



GTPP Interface Configuration

This chapter describes how to configure the GTPP functionality.

The following topics are covered in this chapter:

- [Configuring the GPRS Tunneling Protocol, on page 1](#)
- [Gathering Statistics, on page 41](#)

Configuring the GPRS Tunneling Protocol

Cisco Systems' GGSN/P-GW/S-GW supports both GTPP- and RADIUS-based accounting. The accounting protocol is configured on a per-APN basis.

When the GTPP protocol is used, accounting messages are sent to the Charging Gateways (CGs) over the Ga interface. The Ga interface and GTPP functionality are typically configured within the system's source context. As specified by the standards, a CDR is not generated when a session starts. CDRs are generated according to the interim triggers configured using the charging characteristics configured for the GGSN, and a CDR is generated when the session ends. For interim accounting, STOP/START pairs are sent based on configured triggers.

GTPP version 2 is always used. However, if version 2 is not supported by the Charging Gateway Function (CGF), the system reverts to using GTPP version 1. All subsequent CDRs are always fully-qualified partial CDRs. GTPP version 0 is not supported.

GTPP is configured at the routing context level. Some of the configurables associated with GTPP are *Attributes*, *Charging Agent*, *Deadtime*, etc. The GTPP configuration commands vary according to the services configured, for example, the commands used for GGSN might differ from what is configured for P-GW. For more information on the configuration commands, refer to the *Command Line Interface Reference*.

This section provides the GTPP configuration applied to various products.



Important

Commands used in the configuration examples in this section provide base functionality to the extent that the most common or likely commands and/or keyword options are presented. In many cases, other optional commands and/or keyword options are available. Refer to the *Command Line Interface Reference* for complete information regarding all commands.

Configuring GTPP for ePDG

This section provides the GTPP configuration for ePDG.

1. Configure the accounting context in Call Control Profile level and also specify the accounting mode.

```

configure
  context context_name
    call-control-profile cc-prof_name
    accounting-mode gtp
  end

```

When the accounting mode is set to GTPP, it indicates that the offline charging is enabled and Ga reference point will be used for passing ePDG CDRs to CGF (if enabled).

2. Associate the call-control-profile with an accounting policy configured in the same context. Accounting policies are configured through the policy accounting command in the Context Configuration mode.

```

configure
  context context_name
    call-control-profile cc-prof_name
    associate accounting-policy policy_name
  end

```

The accounting policy name will be used for finding the thresholds limits for various CDR triggers enabled.

3. Associate the accounting context with the ePDG service.

```

configure
  context context_name
    call-control-profile cc-prof_name
    accounting context context-name [ gtp group gtpgroup-name
  ]
  end

```

This command can also be used to associate a predefined GTPP server group - including all its associated configuration - with the call-control-profile. If the GTPP group is not specified, then a default GTPP group in the accounting context will be used.

4. Configure the GTPP group related parameters like GTPP server parameters, GTPP dictionary, and optionally CGF to support GTPP accounting:

```

configure
  context context_name
    gtp group gtp_group
    gtp charging-agent address ip_address port port_num
    gtp server server_name udp-port port_num
    gtp dictionary dictionary_num
    gtp storage-server mode { local | remote | streaming
  }

  gtp attribute node-id-suffix cg
  gtp attribute local-record-sequence-number
  gtp trigger time-limit
  end

```

Configuring GTPP for GGSN

This section provides the GTPP configuration for GGSN.

1. Configure the GTPP group and accounting context configuration in APN level and also specify the accounting mode.

```
configure
  context source
    apn apnname1.com
    accounting-mode gtp
    gtp group group1 accounting-context billing
  end
```

2. Configure the GTPP group related parameters like GTPP server parameters, GTPP dictionary, and optionally CGF to support GTPP accounting:

```
configure
  context source
    gtp group group1
    gtp charging-agent address 1.2.3.4 port 3386
    gtp server 1.3.5.6 max msgs priority 1
    gtp dictionary dict1
    gtp max-cdr 255 wait-time 10
    gtp transport-layer udp
  end
```



Important

For GGSN, accounting context can also be configured in GGSN service. In this case more priority will be given to the APN level configuration. In APN level, if no accounting context is configured then accounting context configured in GGSN service will be considered.

```
configure
  context source
    ggsn-service ggsn1
    accounting context billing
  end
```

The following table list all configuration commands related to the creation and formatting of G-CDRs. These commands are specified in different portions of the system configuration file:

- **gtp group <name>** - These are commands specified within the billing context that also contains the definition of the external interface (the storage server).
- Also contained in the GTPP group is the GTPP dictionary.
- The Rulebase Configuration mode sets the thresholds for various triggers.

Table 1: G-CDR Configuration Parameters

Command	Default	Range	Comment
gtp group <i>name</i> in billing context			

Command	Default	Range	Comment
gtp trigger volume-limit	Enabled	no, enabled	When this trigger is disabled no partial record closure occurs when volume limit is reached.
gtp trigger time-limit	Enabled	no, enabled	When this trigger is disabled no partial record closure occurs when the configured time limit is reached.
gtp trigger tariff-time-change	Enabled	no, enabled	When this trigger is disabled container closure does not happen for a tariff-time change.
gtp trigger sgsn-change-limit [also-intra-sgsn-multiple-address-group-change]	Enabled	no, enabled	Disabling this trigger ignores an SGSN change and does not add the SGSN IP address into the SGSN address list of the G-CDR. This helps to reduce the release of G-CDRs due to SGSN changes crossing the configured limit. also-intra-sgsn-multiple-address-group-change : This keyword includes Intra-SGSN group changes as an SGSN change.
gtp trigger inter-plmn-sgsn-change	Enabled	no, enabled	Disabling this trigger ignores an Inter-PLMN SGSN change and doesn't release a G-CDR.
gtp trigger qos-change	Enabled	no, enabled	Disabling this trigger ignores a qos-change and does not open a new GCDR for it.
gtp trigger rat-change	Enabled	no, enabled	No partial record closure for a RAT change occurs when this trigger is disabled.
gtp trigger ms-timezone-change	Enabled	no, enabled	No partial record closure for a time zone change occurs when this trigger is disabled.

