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

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 gtpp
               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 [ gtpp group gtppgroup-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
          gtpp group gtpp_group
               gtpp charging-agent address ip_address port port_num
               gtpp server server_name udp-port  port_num
               gtpp dictionary dictionary_num
               gtpp storage-server mode { local | remote | streaming
}
               gtpp attribute node-id-suffix cg
               gtpp attribute local-record-sequence-number
               gtpp 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 gtpp
          gtpp 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
          gtpp group group1
          gtpp charging-agent address 1.2.3.4 port 3386
          gtpp server 1.3.5.6 max msgs priority 1
          gtpp dictionary dict1
          gtpp max-cdr 255 wait-time 10
          gtpp 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:

- **gtpp 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
gtpp group *name* in billing context			

Command	Default	Range	Comment
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.
gtpp trigger tariff-time-change	Enabled	no, enabled	When this trigger is disabled container closure does not happen for a tariff-time change.
gtpp 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.
gtpp trigger inter-plmn-sgsn-change	Enabled	no, enabled	Disabling this trigger ignores an Inter-PLMN SGSN change and doesn't release a G-CDR.
gtpp trigger qos-change	Enabled	no, enabled	Disabling this trigger ignores a qos-change and does not open a new GCDR for it.
gtpp trigger rat-change	Enabled	no, enabled	No partial record closure for a RAT change occurs when this trigger is disabled.
gtpp 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
gtpp attribute diagnostics	No	no, enabled	Includes the Diagnostic field in the CDR that is created when PDP contexts are released
gtpp 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).
gtpp 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.
gtpp 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.
gtpp attribute node-id-suffix *string*	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 *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.

Command	Default	Range	Comment
cc profile *index* **sgsns** *num_changes*	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** *seconds***[downlink** *down_octets***uplink** *up_octets* **| total** *total_octets* **]**	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 provided that any or all of the following conditions occur: • 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. Time is measured in seconds and can be configured to any integer value from 60 to 40,000,000. down_octets is the downlink traffic volume measured in octets and can be configured to any integer value from 0 to 1,000,000. up_octets is the uplink traffic volume measured in octets and can be configured to any integer value from 0 to 1,000,000. total_octets is the total traffic volume measured in octets and can be configured to any integer value from 0 to 1,000,000.

Command	Default	Range	Comment
cc profile *index* **volume volume { downlink** *octets* **uplink** *octets* | **total** *octets* }	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 *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.
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 *bits* **profile** *index*	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 *bits* **profile** *index*	bits=0x000 index=8	bits=0x000-0xFFF index=0-15	Same as above, but for "roaming" subscribers
cc-visting behavior *bits* **profile** *index*	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 *index*	No	index=0-15	GGSN accepts CC from AAA server, or uses *index* if not provided
cc-sgsn use-ggsn profile *index*	No	index=0-15	GGSN uses profile *index* and sets bits 0-3 of the CC to *index*, overriding all other ways of providing CC
cc-sgsn use-ggsn behaviour *bits*	0xFFF	0x000-0xFFF	GGSN sets bits 4-31 of the CC to *bits*, 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
      gtpp group default accounting-context SGi
    exit
    gtpp group default
      gtpp charging-agent address 192.0.0.1
      gtpp max-cdrs 2 wait-time 10
      gtpp dictionary custom24
      gtpp 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:

- **gtpp 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 **gtpp dictionary custom24**.
- The Rulebase Configuration mode sets the thresholds for various triggers.

Table 2: eG-CDR Configuration Parameters

Command	Default	Range	Comment
gtpp group *name* in billing context			
gtpp 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.
gtpp 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.
gtpp 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
gtpp egcdr final-record include-content-ids (all | only-with-traffic) closing-cause (same-in-all-partials | unique)	only-with-traffic same-in-all-partials		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. 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'. By default if multiple eG-CDRs are generated for end of subscriber session all the eG-CDRs have the same cause for record closing.
gtpp 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 *name* 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 *seconds*	no	seconds=60..40000000	Sets the interval for generating a partial eG-CDR
egcdr threshold volume (downlink *octets* | uplink *octets* **| total** *octets* **)**	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 *seconds*	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 *octets* **| uplink** *octets* | *total octets* **)**	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 minute *minute* **hour** *hour*	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 *string*		string= 1..63 characters	Selects the default rulebase to be applied to a subscriber session.
cc-home behavior *bits* **profile** *index*	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. 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 *bits* **profile** *index*	bits=0x000 index=8	bits=0x000-0xFFF index=0-15	Same as above, but for "roaming" subscribers
cc-visting behavior *bits* **profile** *index*	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).

