location-info	X	X	X

(1) The configuration to include this AVP only works if the AVP is received from a 3GPP AAA server.
(2) For information on configuration of sub-AVPs under QoS-Information, see Section 3.5.6.4 on page 49.

Table 13 AVPs Excluded by Default from Rf ACR Messages

AVP	Attribute	Rf ACR Messages		
		Start	Interim	Stop
Charging-Rule-Base-Name	charging-rule-base-name	X	X	X
UNI-PDU-CP-Only-Flag	uni-pdu-cp-only-flag	X	X	X
User-Equipment-Info	user-equipment-info		X	X
SCS-AS-Address	scs-as-address	X	X	X
SGi-PtP-Tunneling-Method	sgi-ptp-tunneling-method	X	X	X
Session-Id (Under PS-Information, Credit-Control-Information)	credit-control-session-id		X	X
Destination-Realm (Under PS-Information, Credit-Control-Information)	credit-control-destination-realm		X	X
Credit-Control-Failure-Report (Under PS-Information, Credit-Control-Information)	credit-control-failure-report(1)(2)(3)		X	X

AVP	Attribute	Rf ACR Messages		
		Start	Interim	Stop
CC-Request-Type (Under PS-Information, Credit-Control-Information,Credit-Control-Failure-Report)	credit-control-failure-report(1)(2)(3)		X	X
CC-Request-Status (Under PS-Information, Credit-Control-Information,Credit-Control-Failure-Report)	credit-control-failure-report(1)(2)(3)		X	X
Result-Code (Under PS-Information, Credit-Control-Information,Credit-Control-Failure-Report)	credit-control-failure-report(1)(2)(3)		X	X
CC-Request-Number (Under PS-Information, Credit-Control-Information,Credit-Control-Failure-Report)	credit-control-failure-report(1)(2)(3)		X	X

(1) If credit-control-failure-report is configured, it is recommended to configure credit-control-session-id and credit-control-destination-realm attributes to get complete credit control information in Rf ACR if Gy failure occurs.
(2) If credit-control-failure-report is configured, credit-control-failure-handling and continue-ongoing-session attributes must be also configured. Otherwise a configuration error is raised.
(3) The credit-control-failure-report attribute must be configured in both Rf ACR Interim and Rf ACR Stop messages. If the attribute is only configured in one of the messages, a configuration error is raised.

Optional AVPs under Service-Data-Container in Rf ACR Interim/Stop Messages

Table 14 Service-Data-Container Sub-AVPs Included by Default in Rf ACR Messages

AVP(1)	Attribute	Rf ACR Messages	
		Interim	Stop
Accounting-Input-Octets	accounting-input-octets	X	X
Accounting-Output-Octets	accounting-output-octets	X	X

AVP[1]	Attribute	Rf ACR Messages	
		Interim	Stop
3GPP2-BSID	bs-id	X	X
Change-Condition	change-condition	X	X
Change-Time	change-time	X	X
QoS-Information[2]	qos-information	X	X
SGSN-Address	sgsn-address	X	X
Time-First-Usage	time-first-usage	X	X
Time-Last-Usage	time-last-usage	X	X
3GPP-User-Location-Info	user-location-info	X	X

(1) Under PS-Information ⇒Service-Data-Container.
(2) For information on configuration of sub-AVPs under QoS-Information, see Section 3.5.6.4 on page 49.

Table 15 Service-Data-Container Sub-AVPs Excluded by Default from Rf ACR Messages

AVP[1]	Attribute	Rf ACR Messages	
		Interim	Stop
3GPP-Charging-Id	charging-id	X	X
Time-Usage	time-usage	X	X
Transaction-Report	transaction-report	X	X
CC-Request-Number	cc-request-number	X	X
Credit-Control-Failure-Handling	credit-control-failure-handling[2][3][4]	X	X

(1) Under PS-Information ⇒Service-Data-Container.
(2) If credit-control-failure-handling and continue-ongoing-session attributes are configured, it is recommended to configure the credit-control-failure-report attribute to get complete credit control information in Rf ACR if Gy failure occurs.
(3) If the credit-control-failure-handling attribute is configured, the continue-ongoing-session attribute must be also configured. Otherwise, a configuration error is raised.
(4) The credit-control-failure-handling attribute must be configured in both Rf ACR Interim and Rf ACR Stop messages. If the attribute is only configured in one of the messages, a configuration error is raised.

3.5.6.1.1 Exclude Optional AVPs from Rf ACR Messages

To exclude an optional AVP from Rf ACR start messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile
<profile-name> acr-start
```

```
   <optional-avp> false
```

To exclude an optional AVP from Rf ACR interim messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile
<profile-name> acr-interim
   <optional-avp> false
```

To exclude an optional AVP from Rf ACR stop messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile
<profile-name> acr-stop
   <optional-avp> false
```

Example 1 shows how to exclude `service-context-id` from the Rf ACR interim message for AVP profile `profile1`.

```
Ericsson(config)# epg pgw diameter rf avp-profile profile1
acr-interim service-context-id false
```

Example 1 Excluding an AVP from Rf ACR Interim Message

3.5.6.1.2 Exclude Optional Service-Data-Container Sub-AVPs from Rf ACR Messages

To exclude an optional AVP under the `Service-Data-Container` AVP from Rf ACR interim messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile <profile
-name> acr-interim service-data-container
   <optional-avp> false
```

To exclude an optional AVP under the `Service-Data-Container` AVP from Rf ACR stop messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile <profile
-name> acr-stop service-data-container
   <optional-avp> false
```

Example 2 shows how to exclude `change-condition` under `service-data-container` from the Rf ACR stop message for AVP profile `profile1`.