Command	Default	Range	Comment
gtp attribute diagnostics	No	no, enabled	Includes the Diagnostic field in the CDR that is created when PDP contexts are released
gtp attribute duration-ms	No	no, enabled	Specifies that the information contained in the mandatory Duration field be reported in milliseconds instead of seconds (as the standards require).
gtp attribute plmn-id	Enabled	no, enabled	Reports the SGSN PLMN Identifier value (the RAI) if it was originally provided by the SGSN in the GTP create PDP context request. It is omitted if the SGSN does not supply one.
gtp attribute local-record-sequence-number	no	no, enabled	Includes the Local Record Sequence Number together Node ID field in the CDR that is created when PDP contexts are released.
gtp attribute node-id-suffix <i>string</i>	no	string between 1 to16 characters	Specifies the string suffix to use in the NodeID field of GTPP G-CDRs. With the default setting of "no" the GGSN uses the GTPP context name for the NodeId field.
"ggsn-service name" in Gn context			
cc profile <i>index buckets number</i>	index=0-15 number=4	index=0-15 number=1-4	Specifies the number of traffic volume container changes due to QoS changes or tariff time that can occur before an accounting record should be closed.

Command	Default	Range	Comment
cc profile <i>index</i> sgsns <i>num_changes</i>	index=0-15 num_changes=4	index=0-15 num_changes=1-15	Specifies the number of SGSN changes (i.e., inter-SGSN switchovers) resulting in a new RAI (Routing Area Identity) that can occur before closing an accounting record.

Command	Default	Range	Comment
cc profile index interval <i>seconds</i> [downlink <i>down_octets</i> uplink <i>up_octets</i> total <i>total_octets</i>]	No	index=0-15 interval= 60- 40.000.000 seconds octets=0-1,000,000	<p>Specifies the normal time duration that must elapse before closing an accounting record provided that any or all of the following conditions occur:</p> <ul style="list-style-type: none"> • Downlink traffic volume is reached within the time interval. • Uplink traffic volume is reached within the time interval. • Total traffic volume (up and downlink) is reached within the time interval. <p>Time is measured in seconds and can be configured to any integer value from 60 to 40,000,000.</p> <p>down_octets is the downlink traffic volume measured in octets and can be configured to any integer value from 0 to 1,000,000.</p> <p>up_octets is the uplink traffic volume measured in octets and can be configured to any integer value from 0 to 1,000,000.</p> <p>total_octets is the total traffic volume measured in octets and can be configured to any integer value from 0 to 1,000,000.</p>

Command	Default	Range	Comment
cc profile <i>index</i> volume volume { downlink <i>octets</i> uplink <i>octets</i> total <i>octets</i> }	No	index=0-15 octets= 100.000- 4.000.000.000	Specifies the downlink, uplink, and total volumes that must be met before closing an accounting record. vol_down_octets is measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000. vol_up_octets is measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000. total_octets is the total traffic volume (up and downlink) measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000.
cc profile <i>index</i> tariff time1 mins hours time2 mins hours time3 mins hours time4 mins hours	No	index=0-15 mins=0 to 59 hours=0 to 23	Specifies time-of-day time values to close the current traffic volume container (but not necessarily the accounting record). Four different tariff times may be specified. If less than four times are required, the same time can be specified multiple times.
cc behavior no-records	No	1-12	Specifies the behavior bit upon which the GGSN ceases sending accounting records to a server. nr_value can be configured to any integer value between 1 and 12 corresponding to the 12 behavior bits B1 through B12.
"apn name"			

Command	Default	Range	Comment
cc-home behavior <i>bits</i> profile <i>index</i>	bits=0x000 index=8	bits=0x000-0xFFF index=0-15	When the GGSN is configured to reject the charging characteristics sent by the SGSN for "home" subscribers, it uses the profile index specified by this command to determine the appropriate CCs to use. Multiple behavior bits can be configured for a single profile index by "Or"ing the bit strings together and convert the result to hexadecimal. The properties of the actual CC profile index are configured as part of the GGSN service using the cc profile command.
cc-roaming behavior <i>bits</i> profile <i>index</i>	bits=0x000 index=8	bits=0x000-0xFFF index=0-15	Same as above, but for "roaming" subscribers
cc-visting behavior <i>bits</i> profile <i>index</i>	bits=0x000 index=8	bits=0x000-0xFFF index=0-15	Same as above, but for "visiting" subscribers.
cc-sgsn	No		Causes the GGSN's accepting of the specified CC from the SGSN(s).
cc-sgsn radius-returned	No		GGSN accepts CC provided by Radius
cc-sgsn radius-returned use-ggsn profile <i>index</i>	No	index=0-15	GGSN accepts CC from AAA server, or uses <i>index</i> if not provided
cc-sgsn use-ggsn profile <i>index</i>	No	index=0-15	GGSN uses profile <i>index</i> and sets bits 0-3 of the CC to <i>index</i> , overriding all other ways of providing CC
cc-sgsn use-ggsn behaviour <i>bits</i>	0xFFF	0x000-0xFFF	GGSN sets bits 4-31 of the CC to <i>bits</i> , overriding all other ways of providing CC

Configuring GTPP for P-GW and eG-CDR

This section provides the offline charging configuration for P-GW. The P-GW offline charging configuration uses ECS and eG-CDRs.