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

Table 3: PGW-CDR Configuration Parameters

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

Command	Default	Comment
gtpp 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.
gtpp attribute diagnostics	No	Includes the "Diagnostic" field in the CDR that is created when PDP contexts are released.
gtpp attribute duration-ms	No	Specifying this option results in the mandatory "Duration" field in the CDR to be recorded in milliseconds rather than seconds.
gtpp attribute imei	Enabled	Specifying this option includes the "IMEI" field in the CDR.
gtpp 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.
gtpp attribute msisdn	Enabled	Specifying this option includes the "MSISDN" field in the CDR.
gtpp 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.
gtpp attribute rat	Enabled	Specifying this option includes the "RAT" field in the CDR.
gtpp attribute record-extensions rat	No	Enables encoding of the RAT in the record-extension field of the CDR.

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

Command	Default	Comment
gtpp 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 *System Administration Guide* for your deployment.
gtpp storage-server local file compression	None	Compresses 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 *System Administration Guide* for your deployment.
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. • **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 gtpp
            gtpp group group1 accounting-context pdg
            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 PDG service.

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

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

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

- **gtpp 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 - "gtpp group <name>" in billing context		

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

Command	Default	Comment
gtpp 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.
gtpp attribute msisdn	Enabled	Specifying this option includes the "MSISDN" field in the CDR.
gtpp 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".
gtpp attribute rat	Enabled	Specifying this option includes the "RAT" field in the CDR.
gtpp attribute record-extensions rat	No	Specificing this option enables encoding of the RAT in the record-extension field of the CDR.
gtpp 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 *System Administration Guide* for your deployment.

Command	Default	Comment
gtpp 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 *System Administration Guide* 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
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: • 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. *down_octets* is the downlink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000. *up_octets* is the uplink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000. *total_octets* is the total traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.

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. • *vol_down_octets* is measured in octets and can be configured to any integer value from 100000 to 4000000000. • *vol_up_octets* is measured in octets and can be configured to any integer value from 100000 to 4000000000. • *total_octets* 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** *mins hours* **time2** *mins hours* **time3** *mins hours* **time4** *mins hours*	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 gtpp
             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
          gtpp group default
          gtpp charging-agent address 1.2.3.4 port 3386
          gtpp server 1.3.5.6 max msgs priority 1
          gtpp dictionary dict1
          gtpp max-cdr 255 wait-time 10
          gtpp transport-layer udp
          gtpp trigger volume-limit
          gtpp 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 gtpp
          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 gtpp group sgw
          end
```

5. Configure the GTPP group related parameters.

```
configure
     context source
          gtpp group group1
          gtpp charging-agent address 1.2.3.4 port 3386
          gtpp server 1.3.5.6 max msgs priority 1
          gtpp dictionary dict1
          gtpp max-cdr 255 wait-time 10
          gtpp 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.

- **gtpp 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 - "gtpp group <name>" in billing context		
gtpp trigger volume-limit	Enabled	When this trigger is enabled, partial record closure occurs when the volume limit is reached.

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

Command	Default	Comment
gtpp 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.
gtpp attribute msisdn	Enabled	Specifying this option includes the "MSISDN" field in the CDR.
gtpp 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".
gtpp attribute rat	Enabled	Specifying this option includes the "RAT" field in the CDR.
gtpp attribute record-extensions rat	No	Specificing this option enables encoding of the RAT in the record-extension field of the CDR.
gtpp 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 *System Administration Guide* for your deployment.

