gprs charging cdr-aggregation-limit

To specify the maximum number of call detail records (CDRs) that the gateway GPRS support node (GGSN) aggregates in a charging data transfer message to a charging gateway, use the **gprs charging cdr-aggregation-limit** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging cdr-aggregation-limit *cdr-limit*

no gprs charging cdr-aggregation-limit *cdr-limit*

Syntax Description

cdr-limit	An integer between 1 and 255 that specifies the number of CDRs that can be accumulated in a charging data transfer message. The default is 255 CDRs.

Defaults   255 CDRs

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging cdr-aggregation-limit** command to specify the maximum number of CDRs that can be accumulated in a charging data transfer message to a charging gateway connected to the GGSN.

When the aggregation limit is reached, the GGSN puts the CDRs into a message and immediately sends it to the charging gateway.

To view the configured CDR aggregation limit, use the **show gprs charging parameters** command.

Examples   The following example specifies 128 CDRs:

```
gprs charging cdr-aggregation-limit 128
```

Related Commands	Command	Description
	gprs charging container volume-threshold	Specifies the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
	gprs charging packet-queue-size	Specifies the maximum number of unacknowledged charging data transfer requests that the GGSN maintains in its queue.
	gprs charging transfer interval	Specifies the number of seconds that the GGSN waits before it transfers charging data to the charging gateway.
	show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging cdr-option

To configure the gateway GPRS support node (GGSN) to include or not include certain information elements (IEs) in call detail records (CDRs), use the **gprs charging cdr-option** command in global configuration mode. To return to the default value, use the **no** form of this command.

> **gprs charging cdr-option** [**apn** [**virtual**] | **apn-selection-mode** | **camel-charge-info** | **chch-selection-mode** | **dynamic-address** | **imeisv** | **local-record-sequence-number** | **ms-time-zone** | **nip** | **no-partial-cdr-generation** [**all**] | **node-id** | **packet-count** | **pdp-address** | **pdp-type** | **rat-type** | **served-msisdn** | **sgsn-plmn** | **service-record** [*value*] | **user-loc-info**]

> **no charging cdr-option** [**apn** [**virtual**] | **apn-selection-mode** | **camel-charge-info** | **chch-selection-mode** | **dynamic-address** | **imeisv** | **external-charging-id** | **local-record-sequence-number** | **ms-time-zone** | **nip** | **no-partial-cdr-generation** [**all**] | **node-id** | **packet-count** | **pdp-address** | **pdp-type** | **rat-type** | **served-msisdn** | **sgsn-plmn** | **service-record** [*value*] | **user-loc-info**]

Syntax Description		
apn [**virtual**]	Specifies that the access point name (APN) IE be included or not included in G-CDRs. Optionally, specify the **virtual** keyword to include the virtual APN in G-CDRs, accounting records, and credit control requests (CCRs).	
apn-selection-mode	Specifies that the reason code for APN selection be included or not included in G-CDRs.	
camel-charge-info	Specifies that a copy of the tag and length of the Customized Application for Mobile Enhanced Logic (CAMEL) from the serving GPRS support node's (SGSN's) CDR be included in G-CDRs.	
chch-selection-mode	Specifies that the charging characteristics selection mode IE be included or not included in G-CDRs.	
dynamic-address	Specifies that the dynamic address flag IE be included or not included in G-CDRs.	
imeisv	Specifies that the International Mobile Equipment Identity IMEI software version (IMEISV) be included in G-CDRs. The IMEISV identifies the mobile equipment used by the subscriber.	
local-record-sequence-number	Enables the GGSN to use the local record sequence number field in G-CDRs.	
ms-time-zone	Specifies that the Mobile Station Time Zone (MSTZ) IE be included in G-CDRs. The MSTZ IE indicates the offset between universal time and local time.	
nip	Specifies that the Network-Initiated PDP IE be included in G-CDRs.	
no-partial-cdr-generation [**all**]	Enables the GGSN to create fully-qualified partial G-CDRs. Optionally, specify the **all** keyword option to configure the GGSN to copy the SGSN list for charging releases prior to Release 4 when an SGSN change limit trigger is configure as well.	
node-id	Specifies that the GGSN includes the node that generated the CDR in the node ID field in G-CDRs.	
packet-count	Enables the GGSN to provide uplink and downlink packet counts in the optional record extension field of a G-CDR.	
pdp-address	Specifies that the packet data protocol (PDP) address IE be included or not included in G-CDRs.	

pdp-type	Specifies that the PDP type IE be included or not included in G-CDRs.
rat-type	Specifies that the radio access technology (RAT) IE be included in G-CDRs. The RAT indicates whether the SGSN serves the user equipment (UE) by Universal Terrestrial Radio Access Network (UTRAN) or GSM/EDGE RAN (GERAN).
served-msisdn	Enables the GGSN to provide the mobile station integrated digital network (MSISDN) number from the Create PDP Context request in a G-CDR.
sgsn-plmn	Specifies that the SGSN PLMN identifier be included or not included in G-CDRs.
service-record [*number*]	Enables the GGSN to generate per-service records. Optionally, the maximum number of services records in a CDR can be specified. When the limit is reached, the current G-CDR is closed and a new partial CDR is opened. If a maximum number is not specified, the default of 5 is used.
user-loc-info	Specifies that the user location information (ULI) IE be included in G-CDRs. The ULI provides the cell global identity (CGI) and service area identity (SAI) of the subscriber location.

Defaults   By default, the parameters configured by the following keyword options are included in G-CDRs:

- **apn**
- **dynamic-address**
- **nip**
- **pdp-address**
- **pdp-type**

By default, the parameters configured by the following keyword options are not included in G-CDRs:

- **apn-selection**
- **camel-charge-info**
- **imeisv**
- **local-record-sequence-number**
- **ms-time-zone**
- **node-id**
- **packet-count**
- **rat-type**
- **served-msisdn**
- **user-loc-info**

By default, fully-qualified partial CDR generation is enabled.

By default, the generation of per-service records is disabled. When enabled, by default 5 service records are allowed per G-CDR.