1. Configure the ACS parameters as follows:

```
configure
  active-charging service ECS-SVC
    ruledef IP_ANYMATCH
      ip any-match =TRUE
    #exit
  charging-action CHARGING-ANY
    content-id 3
    billing-action egcdr
  #exit
  rulebase RULEBASE_1
    billing-records egcdr
    action priority 103ruledef IP_ANYMATCH charging-action CHARGING-ANY
    egcdr threshold interval 60
    egcdr threshold volume total 100000
  #exit
#exit
```

2. Configure the context SGi:

```
configure
  context SGi
    ip access-list ECS
      redirect css service ECS_any
    #exit
  apn ipv4.com
    selection-mode subscribed sent-by-ms
    accounting-mode none
    ip access-group ECS in
    ip access-group ECS out
    ip address pool name IPV4-Pool-Group
    active-charging rulebase RULEBASE_1
    gtp group default accounting-context SGi
  exit
  gtp group default
    gtp charging-agent address 192.0.0.1
    gtp max-cdrs 2 wait-time 10
    gtp dictionary custom24
    gtp server 192.0.0.2 max 100
  exit
```

The following tables list all configuration commands related to the creation and formatting of eG-CDR and PGW-CDRs. These commands are specified in different portions of the system configuration file:

- **gtp group** <name> - These are commands specified within the billing context that also contains the definition of the external interface (the storage server).
- Also contained in the GTPP group is the GTPP dictionary.

- For the 3GPP compliant P-GW records described in this document, the correct dictionary is **gtp dictionary custom24**.
- The Rulebase Configuration mode sets the thresholds for various triggers.

Table 2: eG-CDR Configuration Parameters

Command	Default	Range	Comment
gtp group name in billing context			
gtp trigger egcdr max-losdv	no	no, enabled	When this trigger is enabled a partial record will be generated once the maximum configured number of eG-CDR service containers has been reached.
gtp egcdr lotdv-max-containers int	int=8	int=1..8	This parameter allows changing the maximum number of traffic volume containers in the LOTV field of the eG-CDR.
gtp egcdr losdv-max-containers int	int=10	int=1..255	This parameter allows changing the maximum number of service data containers in the eG-CDR.

Command	Default	Range	Comment
gtp egcdr final-record include-content-ids (all only-with-traffic) closing-cause (same-in-all-partials unique)	only-with-traffic same-in-all-partials		<p>The CLI option 'include-content-ids' allows controlling the service containers that are included in the final eG-CDR generated for a subscriber. With "all", not only the service containers which are currently counting traffic are included, but also all other containers which may have been closed earlier for this subscriber session with a "partial" cause value.</p> <p>The CLI option 'closing-cause' allows controlling the cause for record closing in the final eG-CDR in case multiple eG-CDRs need to be generated for final closure reason such as 'Normal Release'.</p> <p>By default if multiple eG-CDRs are generated for end of subscriber session all the eG-CDRs have the same cause for record closing.</p>
gtp egcdr service-idle-timeout seconds	seconds=0	seconds=0, 10-86400	The service idle timeout configuration allows to specify a time period after which, if no data is reported for a service flow, the service container is closed and added to the eGCDR as part of LOSDV Container list with service condition change as "ServiceIdleOut".
rulebase <i>name</i> in Active Charging Service			

Command	Default	Range	Comment
timestamp rounding egcdr (ceiling floor round-off)	round-off		Defines the method to determine the value for time stamp and duration fields in the eG-CDR: ceiling will always use the next full second, floor cuts off all milliseconds, and round off will use the standard rounding mechanism to use the closest full second value (i.e. rounding down for milliseconds 1-499, and rounding up for milliseconds 500-999).
egcdr threshold interval <i>seconds</i>	no	seconds=60..40000000	Sets the interval for generating a partial eG-CDR
egcdr threshold volume (downlink <i>octets</i> uplink <i>octets</i> total <i>octets</i>)	no	octets=10000-400000000	Sets the volume limit in downlink only, uplink only or for the total after which a partial eG-CDR.
egcdr service-data-flow threshold interval <i>seconds</i>	no	seconds=60..40000000	Sets the interval for generating partial service containers. The eG-CDR is not closed unless the maximum configured limit of service containers has been reached and this trigger is not disabled.
egcdr service-data-flow threshold volume (downlink <i>octets</i> uplink <i>octets</i> total <i>octets</i>)	no	octets=10000-400000000	Sets the volume limit in downlink only, uplink only or for the total after which a partial service container is generated. The eG-CDR is not closed unless the maximum configured limit of service containers has been reached and this trigger is not disabled.

Command	Default	Range	Comment
egcdr tariff <i>minute</i> <i>minute hour hour</i>	no	minute=0..59 hour=0..23	Specifies a single tariff time change which triggers the closing and reopening of a traffic data volume container. The command can be repeated up to 4 times to define multiple tariff time changes.
apn name			
active-charging-service rulebase <i>string</i>		string= 1..63 characters	Selects the default rulebase to be applied to a subscriber session.
cc-home behavior <i>bits</i> profile <i>index</i>	bits=0x000 index=8	bits=0x000-0xFF index=0-15	When the GGSN is configured to reject the charging characteristics sent by the SGSN for "home" subscribers, it uses the profile index specified by this command to determine the appropriate CCs to use. Multiple behavior bits can be configured for a single profile index by "Or"ing the bit strings together and convert the result to hexadecimal. Other than for G-CDRs, this setting does not impact the triggers for CDRs, it is just used to set the default content for the CC field in the CDR.
cc-roaming behavior <i>bits</i> profile <i>index</i>	bits=0x000 index=8	bits=0x000-0xFF index=0-15	Same as above, but for "roaming" subscribers
cc-visting behavior <i>bits</i> profile <i>index</i>	bits=0x000 index=8	bits=0x000-0xFF index=0-15	Same as above, but for "visiting" subscribers.
cc-sgsn	no		Causes the GGSN's accepting of the specified CC from the SGSN(s).