```
Ericsson(config)# epg pgw diameter rf avp-profile profile1
acr-stop service-data-container change-condition false
```

Example 2 Excluding an AVP under service-data-container from Rf ACR Stop Message

3.5.6.1.3 Include Optional AVPs in Rf ACR Messages

To include an optional AVP in Rf ACR start messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile
<profile-name> acr-start
   <optional-avp> true
```

To include an optional AVP in Rf ACR interim messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile
<profile-name> acr-interim
   <optional-avp> true
```

To include an optional AVP in Rf ACR stop messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile
<profile-name> acr-stop
   <optional-avp> true
```

Example 3 shows how to include `charging-rule-base-name` in the Rf ACR interim message for AVP profile `profile1`.

```
Ericsson(config)# epg pgw diameter rf avp-profile profile1
acr-interim charging-rule-base-name true
```

Example 3 Including an AVP in Rf ACR Interim Message

3.5.6.1.4 Include Optional Service-Data-Container Sub-AVPs in Rf ACR Messages

To include an optional AVP under the `Service-Data-Container` AVP in Rf ACR interim messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile <profile
-name> acr-interim service-data-container
   <optional-avp> true
```

To include an optional AVP under the `Service-Data-Container` AVP in Rf ACR stop messages for a profile, include the following statement:

```
Ericsson(config)# epg pgw diameter rf avp-profile <profile
-name> acr-stop service-data-container
   <optional-avp> true
```

Example 4 shows how to include `time-usage` under `service-data-container` in the Rf ACR Stop message for AVP profile `profile1`.

```
Ericsson(config)# epg pgw diameter rf avp-profile profile1
acr-interim service-data-container time-usage true
```

Example 4 Including Time-Usage AVP under SDC in Rf ACR Stop Message

3.5.6.2 View Optional AVP Configuration for Rf ACR Messages

To view which optional AVPs are configured to be included or excluded in Rf ACR messages, use the `show full-configuration` command for the following hierarchy levels:

```
epg pgw diameter rf avp-profile <profile-name> acr-start
epg pgw diameter rf avp-profile <profile-name> acr-interim
epg pgw diameter rf avp-profile <profile-name> acr-stop
epg pgw diameter rf avp-profile <profile-name> acr-interim service-data-cont
epg pgw diameter rf avp-profile <profile-name> acr-stop
service-data-container
```

For example, to view the optional AVP configuration for Rf ACR start messages for AVP profile `profile1`, enter the following:

```
Ericsson(config)# show full-configuration epg pgw diameter rf
avp-profile profile1 acr-start
```

AVPs that do not show up in the configuration are included or excluded according to their default value.

3.5.6.3 Associate an AVP Profile to a Charging Profile

To associate an AVP profile with a charging profile, include the following statement:

```
Ericsson(config)# epg pgw charging characteristic
s <profile-name> rf
   avp-profile <profile-name>
```

3.5.6.4 Optional QoS Information Sub-AVPs

The QoS-Information AVP includes all sub-AVPs by default, but some sub-AVPs can be disabled. Table 16 shows the included sub-AVPs depending on the level and messages.

Sub-AVPs can be excluded under the `PS-Information` level or the Service-Data-Container level and also by message type, ACR-Start, ACR-Interim, or ACR-Stop.

For a complete list of sub-AVPs that are included and more information on each sub-AVP, see PGW Rf Interface Description.

Table 16 QoS-Information Sub-AVPs

	QoS-Information AVP Information				
	Acr-Start	Acr-Interim		Acr-Stop	
	Under PS-Information	Under PS-Information	Under Service-Data-Container	Under PS-Information	Under Service-Data-Container
QoS-Class-Identifier	Always included	Always included	Always included	Always included	Always included
Max-Requested-Bandwidth-UL	N/A	N/A	Always included	N/A	Always included
Max-Requested-Bandwidth-DL	N/A	N/A	Always included	N/A	Always included
Extended-Max-Requested-BW-UL	N/A	N/A	Configurable(1)	N/A	Configurable(1)
Extended-Max-Requested-BW-DL	N/A	N/A	Configurable(1)	N/A	Configurable(1)
Guaranteed-Bitrate-UL	N/A	N/A	Always included	N/A	Always included
Guaranteed-Bitrate-DL	N/A	N/A	Always included	N/A	Always included
Extended-GBR-UL	N/A	N/A	Configurable(1)	N/A	Configurable(1)
Extended-GBR-DL	N/A	N/A	Configurable(1)	N/A	Configurable(1)
Allocation-Retention-Priority	Always included	Always included	Always included	Always included	Always included
APN-Aggregate-Max-Bitrate-UL	Always included	Always included	Configurable(2)	Always included	Configurable(2)
APN-Aggregate-Max-Bitrate-DL	Always included	Always included	Configurable(2)	Always included	Configurable(2)
Extended-APN-AMBR-UL	Configurable(3)	Configurable(3)	Configurable(1)	Configurable(3)	Configurable(1)
Extended-APN-AMBR-DL	Configurable(3)	Configurable(3)	Configurable(1)	Configurable(3)	Configurable(1)

(1) To exclude this AVP, see Section 3.5.6.4.2 on page 51

(2) To exclude this AVP, see Section 3.5.6.4.3 on page 51

(3) To exclude this AVP, see Section 3.5.6.4.1 on page 50

3.5.6.4.1 Exclude Extended Bitrate AVPs from the QoS-Information on PS-Information Level

To exclude extended bitrate AVPs in the QoS-Information AVP on the PS-Information level from a message type, issue the following command:

```
Ericsson(config)# epg pgw diameter rf avp-profile <profile-name
> <acr-start | acr-interim | acr-stop> qos-information-detail
```

```
   extended-bitrates false
```

3.5.6.4.2 Exclude Extended Bitrate AVPs from QoS-Information under Service-Data-Container

To exclude extended bitrate AVPs in the QoS-Information AVP under the Service-Data-Container AVP on the PS-Information level, issue the following commands:

```
Ericsson(config)# epg pgw diameter rf avp-profile <profi
le-name> <acr-start | acr-interim | acr-stop> service-da
ta-container qos-information-detail
   extended-bitrates false
```

3.5.6.4.3 Exclude APN-AMBR AVPs from QoS-Information under Service-Data-Container

To exclude APN-AMBR AVPs under the QoS-Information AVP in the Sevice-Data-Container AVP, issue the following command:

```
Ericsson(config)# epg pgw diameter rf avp-profile <profi
le-name> <acr-start | acr-interim | acr-stop> service-da
ta-container qos-information-detail
   apn-ambr false
```

3.5.7 Configure Rf Charging Data Handling

To configure the offset values that are applied to `Accounting-Record-Number` and `LocalSequenceNumber` after a PGW ICR switchover, issue the following commands:

```
Ericsson(config)# epg pgw charging icr switchover
   accounting-record-number-jump <value>
   local-sequence-number-jump <value>
```

The `accounting-record-number-jump` and `local-sequence-number-jump` have default values of `0`, with a range of `0`–`65,000`.

3.5.8 Configure Service-Context-Id Value

Configuring the `service-context-id` value determines the contents of the `Service-Context-Id` AVP.

The configurable value takes on the format **`extensions.MNC.MCC.release.service-context@domain`**.

Table 17 describes the different parts of the `Service-Context-Id` AVP.

Table 17 Configurable Values for the Service-Context-Id AVP

Configurable Values	Description
extensions	Includes operator-specific information for any extensions in a service-specific document. The PGW supports extensions for 3GPP TS 32.251 Release 9 and 10.
MNC.MCC	Identifies the operator implementing the service-specific document, which is used to determine the specific requirements for the operator-configurable parameters.
release	Indicates the 3GPP Release number of the service-specific document that applies to the request. The PGW supports 3GPP TS 32.251 Releases 9, 10, 11, 12, 13, 14, and 15.
service-context	Indicates the service-specific document that applies to the request. The PGW supports 3GPP TS 32.251, configured as **32251**.
domain	Indicates the domain of the service-specific document that applies to the request. The PGW supports **3GPP.org**.

To configure the `Service-Context-Id` value, include the following statement:

```
Ericsson(config)# epg pgw charging rf
   service-context-id <value>
```

Note: The `Service-Context-Id` value can be reconfigured in runtime.

The following examples describe the possible configurations of the `service-context-id` value.

In Example 5, the entire value is configured, with the `xx` extension for an operator with the MNC `000` and the MCC `00`, and the 3GPP TS 32.251 Release 13.

```
Ericsson(config)# epg pgw charging rf service-context-
id xx.00.000.13.32251@3GPP.org
```

Example 5 Configuring Service-Context-Id with a Defined Release

In Example 6, the configuration specifies the `xx` extension for an operator with the MNC `000` and the MCC `00`, with no specified Release.

```
Ericsson(config)# epg pgw charging rf service-context-id xx.00.000
```

Example 6 Configuring Service-Context-Id without a Defined Release

For more information on the Service-Context-Id AVP, refer to SoC with 3GPP TS 32.299 (Offline Charging - PGW).

3.5.9 Store Rf ACRs

The PGW can be configured to store Rf ACRs in Releases 9, 10, 11, 12, 13, 14, and 15 file format. By default, the PGW stores Rf ACRs to disk in Release 9 file format.

To configure Rf ACRs to be stored to disk, include the following statement:

```
Ericsson(config)# epg pgw charging rf
   rf-acr-file-format <value>rf-acr-file-format defines the release for
```

the ACR file and can be 9, 10, 11, 12, 13, 14, and 15.

For information on ACR format, refer to ACR Format.

3.5.10 Configure User Location Change Triggers

By default, the GGSN and PGW close service data containers at any change in user location. To configure the GGSN and PGW to close service data containers only at specific types of changes in user location, include the following statement:

```
Ericsson(config)# epg pgw charging
user-location-change-trigger (bsid | cgi-sai | ecgi | rai | tai)
```

3.5.11 Configure IP Address Type for GGSN-Address and SGSN-Address

For dual stack IP transport, the SGSN-Address and GGSN-Address AVPs include the IPv4 address by default, even if an IPv6 address is used for a session.

For both AVPs, the EPG can be configured to include the IP address corresponding to the IP transport type of the session.

For example, for dual stack IP transport, if an IPv6 address is used for communication between the SGW and PGW, both AVPs include the IPv6 address.

To configure the IP address type for both GGSN-Address and SGSN-Address AVPs, use the following command:

```
Ericsson(config)# epg pgw charging rf
   report-ctrl-address-used
```

3.5.12 Configure Service Condition Change Triggers

To enable service condition change triggers in the PGW, include the following statement:

```
Ericsson(config)# epg pgw charging
   service-condition-change-trigger (continue-ongoing-session |
final | quota-holding-time | rating-condition-change | reauthoriza
```