Command	Default	Comment
gtpp 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 *System Administration Guide* for your deployment.
gtpp 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.
gtpp attribute apn-ambr	None	Specifying this option includes optional field "APN-AMBR" in the CDR as part of epcQOSInformationContent.
gtpp attribute imsi-unauthenticated-flag	None	Specifying this option includes optional field "IMSI Unauthenticated Flag" in the CDR.
gtpp attribute user-csg-information	None	Specifying this option includes optional field "User CSG Information" in the CDR.
gtpp attribute dynamic-flag-extension	None	Specifying this option includes optional field "Dynamic Address Flag Extension" in the CDR.
gtpp attribute sgw-ipv6-addr	None	Specifying this option includes optional field "sgw-ipv6-addr" in the CDR.
gtpp attribute sna-ipv6-addr	None	Specifying this option includes optional field "servingNodeiPv6Address" in the CDR.
gtpp 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: • 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. *down_octets* is the downlink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000. *up_octets* is the uplink traffic volume measured in octets and can be configured to any integer value from 0 to 1000000. *total_octets* is the total traffic volume measured in octets and can be configured to any integer value from 0 to 1000000.

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. • *vol_down_octets* is measured in octets and can be configured to any integer value from 100000 to 4000000000. • *vol_up_octets* is measured in octets and can be configured to any integer value from 100000 to 4000000000. • *total_octets* 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** *mins hours* **time2** *mins hours* **time3** *mins hours* **time4** *mins hours*	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.

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
      gtpp single-source private-extensions
      end
```

Important After you configure the **gtpp 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.

2. When gprs-service and sgsn-service are configured in source context, configure the GTPP group related parameters like GTPP server parameters, GTPP dictionary, and optionally CGF to support GTPP 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 GTPP 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 <*name*> 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
gtpp trigger tariff-time-change	enabled	no, enabled	When this trigger is disabled container closure does not happen for a tariff-time change.
gtpp 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			
gtpp attribute diagnostics	no	no, enabled	Includes the Diagnostic field in the CDR that is created when PDP contexts are released.
gtpp 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.
gtpp attribute imei	enabled	no, enabled	Specifying this option includes field "IMEI" in the CDR.
gtpp 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
gtpp 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.
gtpp attribute msisdn	enabled	no, enabled	Specifying this option includes field "MSISDN" in the CDR.
gtpp 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.
gtpp attribute rat	enabled	no, enabled	Specifying this option includes field "RAT" in the CDR.
HDD related configuration			

Command	Default Value	Range	Comment
gtpp 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 *System Administration Guide* for your deployment.
gtpp 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 *System Administration Guide* for your deployment.

Command	Default Value	Range	Comment
gtpp storage-server mode { local | remote }	remote	enabled	This enables HDD storage.
gtpp 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 *System Administration Guide* for your deployment.
gtpp 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 *System Administration Guide* for your deployment.

Command	Default Value	Range	Comment
gtpp 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 *System Administration Guide* 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. • 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- valuehlr-value	Specify the preference for local/HLR CC settings.
cc local-value behavior <*bits*> **profile** <*index*>	bits=0x000index=8	bits= 0x000-0xFFF 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 <*bits*>	no	bits= 0x000-0xFFF	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-scdrshlr-value-for-scdrs	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
          gtpp group default
          gtpp dictionary custom10
          gtpp storage-server mode local
          gtpp storage-server local file format custom3
          gtpp storage-server local file rotation cdr-count 1000
          gtpp storage-server local file rotation time-interval 4000
          gtpp storage-server local file rotation volume mb 8
          end
```

Important After you configure **gtpp storage-server mode local**, **gtpp storage-server local file format** *custom3* , **gtpp storage-server local file rotation cdr-count***1000* , and **gtpp 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
          gtpp group default
          gtpp charging-agent address 192.168.201.1
          gtpp storage-server 192.168.201.12 port 50000
          gtpp 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 gtpp statistics cgf-address** *cgf_address*
Information on the number of CDRs stored in HDD	At the Exec Mode prompt, enter the following command: **show gtpp 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 *System Administration Guide* 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 gtpp accounting servers group name** *group_name*
Information on the CDR storage server status	At the Exec Mode prompt, enter the following command: **show gtpp storage-server status**