Command	Default	Range	Comment
cc-sgsn radius-returned	no		GGSN accepts CC provided by Radius
cc-sgsn radius-returned use-ggsn profile <i>index</i>	no	index=0-15	GGSN accepts CC from AAA server, or uses <i>index</i> if not provided
cc-sgsn use-ggsn profile <i>index</i>	no	index=0-15	GGSN uses profile <i>index</i> and sets bits 0-3 of the CC to <i>index</i> , overriding all other ways of providing CC
cc-sgsn use-ggsn behaviour <i>bits</i>	0xFFF	0x000-0xFFF	GGSN sets bits 4-31 of the CC to <i>bits</i> , overriding all other ways of providing CC

Table 3: PGW-CDR Configuration Parameters

Command	Default	Comment
GTPP Configuration mode - "gtp group <name>" in billing context		
gtp trigger volume-limit	Enabled	When this trigger is enabled, partial record closure occurs when the volume limit is reached.
gtp trigger time-limit	Enabled	When this trigger is enabled, partial record closure occurs when the configured time limit is reached.
gtp trigger tariff-time-change	Enabled	When this trigger is enabled, container closure occurs for a tariff-time change.
gtp trigger qos-change	Enabled	When this trigger is enabled, container closure occur for qos-change.
gtp trigger rat-change	Enabled	Partial record closure for a RAT change occurs when this trigger is enabled.
gtp trigger ms-timezone-change	Enabled	Partial record closure for a time zone change occurs when this trigger is enabled.
gtp attribute plmn-id	Enabled	Specifying this option includes the "PLMN Id" field in the CDR.

Command	Default	Comment
gtp trigger serving -node-change-limit	Enabled	A change of the serving node address will cause the new address to be added to the list of serving node addresses. A partial CDR will then be generated when the configured limit is reached.
gtp attribute diagnostics	No	Includes the "Diagnostic" field in the CDR that is created when PDP contexts are released.
gtp attribute duration-ms	No	Specifying this option results in the mandatory "Duration" field in the CDR to be recorded in milliseconds rather than seconds.
gtp attribute imei	Enabled	Specifying this option includes the "IMEI" field in the CDR.
gtp attribute local-record-sequence- number	No	Specifying this option includes the optional "Local Record Sequence Number" and "Node-ID" fields in the CDR. Since the Local Record Sequence Number must be unique within one node (identified by Node-ID), the Node-ID field will consist of the sessMgr Recovery count + AAA Manager identifier + the name of the GSN service. Since each AAA Manager generates CDRs independently, the Local Record Sequence Number and Node ID fields uniquely identify a CDR.
gtp attribute msisdn	Enabled	Specifying this option includes the "MSISDN" field in the CDR.
gtp attribute node-id-suffix <string>	No string between 1 and 16 characters	Specifies the suffix to use in the Node-ID field of PGW-CDRs. With the default setting of "no", the P-GW uses the active-charging service name for the Node-ID field.
gtp attribute rat	Enabled	Specifying this option includes the "RAT" field in the CDR.
gtp attribute record-extensions rat	No	Enables encoding of the RAT in the record-extension field of the CDR.

Command	Default	Comment
gtp attribute apn-ni	Enabled	Specifying this option includes field accessPointNameNI in the CDR.
gtp attribute pdp-type	Enabled	Specifying this option includes the pdpPDNType field in the CDR.
gtp attribute pdp-address	Enabled	Specifying this option includes the servedPDPPDNAddress field in the CDR.
gtp attribute dynamic-flag	Enabled	Specifying this option includes the dynamicAddressFlag field in the CDR.
gtp attribute node-id	Enabled	Specifying this option includes the nodeID field in the CDR.
gtp attribute apn-selection-mode	Enabled	Specifying this option includes the apnSelectionMode field in the CDR.
gtp attribute charging -characteristic -selection -mode	Enabled	Specifying this option includes the chChSelectionMode field in the CDR.
gtp attribute ms-time-zone	Enabled	Specifying this option includes the mSTimeZone field in the CDR.
gtp attribute uli	Enabled	Specifying this option includes the userLocationInformation field in the CDR.
gtp attribute losdv	Enabled	Specifying this option includes the LOSDVs field in the CDR.
gtp attribute served-mnai	Enabled	Specifying this option includes the servedMNAI field in the CDR.
gtp attribute pgw-plmn-id	Enabled	Specifying this option includes the p-GWPLMNIdentifier field in the CDR.
gtp attribute start-time	Enabled	Specifying this option includes the startTime field in the CDR.
gtp attribute stop-time	Enabled	Specifying this option includes the stopTime field in the CDR.
gtp attribute pdn-connection-id	Enabled	Specifying this option includes the pDNConnectionID field in the CDR.

Command	Default	Comment
gtp storage-server local file format		<p>Defines the file format for CDR files created on the hard disk.</p> <p>Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.</p>
gtp storage-server local file compression	None	<p>Compresses billing files with gzip.</p> <p>Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.</p>
Rulebase Configuration mode		
egcdr threshold interval <seconds> no egcdr threshold interval	No	Specifies the threshold for the time interval.

Command	Default	Comment
egcdr threshold volume { downlink uplink total <bytes> }	No	Specifies the downlink, uplink, and total volumes that must be met before closing an accounting record. <ul style="list-style-type: none"> • downlink bytes is measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000. • uplink bytes is measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000. • total bytes is the total traffic volume (up and downlink) measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000.
egcdr tariff minute <mins> hour <hours> no egcdr tariff <mins> hour <hours>	No	Specifies the time-of-day time values for closing the current traffic volume container (but not necessarily the accounting record). Six different tariff times may be specified. If less than four times are required, the same time can be specified multiple times.
Cc profile configuration		
cc profile index [0..15] serving-nodes [1..15]	index=8 serving-nodes=4	Specifies the number of serving node changes for which a new address is added to the list of serving node addresses in the CDR. A partial CDR is generated when this limit is exceeded. Currently this is not supported.