```
tion-request | service-idled-out | service-stop | tariff-time-swi
tch | timeout | volume-exhausted | volume-threshold-reached)
```

Note: If the `continue-ongoing-session` attribute is configured, the `credit-control-failure-handling` attribute must be also configured. Otherwise, a configuration error is raised.

If `continue-ongoing-session` and `credit-control-failure-handling` attributes are configured, it is recommended to configure the `credit-control-failure-report` attribute to get complete credit control information in Rf ACR if Gy failure occurs.

The service condition change triggers are disabled by default. The triggers can be reconfigured in runtime.

3.5.13 Configure Accounting Interim Interval Timer

The `Accounting Interim Interval` (AII) timer can be configured at the charging characteristics level, and at profile level.

By default, the AII timer is disabled and is not set to any value. To trigger AII timer-based Rf ACRs, the AII timer must be configured, and the configured value must be shorter than the time limit.

To configure the value of AII timer at the charging characteristics level, use the following statement:

```
Ericsson(config)# epg pgw charging characteristics
   acr-interim-interval <minutes>
```

To configure the value of AII timer for each profile, use the following statement:

```
Ericsson(config)# epg pgw charging characteristic
s <profile-name> rf
   acr-interim-interval <minutes>
```

The value range of the timer is 1–1440 minutes.

The timer can be reconfigured in runtime. The new timer value is sent in the next Rf ACR. The new timer limit takes effect when the next Rf ACR is sent.

4 SGW Charging Configuration

The SGW supports both CDR-based and Rf charging, however, these charging types cannot be used simultaneously. By default, CDR-based charging is enabled.

This section covers the following charging configuration tasks on the SGW:

— Configuring an SGW Node Identifier

— Configuring Charging Profiles

— Configuring CC Selection

— Configuring Charging Data File Properties

— Configuring CDR-Based Charging

— Configuring Rf Charging

Some configuration steps are common to both CDR-based charging and Rf charging. Figure 2 shows the chronological order in which the configuration steps must be performed while initially configuring either CDR-based charging or Rf charging.

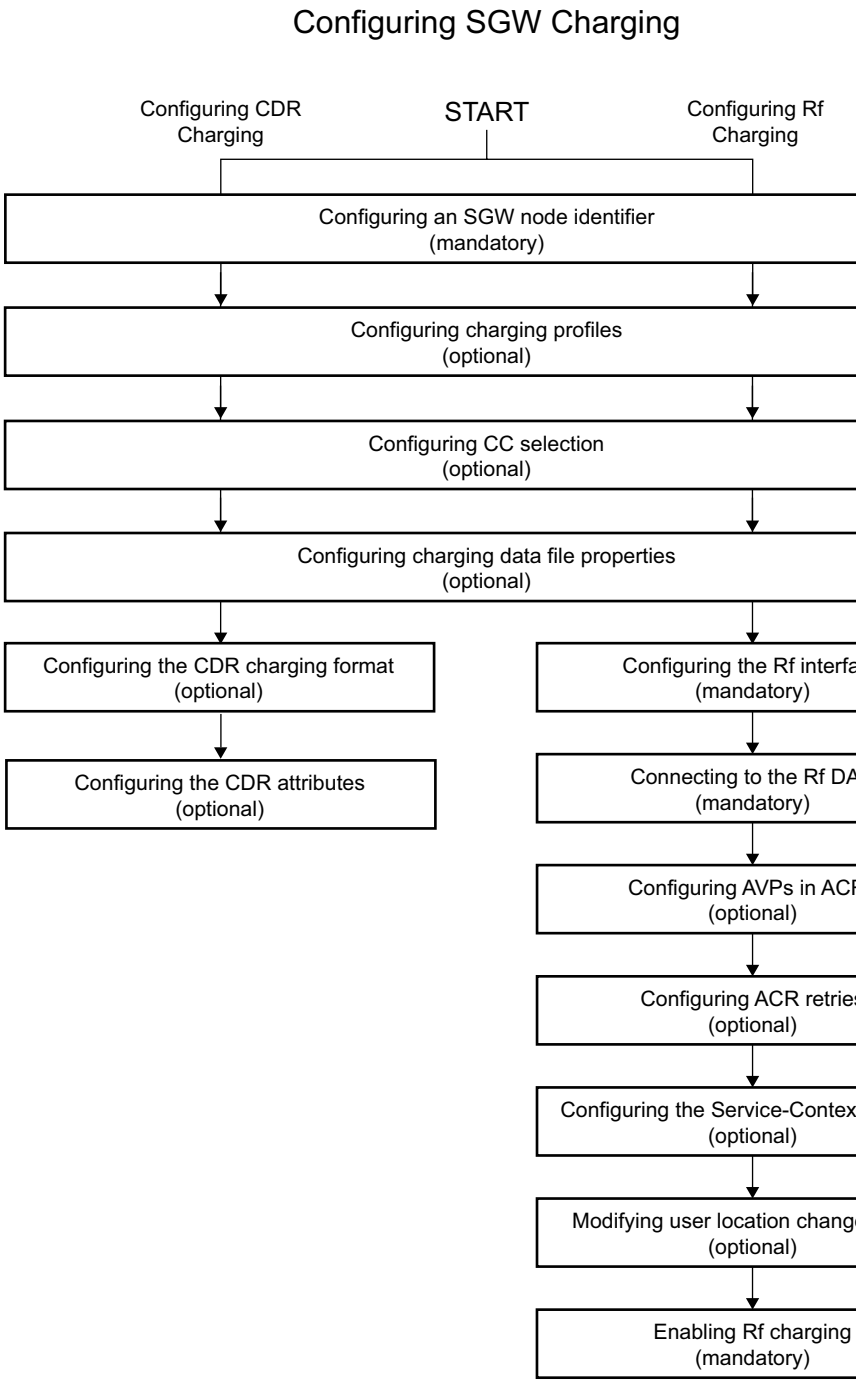

Figure 2 Configuring SGW Offline Charging

4.1 Configure SGW Node Identifier

To configure an identifier for the SGW that is included in the generated CDRs and Rf ACRs, include the following statement:

Note: For a combined EPG, the SGW node identifier must be different than the GGSN/PGW node identifier.