Command Modes   Global configuration

Command History	Release	Modification
	12.1(1)GA	This command was introduced.
	12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T and the **no-partial-cdr-generation** and **packet-count** keyword options were added.
	12.2(2)	This command was integrated into Cisco IOS Release 12.2(2) and the **served-msisdn** keyword option was added.
	12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX and the **apn-selection-mode** keyword option was added.
	12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
	12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
	12.3(2)XB2	This command was integrated into Cisco IOS Release 12.3(2)XB2 and the **sgsn-plmn** keyword option was added.
	12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
	12.3(8)XU2	This command was integrated into Cisco IOS Release 12.3(8)XU2 and the **all** keyword option was added to the **no-partial-cdr-generation** keyword options.
	12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
	12.3(14)YQ	This command was integrated into the Cisco IOS Release 12.3(14)YQ and the **service-record** [*number*] keyword option was added.
	12.3(14)YU	This command was integrated into the Cisco IOS Release 12.3(14)YU and the following keyword options were added: • **apn [virtual]** • **camel-charge-info** • **imeisv** • **ms-time-zone** • **rat-type** • **user-loc-info**
	12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines Use the **gprs charging cdr-option** command to configure the GGSN to include or not include (using the **no** form of the command) the APN, dynamic address flag, NIP, PDP address, or PDP type parameters in G-CDRs.

apn-selection-mode

Use the **gprs charging cdr-option apn-selection-mode** command to enable the GGSN to provide the reason code for APN selection in G-CDRs.

The following are the possible APN selection reason codes:

- 0—Mobile station (MS) or network provided, subscription verified
- 1—MS provided, subscription not verified
- 2—Network provided, subscription not verified

local-record-sequence-number

Certain charging data systems use the local record sequence number field in CDRs to associate the partial records generated in the SGSN and GGSN with a particular PDP context. If the charging gateway implements this feature, use the **gprs charging cdr-option local-record-sequence-number** command to enable the feature on the GGSN.

node-id

Certain charging data systems use the node ID field in CDRs to identify the node that generated the CDR. If the charging gateway that your GGSN communicates with uses this feature, use the **gprs charging cdr-option node-id** command to enable the feature.

no-partial-cdr-generation

Use the **gprs charging cdr-option no-partial-cdr-generation all** command when you want all of the fields in the primary G-CDR to be included in any subsequent G-CDRs (partial G-CDRs) for the same PDP context request. By default, partial G-CDRs do not contain the following fields: network initiated PDP context, access point name (network identifier), PDP type, served PDP address, and dynamic address flag.

When you enable the **gprs charging cdr-option no-partial-cdr-generation** command, the GGSN creates any subsequent G-CDRs for the same PDP context request with the same fields in all G-CDRs and maintains sequence numbering.

If an SGSN change limit trigger is not configured when **gprs charging cdr-option no-partial-cdr-generation command** is configured, and a G-CDR is closed as a result of any other trigger (such as tariff times or QoS changes), the GGSN copies the last SGSN (the current SGSN) in the list in the new G-CDR. However, for charging releases prior to Release 4, by default, when the **gprs charging cdr-option no-partial-cdr-generation** command is configured and there is an SGSN change limit trigger configured either using the **gprs charging container sgsn-change-limit** global configuration or the **limit sgsn-change** charging profile configuration command, the CDR will not contain any SGSN address if it closed because of a non-SGSN-change trigger and there is no SGSN change. Therefore, to ensure that all CDR parameters are copied, including the SGSN list, specify the **all** keyword option when issuing the **gprs charging cdr-option no-partial-cdr-generation**.

Note Enable this command only when there are no active PDP contexts. Enabling this feature will affect all subsequent PDP contexts.

packet-count

When you issue the **gprs charging cdr-option packet-count** command, then the GGSN provides a packet count in the optional record extension field for all uplink and downlink packets transferred since the CDR was opened and subsequently closed.

The following object IDs (OIDs) are used in the optional record extension field of the CDR for the uplink and downlink packet counts:

- OID of the uplink packet count—1.3.6.1.4.1.9.10.48.1.2.2.98
- OID of the downlink packet count—1.3.6.1.4.1.9.10.48.1.2.2.99

served-msisdn

Use the **gprs charging cdr-option served-msisdn** command to enable the GGSN to provide the mobile station ISDN (MSISDN) number from the Create PDP Context request in a G-CDR.

To verify the options configured, use the **show gprs charging parameters** command.

Examples   The following example configures the GGSN to exclude the APN parameter in G-CDRs:

```
no gprs charging cdr-option apn
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging cg-path-requests

To specify the number of minutes that the gateway GPRS support node (GGSN) waits before trying to establish the TCP path to the charging gateway when TCP is the specified path protocol, use the **gprs charging cg-path-requests** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging cg-path-requests *minutes*

no gprs charging cg-path-requests

Syntax Description		
minutes		Number of minutes the GGSN waits before retrying a charging request. The default value is 0 minutes, which disables the timer.

Defaults   0 minutes

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging cg-path-requests** command to specify the number of minutes that the GGSN waits before trying to establish the TCP path to the charging gateway when TCP is the specified path protocol.

Examples   The following example specifies that the GGSN waits 5 minutes before trying to establish the TCP path to the charging gateway:

```
gprs charging cg-path-requests 5
```

Related Commands	Command	Description
	show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging characteristics reject

To configure the gateway GPRS support node (GGSN) to reject GPRS tunneling protocol (GTP) Version 1 (GTP v1) Create PDP Context requests for which no charging profile can be selected, use the **gprs charging characteristics reject** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging characteristics reject

no gprs charging characteristics reject

Syntax Description   This command has no arguments or keywords.

Defaults   Disabled; the GGSN accepts packet data protocol (PDP) context requests for which no charging profile can be selected and applies the global charging defaults.

Command Modes   Global configuration

Command History

Release	Modification
12.3(8)XU	This command was introduced.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging characteristics reject** command to configure the GGSN to reject Create PDP Context requests for which a charging profile cannot be selected.

The following restrictions apply to charging profiles selected for service-aware PDPs:

- All PDP s belonging to the same user must use the same charging profile as that of the primary PDP.
- The default charging profile, i.e. charging profile 0, is not supported for service-aware PDPs. These PDP create requests will be rejected with error code 199.

To verify whether the charging characteristics reject option is enabled or disabled on the GGSN, use the **show gprs charging parameters** command.

Note   This command does not affect GTP Version 0 (GTPv0) Create PDP Context requests.

Examples   The following example configures the GGSN to reject GTP v1 Create PDP Context requests for which no charging profile can be selected:

```
gprs charging characteristics reject
```

	Command	Description
Related Commands.	**category**	Identifies the subscriber category to which a charging profile applies.s
	cdr suppression	Specifies that CDRs be suppressed as a charging characteristic in a charging profile.
	charging profile	Associates a default charging profile to an access point.
	content dcca profile	Defines a DCCA client profile in a GGSN charging profile.
	content postpaid time	Specifies as a trigger condition for postpaid users in a charging profile, the time duration limit that when exceeded causes the GGSN to collect upstream and downstream traffic byte counts and close and update the G-CDR for a particular PDP context.
	content postpaid validity	Specifies as a trigger condition in a charging profile, the amount of time quota granted to a postpaid user is valid.
	content postpaid volume	Specifies as a trigger condition for postpaid users in a charging profile, the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
	content rulebase	Associates a default rule-base ID with a charging profile.
	description	Specifies the name or a brief description of a charging profile.
	gprs charging container time-trigger	Specifies a global time limit, that when exceeded by a PDP context causes the GGSN to close and update the G-CDR for that particular PDP context.
	gprs charging profile	Creates a new charging profile (or modifies an existing one), and enters charging profile configuration mode.
	limit duration	Specifies, as a trigger condition in a charging profile, the time duration limit that when exceeded causes the GGSN to collect upstream and downstream traffic byte counts and close and update the G-CDR for a particular PDP context.
	limit sgsn-change	Specifies, as a trigger condition in a charging profile, the maximum number of SGSN changes that can occur before closing and updating the G-CDR for a particular PDP context.
	limit volume	Specifies, as a trigger condition in a charging profile, the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
	tariff-time	Specifies that a charging profile use the global tariff changes configured using the **gprs charging tariff-time** global configuration command.

gprs charging container change-limit

To specify the maximum number of charging containers within each call detail record (CDR) from the gateway GPRS support node (GGSN), use the **gprs charging container change-limit** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging container change-limit *number*

no gprs charging container change-limit *number*

Syntax Description

number	Integer from 1 to 100. The default value is 5.

Defaults

5 containers

Command Modes

Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines

For each activated packet data protocol (PDP) context on the GGSN, the GGSN creates a G-CDR to collect charging information to be sent to the charging gateway. When certain conditions occur for a PDP context, the GGSN adds information to the CDR or closes the CDR, depending on the trigger condition.

When a CDR is open for a PDP context and the GGSN detects a trigger condition, the GGSN collects the current charging data for that PDP context and appends it to the existing G-CDR in a CDR container.

The following conditions cause the GGSN to create a CDR container and send updates to the charging gateway:

- Quality of service (QoS) change
- Tariff time change
- CDR closure

The following conditions cause the GGSN to create a CDR container and close the G-CDR:

- End of PDP context
- Partial record reason

To control the maximum number of these trigger conditions, and therefore the number of CDR containers in each G-CDR, use the **gprs charging container change-limit** command.

When the number of containers added to a G-CDR reaches the limit specified in the **gprs charging container change-limit** command, the G-CDR is closed and sent as a partial CDR to the charging gateway. If the PDP context remains active, the GGSN opens another G-CDR with a subsequent sequence number associated with that PDP context and its charging data.

Examples

The following example specifies that each CDR includes 25 charging containers:

```
gprs charging change-condition-limit 25
```

Related Commands

Command	Description
gprs charging container volume-threshold	Specifies the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging container sgsn-change-limit

To specify the maximum number of serving GPRS support node (SGSN) changes that can occur before closing and updating a call detail record (CDR) for a particular packet data protocol (PDP) context, use the **gprs charging container sgsn-change-limit** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging container sgsn-change-limit *number*

no gprs charging container sgsn-change-limit *number*

Syntax Description

number	Integer from 0 to 15. The default value is disabled.

Defaults Disabled

Command Modes Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD, with the following changes:
	• The **no** form of the command was added.
	• The default value changed from 15 to disabled.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines A value of 0 means that a CDR is closed each time that a new SGSN begins handling the PDP context.

The command specifies the number of changes, not the number of SGSNs to be supported. The number of SGSNs supported is equal to 1 more than the change limit. For example, if the SGSN change limit is 2, the maximum number of SGSNs in the list before the gateway GPRS support node (GGSN) closes the G-CDR is 3.

When you enable the **gprs charging cdr-option no-partial-cdr-generation** command, the GGSN creates any subsequent G-CDRs for the same PDP context request with the same fields in all G-CDRs and maintains sequence numbering.

If an SGSN change limit trigger is not configured when **gprs charging cdr-option no-partial-cdr-generation command** is configured, and a G-CDR is closed as a result of any other trigger (such as tariff times or quality of service [QoS] changes), the GGSN copies the last SGSN (the current SGSN) in the list in the new G-CDR. However, for charging releases prior to Release 4, by default, when the **gprs charging cdr-option no-partial-cdr-generation** command is configured and there is an SGSN change limit trigger configured either using the **gprs charging container sgsn-change-limit** global configuration or the **limit sgsn-change** charging profile configuration command, the CDR will not contain any SGSN address if it closed because of a non-SGSN-change trigger and there is no SGSN change. Therefore, to ensure that all CDR parameters are copied, including the SGSN list, specify the **all** keyword option when issuing the **gprs charging cdr-option no-partial-cdr-generation**.

Examples

The following example specifies that a G-CDR closes after five SGSN changes in a list for a particular PDP context. If the PDP context is still active, then a partial CDR is opened:

```
gprs charging container sgsn-change-limit 5
```

gprs charging container time-trigger

To specify a global time limit, that when exceeded by a packet data protocol (PDP) context causes the gateway GPRS support node (GGSN) to close and update the call detail record (CDR) for that particular PDP context, use the **gprs charging container time-trigger** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging container time-trigger *number*

no gprs charging container time-trigger *number*

Syntax Description	*number*	Number, in minutes from 5 to 4294967295. The default value is 0, which disables the timer.

Defaults   0—Disabled

Command Modes   Global configuration

Command History

Release	Modification
12.3(8)XU	This command was introduced.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   If a time-trigger has been specified in a charging profile applied to an access point name (APN), that value will override the value specified globally.

Examples   The following example specifies that a G-CDR closes after a particular PDP context time duration exceeds 5 minutes. If the PDP context is still active, then a partial CDR is opened:

```
gprs charging container time-trigger 5
```

Related Commands

Command	Description
gprs charging container change-limit	Specifies the maximum number of charging containers within each CDR from the GGSN.
gprs charging container sgsn-change-limit	Specifies the maximum number of SGSN changes that can occur before closing a G-CDR for a particular PDP context.

Command	Description
gprs charging container volume-threshold	Specifies the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging container volume-threshold

To specify the maximum number of bytes that the gateway GPRS support node (GGSN) maintains across all containers for a particular packet data protocol (PDP) context before closing and updating the call detail record (CDR), use the **gprs charging container volume-threshold** command in global configuration mode. To return to the default value, use the **no** form of this command.

> **gprs charging container volume-threshold** *threshold-value*

> **no gprs charging container volume-threshold** *threshold-value*

Syntax Description

threshold-value	A value between 1 and 4294967295 that specifies the container threshold value, in bytes. The default is 1,048,576 bytes (1 MB).

Defaults

1,048,576 bytes (1 MB)

Command Modes

Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines

While a PDP context (mobile session) is active, charging events are generated based on various actions. One way that users can be charged is based on the amount of data transmitted between the PDN and the mobile station. Data volume is recorded in each container of a G-CDR record. Service providers can use this recorded data volume to bill users by volume usage.

Use the **gprs charging container volume-threshold** command to control the maximum amount of data volume that can be reported in each G-CDR from an active PDP context before the G-CDR is eligible for an update to the charging gateway for subsequent billing. The GGSN opens another partial G-CDR for that PDP context while the PDP context remains in session on the GGSN.

For example, a volume threshold setting of 1 MB is configured on the GGSN. The GGSN opens a container in a G-CDR for a new PDP context. A trigger occurs for the PDP context, and at that time the GGSN has registered transmission of 500 KB of data for the PDP context. The trigger causes the GGSN to close the container for the PDP context, which has occurred before the volume limit is reached (500 KB of data transmitted, and 1 MB allowed).

As transmission for the PDP context continues, the GGSN opens a new container in the G-CDR. The GGSN now has up to 500 KB more data that can be processed for that PDP context before reaching the volume threshold limit for the G-CDR. When the volume threshold is reached across all containers for the PDP context (that is, when the sum of all of the byte counts across all containers for the PDP context reaches 1 MB), the GGSN closes the G-CDR with a volume limit cause so that the G-CDR can be sent to the charging gateway. The GGSN opens another partial G-CDR for the PDP context while it remains in session.

Examples   The following example specifies a threshold value of 2097152:

```
gprs charging container volume-threshold 2097152
```

Related Commands

Command	Description
gprs charging container change-limit	Specifies the maximum number of charging containers within each CDR from the GGSN
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging disable

To disable charging transactions on the gateway GPRS support node (GGSN), use the
gprs charging disable command in global configuration mode. To reenable charging transactions, use
the **no** form of this command.

gprs charging disable

no gprs charging disable

Syntax Description   This command has no arguments or keywords.

Defaults   Charging is enabled.

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging disable** command to disable charging. By default, charging processing is enabled on the GGSN.

Before the GGSN can disable charging, any currently open call detail records (CDRs) must be cleared. To clear any open CDRs, use the **clear gprs charging cdr** command. If you disable charging on the GGSN using the **gprs charging disable** command, then you can re-enable charging using the **no gprs charging disable** command.

⚠
Caution   The **gprs charging disable** command removes charging data processing on the GGSN, which means that the data required to bill customers for network usage is neither being collected by the GGSN nor being sent to the charging gateway. We recommend that you avoid using this command in production network environments. If you must configure this command, use it with extreme care and reserve its usage only for non-production network conditions.

Examples   The following example disables GGSN charging processing:

```
gprs charging disable
```

gprs charging flow-control private-echo

To implement an echo request with private extensions for maintaining flow control on packets transmitted to the charging gateway, use the **gprs charging flow-control private-echo** command in global configuration mode. To disable private extensions for flow control, use the **no** form of this command.

gprs charging flow-control private-echo

no gprs charging flow-control private-echo

Syntax Description   This command has no arguments or keywords.

Defaults   Private flow control is disabled.

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   If the charging gateway that the gateway GPRS support node (GGSN) communicates with implements a proprietary private extension to the echo signal that maintains flow control, use the **gprs charging flow-control private-echo** command to enable private echo signaling. If your charging gateway does not implement this feature, disable the feature.

Examples   The following example enables an echo request:

```
gprs charging flow-control private-echo
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging header short

To enable the gateway GPRS support node (GGSN) to use the GPRS tunneling protocol (GTP) short header (6-byte header), use the **gprs charging header short** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging header short

no gprs charging header short

Syntax Description   This command has no arguments or keywords.

Defaults   Disabled. The GGSN uses the GTP long header.

Command Modes   Global configuration

Command History

Release	Modification
12.2(8)YW	This command was introduced.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging header short** command to specify for the GGSN to use the GTP short header (6-byte header).

Examples   The following example shows the enabling of the GTP short header:

```
gprs charging header short
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging interface source loopback

To configure the GGSN to use a loopback interface for charging messages, use the **gprs charging interface source loopback** command in global configuration mode. To return to the default configuration, use the **no** form of this command.

> **gprs charging interface source loopback** *number*

> **no gprs charging interface source loopback** *number*

Syntax Description

number	Number of the loopback interface to use for charging messages.

Defaults
The global GTP virtual template interface is used for charging messages.

Command History

Release	Modification
12.4(15)XQ	This command was introduced.
12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T.

Usage Guidelines
Use the **gprs charging interface source loopback** command to configure the GGSN to use a loopback interface for charging traffic.

By default, the global GTP virtual template interface is used for all charging messages. With Cisco GGSN Release 8.0 and later, you can configure a charging source interface to use for charging messages.

The charging source interface is a loopback interface that the GGSN has been configured to use for charging traffic using the **gprs charging interface source loopback** global configuration command. Once a loopback interface has been configured as the charging source interface, all charging messages will use the IP address of that loopback interface as their source address.

This feature enables you to separate charging traffic. Optionally, VRF can be configured on the loopback interface, which enables charging traffice to be separated onto a private VLAN.

When configuring a charging source interface, note the following:

- Once configured, the loopback interface cannot not be modified without removing the charging source interface configuration. All charging messages will use the new end points from the path structure.

- A charging source interface cannot be unconfigured while there are active PDPs or CDRs.

Examples
The following example configures the GGSN to use loopback interface 9 for charging traffic:

```
Router(config)# gprs charging interface source loopback 9
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging map data tos

To specify an IP type of service (ToS) mapping for gateway GPRS support node (GGSN) charging packets, use the **gprs charging map data tos** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging map data tos *tos-value*

no gprs charging map data tos *tos-value*

Syntax Description

tos-value	Specifies a ToS mapping value between 0 and 5. A higher number indicates a higher service priority. The default value is 3.