Configuring GTPP for PDG and TTG

This section provides the GTPP configuration for PDG.

1. At the APN level configure GTPP in the accounting-mode.

```
configure
  context dest1
```

```

apn apn_name
accounting-mode gtp
gtp group group1 accounting-context pdg
end

```

- At the context level configure the accounting policy. This is required only for time/tariff/volume threshold configuration.

```

configure
  context dest1
    policy accounting acct1
      cc profile 1 interval 60
      cc profile 1 volume total 100000
      cc profile 1 tariff time 1 0 0 time 2 2 2 time 3 4 4 time
4 5 5
      cc profile 1 buckets 3
      cc profile 1 serving-nodes 4
    end

```

- Associate the accounting policy with the PDG service.

```

configure
  context source
    pdg-service pdg1
    associate accounting-policy acct1
  end

```

- Configure the GTPP group related parameters and CDR attributes/triggers.

```

configure
  context source
    gtp group group1
    gtp charging-agent address 1.2.3.4 port 3386
    gtp server 1.3.5.6 max msgs priority 1
    gtp dictionary dict1
    gtp max-cdr 255 wait-time 10
    gtp transport-layer udp
    gtp trigger volume-limit
    gtp attribute local-record-sequence-number
  end

```

The following table lists configuration commands related to creating and formatting WLAN-CDRs. These commands appear at different portions of the system configuration file.

- gtp group <name>** - These are commands specified within the billing context that also contains the definition of the external interface (the storage server).
- policy accounting** - These commands contain the thresholds for various triggers. The **policy accounting** commands can be associated with the PDG or TTG service by configuring an associated accounting-policy" in that particular service.

Table 4: WLAN-CDR Configuration Parameters

Command	Default	Comment
GTPP Configuration mode - "gtp group <name>" in billing context		

Command	Default	Comment
gtp trigger volume-limit	Enabled	When this trigger is enabled, partial record closure occurs when the volume limit is reached.
gtp trigger time-limit	Enabled	When this trigger is enabled, partial record closure occurs when the configured time limit is reached.
gtp trigger tariff-time-change	Enabled	When this trigger is enabled, container closure occurs for a tariff-time change.
gtp trigger qos-change	Enabled	Enabling this trigger opens a new CDR for a QoS change.
gtp trigger rat-change	Enabled	Partial record closure for a RAT change occurs when this trigger is enabled.
gtp trigger ms-timezone-change	Enabled	Partial record closure for a time zone change occurs when this trigger is enabled.
gtp attribute cell-plmn-id	Enabled	Specifying this option includes the "Cell PLMN Id" field in the CDR.
gtp attribute diagnostics	No	Specifying this option includes the "Diagnostic" field in the CDR that is created when PDP contexts are released.
gtp attribute duration-ms	No	Specifying this option results in the mandatory "Duration" field in the CDR to be recorded in milliseconds rather than seconds.
gtp attribute imei	Enabled	Specifying this option includes the "IMEI" field in the CDR.

Command	Default	Comment
gtp attribute local-record-sequence-number	No	Specifying this option includes the optional "Local Record Sequence Number" and "Node-ID" fields in the CDR. Since the Local Record Sequence Number must be unique within one node (identified by Node-ID), the Node-ID field will consist of the sessMgr Recovery count + AAA Manager identifier + the name of the GSN service. Since each AAA Manager generates CDRs independently, the Local Record Sequence Number and Node ID fields uniquely identify a CDR.
gtp attribute msisdn	Enabled	Specifying this option includes the "MSISDN" field in the CDR.
gtp attribute node-id-suffix <string>	No string between 1 and 16 characters	Specifying this option sets the string suffix to use in the NodeID field of SGW-CDRs. The S-GW uses the GTPP context name for the NodeID field with the default setting of "no".
gtp attribute rat	Enabled	Specifying this option includes the "RAT" field in the CDR.
gtp attribute record-extensions rat	No	Specifying this option enables encoding of the RAT in the record-extension field of the CDR.
gtp storage-server local file format		Defines the file format for CDR files created on the hard disk. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.

Command	Default	Comment
gtp storage-server local file compression	None	Compresses generated billing files with gzip. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.
"policy accounting" in Gn context		
cc profile <index> buckets <number>	index=0-15 number=4	Specifies the number of traffic volume container changes due to QoS changes or tariff time that can occur before an accounting record is closed.

Command	Default	Comment
<pre>cc profile <index> interval <seconds> [downlink <down_octets> uplink <up_octets> total <total_octets>]</pre>	No	<p>Specifies the normal time duration that must elapse before closing an accounting record provided that any or all of the following conditions occur:</p> <ul style="list-style-type: none"> • Downlink traffic volume is reached within the time interval • Uplink traffic volume is reached within the time interval • Total traffic volume (uplink and downlink) is reached within the time interval is measured in seconds and can be configured to any integer value from 60 to 4000000. <p><i>down_octets</i> is the downlink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.</p> <p><i>up_octets</i> is the uplink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.</p> <p><i>total_octets</i> is the total traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.</p>

Command	Default	Comment
cc profile <index> volume { downlink <vol_down_octets> uplink <vol_up_octets> total <total_octets> }	No	Specifies the downlink, uplink, and total volumes that must be met before closing an accounting record. <ul style="list-style-type: none"> • <i>vol_down_octets</i> is measured in octets and can be configured to any integer value from 100000 to 4000000000. • <i>vol_up_octets</i> is measured in octets and can be configured to any integer value from 100000 to 4000000000. • <i>total_octets</i> is the total traffic volume (uplink and downlink) measured in octets and can be configured to any integer value from 100000 to 4000000000.
cc profile <index> tariff time1 <i>mins hours</i> time2 <i>mins hours</i> time3 <i>mins hours</i> time4 <i>mins hours</i>	No	Specifies time-of-day time values to close the current traffic volume container (but not necessarily the accounting record). Four different tariff times may be specified. If less than four times are required, then the same time value can be specified multiple times.