```
Ericsson(config)# epg sgw
   node <node-identifier>
```

By default, the SGW node identifier is a string of up to 20 characters. When `long-node-id-allowed` is configured, the maximum length of SGW node identifier is 32 characters. Spaces must not be used in the string.

For more information on the long node identifier configuration, refer to EPG Software Configuration Overview.

Note: To run the SGW application, it is mandatory to configure the node identifier.

4.2 Configure Charging Profiles

This section describes how to configure the different parameters associated with a charging profile.

Note: If a parameter is not configured for a charging profile, the default value of that parameter is used for the charging profile.

It is possible to reconfigure a charging profile in runtime. For existing charging sessions, a change takes effect for the next CDR or ACR.

Note: Configuring unnecessarily low limits leads to a high number of records. Configuring unnecessarily high limits leads to a risk of losing data in the event of a failure.

4.2.1 Disable CDR and Rf ACR Generation

The `no-cdr-generation` statement disables charging (CDR and Rf ACR generation) for bearers (during CDR-based charging) and PDN connections (during Rf charging) associated with a charging profile configured with `no-cdr-generation`. By default, charging is enabled.

To disable charging for the bearers or PDN connections associated with a specific charging profile, include the following statement:

```
Ericsson(config)# epg sgw charging characteristics
profile <profile-number>
   no-cdr-generation
```

If a bearer or PDN connection is created when `no-cdr-generation` is configured, it is not possible to later start charging for that bearer or PDN connection.

4.2.2 Configure Time Limit

To configure the time limit that forces partial CDR or Rf ACR Interim generation, include the following statement:

```
Ericsson(config)# epg sgw charging characteristics
profile <profile-number>
   time-limit <minutes>
```

The default time limit is 60 minutes. The configurable range is 15–1,440 minutes, in increments of 15 minutes.

4.2.3 Configure Volume Limit

To configure the volume limit that forces partial CDR or Rf ACR Interim generation, include the following statement:

```
Ericsson(config)# epg sgw charging characteristics
profile <profile-number>
   volume-limit <kilobytes>
```

The default volume limit is 10,000 KB. The value range is 100–2,097,152 KB.

4.2.4 Configure Charging Condition Change Limit

To configure the limit of charging condition changes that forces Rf ACR Interim generation, include the following statement:

```
Ericsson(config)# epg sgw charging characteristics
profile <profile-number>
   change-limit <number>
```

The default charging condition change limit for Rf charging is five changes. The value range is 1 and 10 changes.

For CDR-based charging, the configured change limit does not apply as all supported charging triggers trigger closure of partial or final CDRs.

4.3 Configure CC Selection for the SGW

At bearer activation, the SGW determines the CC and corresponding charging profile to be used. For information on configuration of charging profiles, see Section 4.2 on page 57.

For more information on the CC selection procedure, refer to Offline Charging.

4.3.1 Configure Default Charging Profile for the SGW

It is possible to configure a default charging profile for the SGW when no CC value is available at bearer activation. By default, the SGW uses profile `0`. The configurable range is `0`–15.

To configure the default profile, include the following statement:

```
Ericsson(config)# epg sgw charging characteristics
   default-profile <profile>
```

4.3.2 Configure Charging Profile for Roaming Subscribers

It is possible to configure a charging profile for roaming subscribers. By default, no profile is defined. The configurable range is `0`–15.

To designate a specific charging profile for roaming subscribers, include the following statement:

```
Ericsson(config)# epg sgw charging characteristics
   roaming-based-profile <profile>
```

4.3.2.1 Configuration for Only Roaming Subscribers

It is possible to configure the SGW to generate charging data only for roaming subscribers. Example 7 shows a configuration for generating charging data for only roaming subscribers.

```
epg sgw charging characteristics default-profile 4
epg sgw charging characteristics roaming-based-profile 8
epg sgw charging characteristics ignore-profile-from-serving-node
epg sgw charging characteristics profile 4
 no-cdr-generation
!
epg sgw charging characteristics profile 8
 volume-limit 10000
 time-limit   60
!
```

Example 7 Generating Charging Data for Only Roaming Subscribers

The configuration in Example 7 forces all roaming subscribers attaching from a network not in the SGW PLMN ID list to use `profile 8`, where charging is enabled. By setting `ignore-profile-from-serving-node`, the configuration also forces all home subscribers, as defined by the SGW PLMN ID list, to use `profile 4`, where charging is disabled. For information on the charging profile selection process, refer to Offline Charging.

For information about configuring the SGW PLMN ID list, see Section 4.3.4 on page 60.

4.3.3 Ignore CC Sent by Serving Node

By default, the CC from the serving node is used for determining the charging profile. It is possible to ignore the CC received from the serving node. For more information on the configuration of a charging profile for roaming users, see Section 4.3.2 on page 59.

To ignore CC received from the serving node, include the following statement:

```
Ericsson(config)# epg sgw charging characteristics
   ignore-profile-from-serving-node
```

4.3.4 Configure SGW PLMN IDs

By default, the SGW generates charging for all UE devices with an external PGW, that is, connected through the S5 or S8 interface.

Multiple SGW PLMN IDs can be included in the list for other networks that are considered to be home networks.

To configure home PLMN IDs for the SGW, include the following statement:

```
Ericsson(config)# epg sgw charging equivalent-plmn-id-list
   plmn-id [<list-of-plmn-ids>]
```

For information on how to configure a charging profile to use for roaming users, see Section 4.3.2 on page 59.

4.4 Configure Charging Data File Properties

This section gives instructions for configuring charging data file properties.

Note: CDR transfer with GTP Prime is not supported for SGW-CDRs.

For more information on charging data files, refer to CDR-Based Charging Interface Description.

4.4.1 Configure Compression of Charging Data Files

To configure the SGW to compress all charging data files using `gzip`, include the following statement:

```
Ericsson(config)# epg sgw charging charging-data-file
   compression
```

4.4.2 Configure Creation of Empty Charging Data Files

Note: The configuration described in this section does not apply to Rf ACRs.

To configure the SGW to create charging data files periodically, even if the files are empty, include the following statement:

```
Ericsson(config)# epg sgw charging charging-data-f
ile local-data-file
   force-empty-files
```

The local data files for the SGW are kept in the directories listed in Table 1 and Table 2.

The SGW does not initiate charging data file generation before any CDR is generated, even if `force-empty-files` is configured.

4.4.3 Configure Maximum Charging Data File Size

To configure the maximum size of charging data files for the SGW, include the following statement:

```
Ericsson(config)# epg sgw charging charging-data-file
   maximum-size <size>
```

By default, the maximum size of SGW charging data files is 102,400 KB. The file size can range from 1,024 through 102,400 KB (1 MB through 100 MB).

4.4.4 Configure Maximum Charging Data File Age

To configure the maximum age of charging data files for the SGW, include the following statement:

```
Ericsson(config)# epg sgw charging charging-data-file
   maximum-age <minutes>
```

By default, the maximum age of SGW charging data files is 120 minutes. The file age can range from 5 minutes through 1,440 minutes (24 hours).

4.5 Configure CDR-Based Charging

This section describes the configuration of CDR-based charging for the SGW.

4.5.1 Configure CDR Charging Format

To configure the charging format for the SGW, include the following statement:

```
Ericsson(config)# epg sgw charging
   charging-format (9 | 13 | 15)
```

By default, the `charging-format` value is 9.

The format for SGW-CDRs is further specified in CDR Format for the SGW.

4.5.2 Configure CDR Generation in the SGW for a Combined Session

It is possible for the SGW to generate CDRs for a combined session in a combined SGW and PGW.

To configure the SGW to generate CDRs for a combined session, include the following statement:

```
Ericsson(config)# epg sgw charging
   charging-record-combined-session
```

By default, CDR generation for a combined session is disabled.

It is possible to reconfigure the SGW CDR Generation for a Combined Session in runtime. Existing charging sessions are not affected by the reconfiguration. Reconfiguration takes effect when the next charging session starts.

4.5.3 Configure CDR Attributes

This section describes configuration of several SGW-CDR attributes.

Note: The CDR attributes can be configured during operation. The new configuration takes effect immediately.

4.5.3.1 Configure APN Encoding Options for the SGW

It is possible to specify how the SGW encodes APN names in CDRs. APN names contain embedded dots between its components, much like IP addresses or internet host and domain names. The SGW can generate CDRs with the dots intact (dot notation) or replace the dots with a length indicator before each component (digit notation), depending on the expectation of the charging gateway.

By default, the SGW represents APNs in dot notation. To configure the SGW to explicitly use digit notation or dot notation for encoding APN names, include the following statement:

```
Ericsson(config)# epg sgw charging cdr-attribute
   apn-encoding (digit-notation | dot-notation)
```

4.5.3.2 Include Record Sequence Numbers

By default, the SGW does not include record sequence numbers in CDRs when only one record is produced. To configure the SGW to always include record sequence numbers in single CDRs, include the following statement:

```
Ericsson(config)# epg sgw charging cdr-attribute
   record-seq-number-single-cdr
```

It is possible to reconfigure the inclusion of record sequence numbers in runtime. For existing charging sessions, reconfiguration takes effect when the next single CDR is generated.

4.5.3.3 Configure SGW Change in CDRs

CDRs can be set to specify when a record closes because of SGW relocation. Billing systems can therefore identify when bearer continuation occurs at SGW relocation. By default, the SGW indicates **normalRelease** at SGW relocation.

To configure the SGW to indicate **normalRelease** at SGW relocation, include the following statement:

```
Ericsson(config)# epg sgw charging
   closing-reason-for-sgw-change normal-release
```

To configure the SGW to indicate **sGWChange** at SGW relocation, include the following statement:

```
Ericsson(config)# epg sgw charging
   closing-reason-for-sgw-change sgw-change
```

It is possible to modify the configuration in runtime. The change is applied immediately.

4.5.3.4 Exclude Fields from CDRs

The CDR attribute statements exclude specific fields and information from the CDRs. An active SGW generates many CDRs with specific charging details included by default. Much of the information is not necessary in the CDRs if it is not needed to determine customer charges or if the charging gateway can determine the information from other sources. The SGW can be configured to exclude certain fields to keep the size of the CDRs as small as possible.

CDR exclusion attributes are configured at the `epg sgw charging cdr-attribute` hierarchy level.

For example, to exclude the IMSI unauthenticated flag from SGW-CDRs, enter the following:

```
Ericsson(config)# epg sgw charging cdr-attribute
no-imsi-unauthenticated-flag
```

The information that can be excluded from CDRs is shown in Table 18.

Table 18 Common Excludable Fields

Information to Exclude	Attribute
Control Plane Only PDN Connection Indication	`no-uni-pdu-cp-only-flag`

Information to Exclude	Attribute
CP-CIoT-EPS-Optimisation-Indicator	`no-cp-ciot-eps-optimisation-indicator`
Serving PLMN Rate Control	`no-serving-plmn-rate-control`
MO Exception Data Counter	`no-mo-exception-data`
IMSI unauthenticated flag	`no-imsi-unauthenticated-flag`
Low priority indicator	`no-low-priority-indicator`
PDP/PDN Type Extension	`no-pdn-type-extensio`
PGW IPv6 address used	`no-pgw-ipv6-address-used`
Serving node IPv6 address	`no-serving-node-ipv6-address`
SGW IPv6 address	`no-sgw-ipv6-address`
QoS extended bitrates	`no-qos-extended-bitrates`
QoS APN AMBR	`no-qos-apn-ambr`
Secondary RAT usage report	`no-secondary-rat-usage-report`
MSISDN-NPI	`no-msisdn-number-plan-indicator`

4.6 Configure Rf Charging

To configure Rf charging in the SGW, use the steps detailed in the following sections.

4.6.1 Configure Rf Interface

To configure Rf charging, the Rf interface must first be configured.

For detailed information about configuring the Rf interface, refer to Diameter Configuration.

4.6.2 Connect to Rf DAS

A Diameter Application System (DAS) must be previously configured for the Rf application. For information on configuring DASs, refer to Diameter Configuration.

To connect to a configured Rf DAS, include the following statement:

```
Ericsson(config)# epg sgw charging rf
   diameter-application-system <das-id>
```

The DAS can be reconfigured in runtime. New Rf ACRs, for both new and existing Rf sessions, are sent using the new DAS.

4.6.3 Configure AVPs in Rf ACRs

The following subsections describe how to configure Rf ACRs.

4.6.3.1 Configure Rf ACR Attributes

It is possible to configure the following AVPs in Rf ACR messages:

- `SGW-Address`
- `Idle-To-Connected-Transition-Count` and `Connected-Duration`
- `Charging-Gateway-Function-Host`
- `Charging-Group-Id`
- `IMSI-Unauthenticated-Flag`
- `Change-Condition`
- `CP-CIoT-EPS-Optimisation-Indicator`
- `Serving-PLMN-Rate-Control`
- `UNI-PDU-CP-Only-Flag`
- `RRC-Cause-Counter`
- `3GPP-Charging-Id at TDV Level`

Note: The AVP fields can be configured during operation. The new configuration takes effect immediately for both new and existing Rf sessions.

For more information about Rf ACRs and AVPs, refer to SGW Rf Interface Description.

4.6.3.1.1 Configure SGW-Address

The SGW can be configured to include either the SGW S5/S8-C or the SGW S4/S11-C address in the `SGW-Address` AVP.

To specify which SGW address is included in the `SGW-Address` AVP in Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   sgw-address-value (s5s8c | s4s11c)
```

By default, the SGW S5/S8-C address is included in the `SGW-Address` AVP.

The SGW address can be modified in runtime. New configurations apply to the next Rf ACR.

To exclude the `SGW-Address` AVP from Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   no-sgw-address
```

4.6.3.1.2 Configure Idle-To-Connected-Transition-Count and Connected-Duration

To include the `Idle-To-Connected-Transition-Count` and `Connected-Duration` AVPs in Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   connected-info
```

4.6.3.1.3 Configure Charging-Gateway-Function-Host

To include the `Charging-Gateway-Function-Host` AVP in Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   charging-gateway-function-host
```

4.6.3.1.4 Configure Charging-Group-Id

To include the `Charging-Group-Id` AVP in Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   charging-group-id
```

4.6.3.1.5 Configure IMSI-Unauthenticated-Flag

To exclude the `IMSI-Unauthenticated-Flag` AVP from Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attributes
   no-imsi-unauthenticated-flag
```

4.6.3.1.6 Configure Change-Condition

ACRs can be set to specify when a record closes due to SGW relocation. The CDF can therefore identify when bearer continuation occurs at SGW relocation. By default, the SGW indicates `Normal Release` at SGW relocation.

To configure the SGW to indicate `Normal Release` at SGW relocation, include the following statement:

```
Ericsson(config)# epg sgw charging
   closing-reason-for-sgw-change normal-release
```

To configure the SGW to indicate `SGW Change` at SGW relocation, include the following statement:

```
Ericsson(config)# epg sgw charging
   closing-reason-for-sgw-change sgw-change
```

It is possible to modify the configuration in runtime. The change is applied immediately.

4.6.3.1.7 Configure CP-CIoT-EPS-Optimisation-Indicator

To include the `CP-CIoT-EPS-Optimisation-Indicator` AVP in Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   cp-ciot-eps-optimisation-indicator
```

4.6.3.1.8 Configure Serving-PLMN-Rate-Control

To exclude the `Serving-PLMN-Rate-Control` AVP from Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   serving-plmn-rate-control
```

4.6.3.1.9 Configure UNI-PDU-CP-Only-Flag

To include the `UNI-PDU-CP-Only-Flag` AVP in Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   uni-pdu-cp-only-flag
```

4.6.3.1.10 Change in UP to UE Trigger at Traffic-Data-Volumes Level

To include the Change in UP to UE trigger, include the following statement:

```
Ericsson(config)# epg sgw charging
   change-in-up-to-ue-trigger
```

4.6.3.1.11 Configure RRC-Cause-Counter

To include the `RRC-Cause-Counter` AVP in Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   mo-exception-data
```

The `RRC-Cause-Counter` AVP includes information about the cause `MO Exception Data`.

4.6.3.1.12 Configure 3GPP-Charging-Id at TDV Level

To configure the `3GPP-Charging-Id` sub-AVP under the TDV AVP, include the following statement:

```
Ericsson(config)# epg sgw charging rf acrattribute
   tdv-charging-id
```

4.6.4 Configure Rf ACR Retries

It is possible to configure the number of times the SGW resends an Rf ACR to a CDF when the SGW does not receive an ACA indicating success. By default, the SGW resends an Rf ACR one time before storing the Rf ACR to disk. The configurable range is 0–4. For information about Rf ACR message failure handling, refer to SGW Rf Interface Description.

To configure the number of times to resend Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf
   acr-retries <value>
```

The Rf ACR retry value can be reconfigured in runtime. The new value is applied to the next Rf ACR that is sent.