Defaults   3

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging map data tos** command to specify a value for the ToS precedence bits in the IP header for charging packets transmitted by the GGSN.

Examples   The following example shows ToS mapping value of 5:

```
gprs charging map data tos 5
```

Related Commands	Command	Description
	show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging message transfer-request command-ie

To specify for the gateway GPRS support node (GGSN) to include the Packet Transfer Command information element (IE) in Data Record Transfer Request messages, use the **gprs charging message transfer-request command-ie** command in global configuration mode. To return to the default value, use the **no** form of this command.

> **gprs charging message transfer-request command-ie**

> **no gprs charging message transfer-request command-ie**

Syntax Description   This command has no arguments or keywords.

Defaults   The GGSN does not include the Packet Transfer Command IE.

Command Modes   Global configuration

Command History

Release	Modification
12.2(8)YW	This command was introduced.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging message transfer-request command-ie** command to configure the GGSN to include the Packet Transfer Command IE in Data Record Transfer Request messages.

When the **gprs charging message transfer-request command-ie** command is enabled, the Packet Transfer Command IE is included in Data Record Transfer Request messages with the value set to Send Data Record Packet (1), unless the **gprs charging message transfer-request possibly-duplicate** command has been configured.

When the **gprs charging message transfer-request possibly-duplicate** command is configured along with the **gprs charging message transfer-request command-ie** command, if a charging gateway (CG) should fail, when the GGSN switches over to the standby CG, the GGSN will retransmit Data Record Transfer Request message (sent to the previously active CG) and set the value of the Data Record Transfer Request IE to Send Possibly Duplicate Data Record Packet (2).

The GGSN does not support the following values of the Packet Transfer Command IE:

- Cancel Data Record Packet (3)
- Release Data Record Packet (4).

Examples   The following example specifies for the GGSN to include the Packet Transfer Command IE in Data Record Transfer Response messages:

```
gprs charging message transfer-request command-ie
```

Related Commands

Command	Description
gprs charging message transfer-request possibly-duplicate	Specifies for the GGSN to retransmit Data Record Transfer Request messages (sent to a previously active charging gateway) with the value of the Packet Transfer Request IE set to Send Possibly Duplicate Data Record Packet (2).
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging message transfer-request possibly-duplicate

To specify for the gateway GPRS support node (GGSN) to retransmit Data Record Transfer Request messages (sent to a previously active charging gateway) with the value of the Packet Transfer Request information element (IE) set to Send Possibly Duplicate Data Record Packet (2), use the **gprs charging message transfer-request possibly-duplicate** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging message transfer-request possibly-duplicate

no gprs charging message transfer-request possibly duplicate

Syntax Description   This command has no arguments or keywords.

Defaults   The GGSN sets the value of the Packet Transfer Request IE to Send Data Record Packet (1).

Command Modes   Global configuration

Command History

Release	Modification
12.3(8)XU	This command was introduced.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging message transfer-request possibly-duplicate** command to configure the GGSN to retransmit Data Record Transfer Request messages to a newly active charging gateway (sent to a previously active charging gateway) with the value of the Packet Transfer Request IE set to Send Possibly Duplicate Data Record Packet (2), use the **gprs charging message transfer-request possibly-duplicate** command.

This command must be used with the **gprs charging message transfer-request command-ie** command. When the **gprs charging message transfer-request command-ie** command is enabled, the Packet Transfer Command IE is included in Data Record Transfer Request messages with the value set to Send Data Record Packet (1), unless the **gprs charging message transfer-request possibly-duplicate** command has been configured.

When the **gprs charging message transfer-request possibly-duplicate** command is configured along with the **gprs charging message transfer-request command-ie** command, if a charging gateway (CG) should fail, when the GGSN switches over to the standby CG, the GGSN will retransmit Data Record Transfer Request messages (sent to the previously active CG) with the value of the Data Record Transfer Request IE set to Send Possibly Duplicate Data Record Packet (2).

The GGSN does not support the following values of the Packet Transfer Command IE:

- Cancel Data Record Packet (3)

- Release Data Record Packet (4).

Examples   The following example specifies for the GGSN to retransmit Data Record Transfer Request messages with the value of the Packet Transfer Request IE set to Send Possibly Duplicate Data Record Packet (2) in the case a charging gateway goes down and a secondary gateway becomes active:

```
gprs charging message transfer-request possibly-duplicate
```

Related Commands

Command	Description
gprs charging message transfer-request command-ie	Specifies for the GGSN to include the Packet Transfer Command IE in the Data Record Transfer Request messages.
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging message transfer-response number-responded

To specify for the gateway GPRS support node (GGSN) to use the Number of Requests Responded field instead of the Length field in the Requests Responded information element (IE) of Data Record Transfer Response messages, use the **gprs charging message transfer-response number-responded** command in global configuration mode. To return to the default value, use the **no** form of this command.

> **gprs charging message transfer-response number-responded**
>
> **no gprs charging message transfer-response number-responded**

Syntax Description   This command has no arguments or keywords.

Defaults   The GGSN uses the Length field.

Command Modes   Global configuration

Command History

Release	Modification
12.2(8)YW	This command was introduced.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging message transfer-response number-responded** command to specify for the GGSN to use the Number of Requests Responded field instead of the Length field in the Requests Responded IE of Data Record Transfer Response messages when connecting to a charging gateway that does not support the Length field.