This section provides the GTPP configuration for TTG.

1. At the subscriber level configure GTPP in the accounting-mode.

```
configure
  context dest1
    subscriber default
      accounting-mode gtp
    end
```

2. At the context level configure the accounting policy. This is required only for time/tariff/volume threshold configuration.

```
configure
  context dest1
    policy accounting acct1
      cc profile 1 interval 60
      cc profile 1 volume total 100000
      cc profile 1 tariff time 1 0 0 time 2 2 2 time 3 4 4 time
4 5 5
      cc profile 1 buckets 3
```

```
cc profile 1 serving-nodes 4
end
```

3. Associate the accounting policy with the TTG service.

```
configure
  context source
    pdg-service pdg1
    accounting context pdg
    associate accounting-policy acct1
  end
```

4. Configure the GTPP group related parameters and CDR attributes/triggers.

```
configure
  context source
    gtp group default
    gtp charging-agent address 1.2.3.4 port 3386
    gtp server 1.3.5.6 max msgs priority 1
    gtp dictionary dict1
    gtp max-cdr 255 wait-time 10
    gtp transport-layer udp
    gtp trigger volume-limit
    gtp attribute rat
  end
```

Configuring GTPP for S-GW

This section provides the GTPP configuration for S-GW.

1. At the subscriber level configure GTPP in the accounting-mode.

```
configure
  context dest1
    subscriber default
    accounting-mode gtp
  end
```

2. At the context level configure the accounting policy. This is required only for time/tariff/volume threshold configuration.

```
configure
  context dest1
    policy accounting lte
    cc profile 1 interval 60
    cc profile 1 volume total 100000
    cc profile 1 tariff time 1 0 0 time 2 2 2 time 3 4 4 time 4 5 5

    cc profile 1 buckets 3
    cc profile 1 serving-nodes 4
  end
```

3. Associate the accounting policy with the S-GW service.

```

configure
  context source
    sgw-service sgw1
    associate accounting-policy lte
  end

```

4. Configure the accounting context and GTPP group in S-GW service level. If accounting context is not configured in S-GW service the source context and "default" GTPP group will be selected.

```

configure
  context source
    sgw-service sgw1
    accounting context dest1 gtp group sgw
  end

```

5. Configure the GTPP group related parameters.

```

configure
  context source
    gtp group group1
    gtp charging-agent address 1.2.3.4 port 3386
    gtp server 1.3.5.6 max msgs priority 1
    gtp dictionary dict1
    gtp max-cdr 255 wait-time 10
    gtp transport-layer udp
  end

```



Important

SGW-CDRs are suppressed and only PGW-CDRs are generated for a session hosted by the associated S-GW and P-GW service. SGW-CDRs are generated when the S-GW connects to an external P-GW.

The following table lists the configuration commands related to creating and formatting SGW-CDRs. These commands appear at different portions of the system configuration file.

- **gtp group** <name> - These are commands specified within the billing context that also contains the definition of the external interface (the storage server).
- **policy accounting** - These commands contain the thresholds for various triggers. The "policy accounting" commands can be associated with the sgw-service by configuring an associated accounting-policy" in sgw-service.

Table 5: SGW-CDR Configuration Parameters

Command	Default	Comment
GTPP Configuration mode - "gtp group <name>" in billing context		
gtp trigger volume-limit	Enabled	When this trigger is enabled, partial record closure occurs when the volume limit is reached.

Command	Default	Comment
gtp trigger time-limit	Enabled	When this trigger is enabled, partial record closure occurs when the configured time limit is reached.
gtp trigger tariff-time-change	Enabled	When this trigger is enabled, container closure occurs for a tariff-time change.
gtp trigger qos-change	Enabled	Enabling this trigger opens a new CDR for a QoS change.
gtp trigger rat-change	Enabled	Partial record closure for a RAT change occurs when this trigger is enabled.
gtp trigger ms-timezone-change	Enabled	Partial record closure for a time zone change occurs when this trigger is enabled.
gtp attribute apn-ambr-change	disabled	No partial record closure for an apn-ambr-change occurs when this trigger is disabled.
gtp attribute cell-plmn-id	Enabled	Specifying this option includes the "Cell PLMN Id" field in the CDR.
gtp attribute diagnostics	No	Specifying this option includes the "Diagnostic" field in the CDR that is created when PDP contexts are released.
gtp attribute duration-ms	No	Specifying this option results in the mandatory "Duration" field in the CDR to be recorded in milliseconds rather than seconds.
gtp attribute imei	Enabled	Specifying this option includes the "IMEI" field in the CDR.

Command	Default	Comment
gtp attribute local-record-sequence-number	No	Specifying this option includes the optional "Local Record Sequence Number" and "Node-ID" fields in the CDR. Since the Local Record Sequence Number must be unique within one node (identified by Node-ID), the Node-ID field will consist of the sessMgr Recovery count + AAA Manager identifier + the name of the GSN service. Since each AAA Manager generates CDRs independently, the Local Record Sequence Number and Node ID fields uniquely identify a CDR.
gtp attribute msisdn	Enabled	Specifying this option includes the "MSISDN" field in the CDR.
gtp attribute node-id-suffix <string>	No string between 1 and 16 characters	Specifying this option sets the string suffix to use in the NodeID field of SGW-CDRs. The S-GW uses the GTPP context name for the NodeID field with the default setting of "no".
gtp attribute rat	Enabled	Specifying this option includes the "RAT" field in the CDR.
gtp attribute record-extensions rat	No	Specifying this option enables encoding of the RAT in the record-extension field of the CDR.
gtp storage-server local file format		Defines the file format for CDR files created on the hard disk. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.