4.6.5 Configure Service-Context-Id Value

Configuring the `service-context-id` value determines the contents of the Service-Context-Id AVP field.

The configurable value takes on the format **`extensions.MNC.MCC.release.service-context@domain`**.

Table 19 describes the different parts of the Service-Context-Id AVP.

Table 19 Configurable Values for the Service-Context-Id AVP

Configurable Values	Description
`extensions`	Includes operator-specific information for any extensions in a service-specific document. The SGW supports extensions for 3GPP TS 32.251 Release 9 and 10.
`MNC.MCC`	Identifies the operator implementing the service-specific document, which is used to determine the specific requirements for the operator-configurable parameters.
`release`	Indicates the 3GPP Release number of the service-specific document that applies to the request. The SGW supports 3GPP TS 32.251 Releases 9, 10, 11, 12, 13, 14, and 15.

Configurable Values	Description
service-context	Indicates the service-specific document that applies to the request. The SGW supports 3GPP TS 32.251, configured as **32251**.
domain	Indicates the domain of the service-specific document that applies to the request. The SGW supports **3GPP.org**.

To configure the Service-Context-Id value, include the following statement:

```
Ericsson(config)# epg sgw charging rf
   service-context-id <value>
```

Note: The Service-Context-Id value can be reconfigured in runtime. Reconfiguration closes the current Rf ACR file and opens a new Rf ACR file. New configurations apply to the next Rf ACR that is stored to file.

The following examples describe the possible configurations of the service-context-id value.

In Example 8, the entire value is configured, with the xx extension for an operator with the MNC 000 and the MCC 00, and the 3GPP TS 32.251 Release 10.

```
Ericsson(config)# epg sgw charging rf service-context-
id xx.00.000.10.32251@3GPP.org
```

Example 8 Configuring the Service-Context-Id with a Defined Release

In Example 9, the configuration specifies the xx extension for an operator with the MNC 000 and the MCC 00, with no specified Release.

```
Ericsson(config)# epg sgw charging rf service-context-id xx.00.000
```

Example 9 Configuring the Service-Context-Id without a Defined Release

For more information on the Service-Context-Id AVP, refer to SoC with 3GPP TS 32.299 (Offline Charging - SGW).

4.6.6 Store Rf ACRs

It is possible to store Rf ACRs in Releases 9, 10, 11, 12, 13, 14, and 15 file format, regardless of the release specified in the Service-Context-Id AVP.

To configure Rf ACRs to be stored to disk, include the following statement:
Ericsson(config)# **epg sgw charging rf**
rf-acr-file-format <value>rf-acr-file-format defines the release for the ACR file and can be set to 9, 10, 11, 12, 13, 14, and 15.

For information on ACR format, refer to ACR Format.

4.6.7 Modify User Location Change Trigger

User Location Information (ULI) details where a UE is located during the charging container recording interval.

By default, the ULI change trigger is not active, which means that a user location change does not trigger a charging container closure.

It is possible to configure the user location change trigger for specific changes in parameters, such as Cell Global Identity (CGI), Routing Area Identity (RAI), Tracking Area Identity (TAI), or for any ULI change.

To activate the user location change trigger for specific parameters, include the following statement:

```
Ericsson(config)# epg sgw charging
   user-location-change-trigger (cgi | ecgi | lai | rai | sai | tai)
```

Modifying the ULI change trigger is possible in runtime. All modifications apply immediately for all PDN connections and Rf sessions.

4.6.8 Enable Rf Charging

To enable Rf charging in the SGW, include the following statement:

```
Ericsson(config)# epg node feature-activation
   charging-rf
```

Note: Enabling Rf charging disables CDR-based charging.

Do!

Before enabling Rf charging, ensure that a DAS has been configured. For information about configuring a DAS, see Section 4.6.2 on page 64.

By default, the license for Rf charging is not configured. To enable Rf charging, the node must be stopped. For instructions on starting and stopping the node, refer to EPG Software Configuration Overview.

4.6.9 Configure Accounting Interim Interval Timer

The AII timer can be configured at the charging characteristics level, and at profile level.

By default, the AII timer is disabled and is not set to any value. To trigger AII timer-based Rf ACRs, the AII timer must be configured, and the configured value must be shorter than the time limit.

To configure the value of AII timer at the charging characteristics level, use the following statement:

```
Ericsson(config)# epg sgw charging characteristics
   acr-interim-interval <minutes>
```

To configure the value of AII timer for each profile, use the following statement:

```
Ericsson(config)# epg sgw charging characteristics
profile <profile-id>
   acr-interim-interval <minutes>
```

The value range of the timer is 1–1440 minutes.

The timer can be reconfigured in runtime. The new timer value is sent in the next Rf ACR. The new timer limit takes effect when the next Rf ACR is sent.

4.6.10 Configure Charging for Extended Bitrates

To exclude the `QoS-Extended-Bitrates` AVP from the Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   no-qos-extended-bitrates
```

4.6.11 Configure Charging for Secondary RAT Usage Data Reporting

To exclude the `Secondary-RAT-Usage-Report` AVP from the Rf ACRs, include the following statement:

```
Ericsson(config)# epg sgw charging rf acr-attribute
   no-secondary-rat-usage-report
```