Command	Default	Comment
gtp storage-server local file compression	None	Compresses generated billing files with gzip. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.
gtp attribute served-pdp-pdn-address-extension	None	Allows the operator to configure the served-pdp-pdn-extension field in S-CDR. This CLI introduced in 14.0 release.
gtp attribute apn-ambr	None	Specifying this option includes optional field "APN-AMBR" in the CDR as part of epcQOSInformationContent.
gtp attribute imsi-unauthenticated-flag	None	Specifying this option includes optional field "IMSI Unauthenticated Flag" in the CDR.
gtp attribute user-csg-information	None	Specifying this option includes optional field "User CSG Information" in the CDR.
gtp attribute dynamic-flag-extension	None	Specifying this option includes optional field "Dynamic Address Flag Extension" in the CDR.
gtp attribute sgw-ipv6-addr	None	Specifying this option includes optional field "sgw-ipv6-addr" in the CDR.
gtp attribute sna-ipv6-addr	None	Specifying this option includes optional field "servingNodeIPv6Address" in the CDR.
gtp attribute pgw-ipv6-addr	None	Specifying this option includes optional field "pgw-ipv6-addr" in the CDR.

Command	Default	Comment
"policy accounting" in Gn context		
cc profile <index> buckets <number>	index=0-15 number=4	Specifies the number of traffic volume container changes due to QoS changes or tariff time that can occur before an accounting record is closed.
cc profile <index> interval <seconds> [downlink <down_octets> uplink <up_octets> total <total_octets>]	No	Specifies the normal time duration that must elapse before closing an accounting record provided that any or all of the following conditions occur: <ul style="list-style-type: none"> • Downlink traffic volume is reached within the time interval • Uplink traffic volume is reached within the time interval • Total traffic volume (uplink and downlink) is reached within the time interval is measured in seconds and can be configured to any integer value from 60 to 4000000. <p><i>down_octets</i> is the downlink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.</p> <p><i>up_octets</i> is the uplink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.</p> <p><i>total_octets</i> is the total traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.</p>

Command	Default	Comment
<pre>cc profile <index> volume { downlink <vol_down_octets> uplink <vol_up_octets> total <total_octets> }</pre>	No	<p>Specifies the downlink, uplink, and total volumes that must be met before closing an accounting record.</p> <ul style="list-style-type: none"> • <i>vol_down_octets</i> is measured in octets and can be configured to any integer value from 100000 to 4000000000. • <i>vol_up_octets</i> is measured in octets and can be configured to any integer value from 100000 to 4000000000. • <i>total_octets</i> is the total traffic volume (uplink and downlink) measured in octets and can be configured to any integer value from 100000 to 4000000000.
<pre>cc profile <index> tariff time1 mins hours time2 mins hours time3 mins hours time4 mins hours</pre>	No	<p>Specifies time-of-day time values to close the current traffic volume container (but not necessarily the accounting record). Four different tariff times may be specified. If less than four times are required, then the same time value can be specified multiple times.</p>

Configuring GTPP for SGSN

This section provides the GTPP configuration for SGSN.

1. At the local context level, configure the system to reserve a CPU for performing a AAA proxy function for accounting.

```
configure
context local
    gtp single-source private-extensions
end
```



Important

After you configure the **gtp single-source private-extensions** command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the *System Administration Guide* for your deployment.

- When gprs-service and sgsn-service are configured in source context, configure the GTTP group related parameters like GTTP server parameters, GTTP dictionary, and optionally CGF to support GTTP accounting:

```

configure
  context source
    gtpp group default
    gtpp charging-agent address 192.168.10.10
    gtpp server 192.168.10.2 priority 1 max 1
    gtpp dictionary custom10
  end
    
```



Important

The above configuration is applicable for the transfer of generated CDRs to the CGF server over GTTP protocol. Configuration varies slightly if GSS/HDD is used for transferring/storing CDRs.

The following table lists all configuration commands which are related to the creation and formatting of S-CDRs. These commands are given in different portions of the configuration file:

- **gtpp group** *<name>* in the billing context: these are commands specified together with the definition of the external interface, i.e. the storage server.
- **sgsn-service/gprs-service** *<name>* in the Gn context: global settings, mainly for triggers, related to all subscribers depending on the selected charging characteristics.
 - sgsn-service config is required for 3G.
 - gprs-service config is required for 2G.
- **sgsn-operator-policy** *<name>*: defines the preference and default value for the charging characteristics

Table 6: S-CDR Configuration Parameters

Command	Default Value	Range	Comment
gtpp group <i><name></i> in billing context			
Trigger Related Configuration			
gtpp trigger volume-limit	enabled	no, enabled	When this trigger is disabled no partial record closure occurs when volume limit is reached.
gtpp trigger time-limit	enabled	no, enabled	When this trigger is disabled no partial record closure occurs when the configured time limit is reached.

Command	Default Value	Range	Comment
gtp trigger tariff-time-change	enabled	no, enabled	When this trigger is disabled container closure does not happen for a tariff-time change.
gtp trigger qos-change	enabled	no, enabled	Disabling this trigger ignores a qos-change and does not open a new CDR for it.
CDR attribute related configuration			
gtp attribute diagnostics	no	no, enabled	Includes the Diagnostic field in the CDR that is created when PDP contexts are released.
gtp attribute duration-ms	no	no, enabled	Specifying this option results in mandatory "Duration" field in the CDR to be recorded in milliseconds rather than seconds.
gtp attribute imei	enabled	no, enabled	Specifying this option includes field "IMEI" in the CDR.
gtp attribute camel-info	disabled	no, enabled	If enabled include CAMEL related information in the CDR provided if Ge interface is enabled.

Command	Default Value	Range	Comment
gtp attribute local-record-sequence-number	no	no, enabled	Specifying this option includes optional fields "Local Record Sequence Number" and "Node-ID" in the CDR. Since the "Local Record Sequence Number" has to be unique within one node (identified by "Node-ID"), "Node-ID" field will consist of sessMgr Recovery count + AAA Manager identifier + the name of the GSN service. Since each AAA Manager generates CDRs independently, that allows the "Local Record Sequence Number" and "Node ID" fields to uniquely identify a CDR.
gtp attribute msisdn	enabled	no, enabled	Specifying this option includes field "MSISDN" in the CDR.
gtp attribute node-id-suffix <string>	no	string from 1 to 16 characters	Specifies the string suffix to use in the Node-ID field of S-CDRs. With the default setting of "no" the SGSN uses the GTPP context name for the Node-Id field.
gtp attribute rat	enabled	no, enabled	Specifying this option includes field "RAT" in the CDR.
HDD related configuration			

Command	Default Value	Range	Comment
gtp storage-server local file format <custom1-custom6>	custom4	enabled	Defines the file format for CDR files created on the hard disk. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.
gtp storage-server local file compression	none	none gzip	Allows to compress generated billing files with gzip. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.

Command	Default Value	Range	Comment
gtp storage-server mode { local remote }	remote	enabled	This enables HDD storage.
gtp storage-server local file rotation cdr-count <1000-65535>	cdr-count 10000	no, enabled	Configures cdr-count for file rotation. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.
gtp storage-server local file rotation volume mb <2MB-40MB>	4MB	no, enabled	Configures file volume for file rotation. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.

Command	Default Value	Range	Comment
gtp storage-server local file rotation time-interval	3600	no, enabled	Configures time-interval for file rotation. Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.
sgsn-service <name> in Gn context or "gprs-service <name>" in Gn context			
cc profile <index> buckets <number>	index=0-15 number=4	index=0-15 number=1-4	Specifies the number of traffic volume container changes due to QoS changes or tariff time that can occur before an accounting record should be closed.
cc profile <index> interval <seconds>	no	index=0-15 interval= 60-40.000.000 seconds octets=0-1,000,000	Specifies the normal time duration that must elapse before closing an accounting record.

Command	Default Value	Range	Comment
cc profile <index> volume volume { downlink <octets> uplink <octets> total <octets> }	no	index=0 -1 5 octets= 100.000- 4.000.000.000	Specifies the downlink, uplink, and total volumes that must be met before closing an accounting record. <ul style="list-style-type: none"> • vol_down_octets is measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000 • vol_up_octets is measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000 • total_octets is the total traffic volume (up and downlink) measured in octets and can be configured to any integer value from 100,000 to 4,000,000,000
cc profile <index> tariff time1 mins hours time2 mins hours time3 mins hours time4 mins hours	no	index= 0-15 mins= 0 to 59 hours= 0 to 23	Specifies time-of-day time values to close the current traffic volume container (but not necessarily the accounting record). Four different tariff times may be specified. If less than four times are required, the same time can be specified multiple times.
sgsn-operator-policy { default name <name> }			

Command	Default Value	Range	Comment
cc behavior no-records	no	1-12	Specifies the behavior bit upon which the SGSN ceases sending accounting records to a server. nr_value can be configured to any integer value between 1 and 12 corresponding to the 12 behavior bits.
cc prefer	hlr-value	local- value hlr-value	Specify the preference for local/HLR CC settings.
cc local-value behavior <i><bits> profile <index></i>	bits=0x000index=8	bits= 0x000-0xFF index=0-15	When no CC is provided by the HLR or the local-value is preferred, then this command specifies the charging characteristics to be used.
sgsn-operator-policy { default name <name> } , apn			
cc local-value-for-scdrs behaviour <i><bits></i>	no	bits= 0x000-0xFF	Set behavior bits per APN for S-CDR. This will be given highest priority if CC is configured in sgsn-op-policy and apn level.
cc prefer	no	hlr-value-for-scds hlr-value-for-scds	Define if HLR or local CC value is used in S-CDR.

Sample Configuration for SGSN when HDD is Used

When internal HDD is enabled for storage of generated CDRs, AAA proxy should use the configuration from GTPP group for File Format/GTPP Custom dictionary/File rotation, etc.

```

configure
  context source
    gtp group default
    gtp dictionary custom10
    gtp storage-server mode local
    gtp storage-server local file format custom3
    gtp storage-server local file rotation cdr-count 1000
    gtp storage-server local file rotation time-interval 4000
    gtp storage-server local file rotation volume mb 8
  end

```


**Important**

After you configure **gtp storage-server mode local**, **gtp storage-server local file format *custom3***, **gtp storage-server local file rotation cdr-count*1000***, and **gtp storage-server local file rotation time-interval *4000*** CLI commands, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the *System Administration Guide* for your deployment.

Sample Configuration for SGSN when GSS is Used

S-CDRs are generated by Session Manager and are sent immediately to the GSS using a proprietary protocol based on UDP.

```
configure
  context source
    gtp group default
    gtp charging-agent address 192.168.201.1
    gtp storage-server 192.168.201.12 port 50000
    gtp dictionary custom10
  end
```

Gathering Statistics

The following table lists the commands that can be used to gather GTPP statistics.

In the following table, the first column lists what statistics/information to gather and the second column lists the command to use.

Table 7: Gathering Statistics 0

Statistics/Information	Action to Perform
GTPP statistics for Charging Gateway Functions	At the Exec Mode prompt, enter the following command: show gtp statistics cgf-address <i>cgf_address</i>
Information on the number of CDRs stored in HDD	At the Exec Mode prompt, enter the following command: show gtp storage-server local file statistics Important After you configure this command, you must save the configuration and then reload the chassis for the command to take effect. For information on saving the configuration file and reloading the chassis, refer to the <i>System Administration Guide</i> for your deployment.

Statistics/Information	Action to Perform
Information on the GTPP accounting server configuration	At the Exec Mode prompt, enter the following command: show gtp accounting servers group name <i>group_name</i>
Information on the CDR storage server status	At the Exec Mode prompt, enter the following command: show gtp storage-server status