Examples   The following example specifies for the GGSN to use the Number of Requests Responded field:

```
gprs charging message transfer-response number-responded
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging packet-queue-size

To specify the maximum number of unacknowledged charging data transfer requests that the gateway GPRS support node (GGSN) maintains in its queue, use the **gprs charging packet-queue-size** command in global configuration mode. To return to the default value, use the **no** form of this command.

    gprs charging packet-queue-size *queue-size*

    no gprs charging packet-queue-size *queue-size*

Syntax Description

queue-size	Value between 1 and 512 that specifies the maximum queue size for the GGSN charging packet data queue. The default is 128 packets.

Defaults   128 packets

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging packet-queue-size** command to specify the maximum size of the GGSN queue of outstanding charging data transfer requests. This queue stores all unacknowledged charging data requests.

When the charging packet queue reaches the specified size, the GGSN stops queuing charging packets until a packet is cleared from the queue and stores new charging packets in memory.

If monitoring of the performance of the charging gateway indicates that it is processing charging packets too slowly, you can increase the size of the charging packet queue. Conversely, if the performance of the charging gateway is fast, you can decrease the size of the charging packet queue.

Examples   The following example specifies a GGSN queue of 512 charging data transfer requests:

```
gprs charging packet-queue-size 512
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging path-protocol

To specify the protocol that the gateway GPRS support node (GGSN) uses to transmit and receive charging data, use the **gprs charging path-protocol** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging path-protocol {**udp** | **tcp**}

no gprs charging path-protocol {**udp** | **tcp**}

Syntax Description		
udp	User Datagram Protocol (UDP), which is a connectionless transport protocol.
tcp	Transport Control Protocol (TCP), which is a connection-based transport protocol.

Defaults   UDP

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging path-protocol** command to specify the protocol used by the GGSN to transfer charging data.

Examples   The following example shows use of UDP:

```
gprs charging path-protocol udp
```

Related Commands	Command	Description
	gprs charging cg-path-requests	Specifies the number of minutes that the GGSN waits before trying to establish the TCP path to the charging gateway when TCP is the specified path protocol.
	show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging port

To configure the destination port of the charging gateway, use the **gprs charging port** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging port *port-num*

no gprs charging port *port-num*

Syntax Description

port-num	Integer from 1024 to 10000. The default port is 3386.

Defaults   Port 3386

Command Modes   Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Examples   The following example changes the default port of 3386 to 1055:

```
gprs charging port 1055
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging profile

To create a new charging profile (or modify an existing one), and enter charging profile configuration mode, use the **gprs charging profile** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging profile *profile-number*

no gprs charging profile *profile-number*

Syntax Description	*profile-number* Number of the charging profile. Valid values are 1 to 255.

Defaults Disabled

Command Modes Global configuration

Command History

Release	Modification
12.3(8)XU	This command was introduced.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ and the valid range of configurable profiles changed to 1 to 255.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines Use the **gprs charging profile** global configuration command to create charging profiles. Charging profiles define the charging method to apply to a specific type of user (home, roamer, visitor), enabling you to apply a charging method on a per-packet data protocol (PDP) context basis.

The GGSN supports up to 256 charging profiles (numbered 0 to 255). Charging profiles define the charging method for a PDP context.

Profile 0 is a set profile that always exists and is not created by the user. However, it can be modified using the charging-related global configuration commands. Profiles 1 to 255 can be defined by the user and customized using the charging profile configuration commands. You can apply these charging profiles at the access point name (APN) and global level as the default charging method for a specific user type.

When using charging profiles, please note the following:

- The GGSN must be configured to include the charging characteristics selection mode parameter in CDRs using the **gprs charging cdr-option chch-selection-mode** global configuration command.

- The GGSN must be configured to receive the charging characteristics selection mode IE in CDRs using the **gprs charging release** global configuration command.

The following types of charging characteristics and trigger conditions can be configured in a charging profile:

- Subscriber category (using the **category** command)
- CDR suppression (using the **cdr-suppression** command)
- Volume limit (using the **limit volume** command)
- Duration limit (using the **limit duration** command)
- Tariff time (using the **tariff-time** command)
- SGSN change limit (using the **limit sgsn-change** command)

When a Create PDP Context request is received, the charging profile is selected based on the following sources of input:

- Serving GPRS support node (SGSN)/home location register (HLR) via the charging characteristics information element (IE).
- Local defaults.
- Charging profile index authentication, authorization, and accounting (AAA) attribute.

Note The charging profile index received from AAA will take effect only if service-awareness has been configured globally on the GGSN (using the **gprs service-aware** global configuration command), and at the APN level (using the **service-aware** access-point configuration command).

For information on configuring a service-aware GGSN, see the "Configuring Enhanced Service-Aware Billing" chapter of the Cisco GGSN Configuration Guide.

The order in which a charging profile is selected for a PDP context, is as follows:

1. Charging profile index in the override rule on the APN—If a default charging profile has been configured at both the APN and global level to override the SGSN specification, the APN default charging profile is used first.

2. Charging profile index in the override rule on the box (global default charging profile)—If there is no default charging profile default configured at the APN, the default charging profile configured globally is use.

3. Charging profile index from AAA.

4. Charging profile index from SGSN/HLR

5. Charging profile index from the non-override rule on the APN.

6. Charging profile index from non-override rule on the box (global default charging profile).

If none of the above applies, the PDP context is rejected if the **gprs charging characteristics reject** global configuration command is configured and the Create PDP Context request is GTP v1. If the **gprs charging characteristics reject** command is not configured, the GTPv1 PDP context is created using charging profile 0.

Note The default charging profile, i.e. charging profile 0, is not supported for service-aware PDPs. These Create PDP Context requests will be rejected with error code 199.

Examples   The following example creates charging profile number 10 and enters charging profile configuration mode:

```
gprs charging profile 10
```

Related Commands.

Command	Description
category	Identifies the subscriber category to which a charging profile applies.s
cdr suppression	Specifies that CDRs be suppressed as a charging characteristic in a charging profile.
charging profile	Associates a default charging profile to an access point.
content dcca profile	Defines a DCCA client profile in a GGSN charging profile.
content postpaid time	Specifies as a trigger condition for postpaid users in a charging profile, the time duration limit that when exceeded causes the GGSN to collect upstream and downstream traffic byte counts and close and update the G-CDR for a particular PDP context.
content postpaid validity	Specifies as a trigger condition in a charging profile, the amount of time quota granted to a postpaid user is valid.
content postpaid volume	Specifies as a trigger condition for postpaid users in a charging profile, the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
content rulebase	Associates a default rule-base ID with a charging profile.
description	Specifies the name or a brief description of a charging profile.
gprs charging characteristics reject	Configures the GGSN to reject Create PDP Context requests for which no charging profile can be selected.
gprs charging container time-trigger	Specifies a global time limit, that when exceeded by a PDP context causes the GGSN to close and update the G-CDR for that particular PDP context.
limit duration	Specifies, as a trigger condition in a charging profile, the time duration limit that when exceeded causes the GGSN to collect upstream and downstream traffic byte counts and close and update the G-CDR for a particular PDP context.
limit sgsn-change	Specifies, as a trigger condition in a charging profile, the maximum number of SGSN changes that can occur before closing and updating the G-CDR for a particular PDP context.
limit volume	Specifies, as a trigger condition in a charging profile, the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
tariff-time	Specifies that a charging profile use the tariff changes configured using the **gprs charging tariff-time** global configuration command.

gprs charging profile default

To specify a global default charging profile to be used if no charging profile is specified at the access point name (APN), use the **gprs charging profile default** command in global configuration mode. To return to the default value, use the **no** form of this command.

> **gprs charging profile default {home | roaming | visiting | any} [trusted]** *profile-number* **[override]**

> **no gprs charging profile default {home | roaming | visiting | any}** *profile-number* **[trusted]** *profile-number* **[override]**

Syntax Description		
	home	Specifies that the charging profile applies to home mobile subscribers.
	roaming	Specifies that the charging profile applies to roaming mobile subscribers (subscribers whose serving GPRS support node (SGSN) public land mobile network (PLMN) ID differs from the gateway GPRS support node's (GGSN's).
	visiting	Specifies that the charging profile applies to visiting mobile subscribers (subscribers whose internation mobile subscriber identity [IMSI] contains a foreign PLMN ID).
	any	Specifies that the charging profile will apply to all types of users.
	trusted	(Optional) Specifies that the charging profile applies if the user is a visiting or roaming user (depending on whether **roaming** or **visiting** has been specified) whose PLMN ID is a trusted one (as configured using the **gprs mcc mnc** command).
	profile-number	Number of the charging profile that is being defined as the default for a selection method. Valid values are 0 to 15. If 0 is specified, charging behavior is defined by global charging characteristics (those not defined in a charging profile).
	override	(Optional) Specifies that the charging characteristic value received from the SGSN in the Create packet data protocol (PDP) Context request be ignored and the APN default used instead.

Defaults Disabled

Command Modes Global configuration

Command History	Release	Modification
	12.3(8)XU	This command was introduced.
	12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
	12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
	12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
	12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging profile default** global configuration command to define a global default charging profile for a specific type of users to be used when no default is configured at the APN.

For complete information on configuring and using charging profiles, and the order in which charging profiles are selected for a PDP context, see the "Configuring Charging Profiles" section of the "Configuring Charging on the GGSN" chapter of the *Cisco GGSN Configuration Guide*.

Examples   The following example specifies charging profile number 10 to be the global default for home users:

```
gprs charging profile default 10 home
```

Related Commands.

Command	Description
category	Identifies the subscriber category to which a charging profile applies.
cdr suppression	Specifies that CDRs be suppressed as a charging characteristic in a charging profile.
charging profile	Associates a default charging profile to an access point.
description	Specifies the name or a brief description of a charging profile.
gprs charging characteristics reject	Configures the GGSN to reject Create PDP Context requests for which no charging profile can be selected.
gprs charging container time-trigger	Specifies a global time limit, that when exceeded by a PDP context causes the GGSN to close and update the G-CDR for that particular PDP context.
gprs charging profile	Creates a new charging profile (or modifies an existing one), and enters charging profile configuration mode.
limit duration	Specifies, as a trigger condition in a charging profile, the time duration limit that when exceeded causes the GGSN to collect upstream and downstream traffic byte counts and close and update the G-CDR for a particular PDP context.
limit sgsn-change	Specifies, as a trigger condition in a charging profile, the maximum number of SGSN changes that can occur before closing and updating the G-CDR for a particular PDP context.
limit volume	Specifies, as a trigger condition in a charging profile, the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR.
tariff-time	Specifies that a charging profile use the tariff changes configured using the **gprs charging tariff-time** global configuration command.

gprs charging reconnect

To configure the gateway GPRS support node (GGSN) to periodically attempt to reconnect to an unreachable charging gateway (CG) in order to determine when the link is back up, use the **gprs charging reconnect** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging reconnect *minutes*

no gprs charging reconnect

Syntax Description		
	minutes	Number of minutes the GGSN waits between attempts to reconnect to a charging gateway. The valid range is 1 to 600 minutes.

Defaults 1 minute.

Command Modes Global configuration

Command History

Release	Modification
12.3(1)	This command was introduced.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines Configuring the GGSN to automatically attempt to reconnect to an unreachable CG is necessary only when User Datagram Protocol(UDP) is used as the charging transport protocol and the charging gateway does not support echo requests.

Examples The following example configures the GGSN to try to reconnect to a charging gateway every 5 minutes:

```
gprs charging reconnect 5
```

Related Commands

Command	Description
gprs charging path-protocol	Specifies the transport path protocol to be used by the GGSN to transmit and receive charging data.
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging release

To configure the charging release with which the gateway GPRS support node (GGSN) is to comply when presenting call detail records (CDRs), use the **gprs charging release** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging release {**99** | **98** | **4** | **5**}

no gprs charging release {**99** | **98** | **4** | **5**}

Syntax Description

99	Specifies for the GGSN to present R97/R98 and R99 quality of service (QoS) profile formats in G-CDRs.
98	Specifies for the GGSN to present only R97/R98 QoS profile formats in G-CDRs.
4	Specifies for the GGSN to comply with 3GPP TS 32.215 Release 4.
5	Specifies for the GGSN to comply with 3GPP TS 32.215 Release 5.

Defaults   99

Command Modes   Global configuration

Command History

Release	Modification
12.2(8)YW	This command was introduced.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU and the **4** and **5** keyword options were added.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   When **99** is configured, the Charging Characteristics parameter is included in G-CDRs. When **4** and **5** are configured, the Charging Characteristics Selection Mode information element (IE) is included.

To verify charging release configuration, use the **show gprs charging parameters** command.

Examples   The following example enables the GGSN to present both R97/R98 QoS profile formats and R99 QoS profile formats in G-CDRs:

```
gprs charging release 99
```

Related Commands	Command	Description
	gprs charging cdr-option	Configures the GGSN to include or not include certain parameters in G-CDRs
	show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging roamers

To enable charging for roamers on the gateway GPRS support node (GGSN), use the **gprs charging roamers** command in global configuration mode. To disable charging for roamers on the GGSN, use the **no** form of this command.

gprs charging roamers

no gprs charging roamers

Syntax Description   This command has no arguments or keywords.

Defaults   Charging for roamers is disabled.

Command Modes   Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging roamers** command to enable support on the GGSN for the creation of call detail records (CDRs) for roaming mobile subscribers.

Note   Before enabling the creation of CDRs for roaming mobile subscribers, an public land mobile network (PLMN) IP address range (or list of address ranges) must first be configured using the **gprs plmn ip address** command with the **sgsn** keyword option specified.

When the charging for roamers feature is enabled on the GGSN, when the GGSN receives a packet data protocol (PDP) context request, it first checks to see if both the GGSN and serving GPRS support node (SGSN) PLMN IDs are present and match (via the Routing Area Information field [RAI] information element [IE]).

If both IDs are not present or do not match, the GGSN matches the IE containing the serving GPRS support node (SGSN) Signaling Address field against a list of PLMN IP address ranges that have been defined using the **gprs plmn ip address** command with the **sgsn** keyword option specified.

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Note To use the RAI IE in Create PDP Context requests to detect roamers, a valid home PLMN must be configured on the GGSN using the **gprs mcc mn** global configuration command. When a valid home PLMN is configured, or valid trusted PLMNs, a CDR will not be generated if the RAI matches the configured home (or trusted) PLMN. A CDR will be created for all PDPs with RAIs that do not match a home or trusted PLMN.

Note If the RAI field is not present in a Create PDP Context, and an address range has not been configured using the **gprs plmn ip address** command with the **sgsn** keyword option specified, the PDP will be classified as "unknown" and treated as a roamer.

If the GGSN determines that the SGSN that sent the Create PDP Context request is not located within the same PLMN in which the GGSN is located, the GGSN generates a CDR. If the GGSN determines that the SGSN is located in the same PLMN, it will not generate a CDR until it receives notification that the SGSN has changed to that of one located in another PLMN.

How the charging for roamers feature functions when the GGSN determines that a Create PDP Context request is that of a roamer by matching the PDP context request IE containing the SGSN Signaling address fields against a list of PLMN IP addresses depends on how the PLMN IP address ranges have been defined using the **gprs plmn ip address** command with the **sgsn** keyword option specified.

- If no PLMN IP address ranges are configured using the **gprs plmn ip address** *start_ip end_ip* [**sgsn**] command, the GGSN generates CDRs for all initiated PDP contexts regardless of whether the GGSN and SGSN are located within the same PLMN.

- If a list of PLMN IP address ranges has been configured using the **gprs plmn ip address** *start_ip end_ip* [**sgsn**] command, and one or more of those ranges has been defined using the **sgsn** keyword, the GGSN uses those ranges defined with the **sgsn** keyword to determine whether an SGSN is located within the same PLMN.

  With this configuration, the following scenarios outline how the charging for roamers feature will function:

  - Mobile station 1 (MS1) is subscribed to PLMN1 and attaches to an SGSN in PLMN2. From PLMN2, MS1 initiates a PDP context with the GGSN in PLMN1. In this case, MS1 is a roamer, and the GGSN generates a CDR because it determines that the SGSN is located in a different PLMN.

  - MS1 is subscribed to PLMN1 and attaches to an SGSN in PLMN2. From PLMN2, MS1 initiates a PDP context with the GGSN in PLMN2. In this case, MS1 is not a roamer because the SGSN and GGSN are in the same PLMN. The GGSN does not create a G-CDR.

Configuration Guidelines

To enable charging for roamers on the GGSN, you should first define a set of IP address ranges for a PLMN using the **gprs plmn ip address** command.

It is important that you configure the **gprs plmn ip address** and **gprs charging roamers** commands in their proper order. After you configure the IP address range for a PLMN, use the **gprs charging roamers** command to enable charging for roamers on the GGSN. You can change the IP address range by reissuing the **gprs plmn ip address** command.

To verify your configuration, use the **show gprs charging parameters** command to see if the charging for roamers feature is enabled. To verify your PLMN IP address ranges, use the **show gprs plmn ip address** command.

Examples   The following example enables the charging for roamers feature on the GGSN:

```
gprs charging roamers
```

Related Commands

Command	Description
gprs plmn ip address	Defines the IP address range for a PLMN that the GGSN uses to determine whether a Create PDP Context request is from a roamer.
show gprs charging parameters	Displays information about the current GGSN charging configuration.
show gprs plmn ip address	Displays a list of defined PLMN IP address ranges.

gprs charging send-buffer

To configure the size of the buffer that contains the GPRS tunneling protocol (GTP) packet data unit (PDU) and signaling messages on the gateway GPRS support node (GGSN), use the **gprs charging send-buffer** command in global configuration mode. To return to the default value, use the **no** form of this command.

> **gprs charging send-buffer** *bytes*

> **no gprs charging send-buffer** *bytes*

Syntax Description	*bytes*	Integer from 300 to 1460. The default value is 1460 bytes.

Defaults   1460 bytes

Command Modes   Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Examples   The following example specifies a buffer size of 512 bytes:

```
gprs charging send-buffer 512
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging server-switch-timer

To specify a timeout value that determines when the gateway GPRS support node (GGSN) attempts to find an alternate charging gateway after a destination charging gateway cannot be located or becomes unusable, use the **gprs charging server-switch-timer** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging server-switch-timer *seconds*

no gprs charging server-switch-timer *seconds*

Syntax Description		
seconds	Timeout value (between 0 and 300 seconds), that the GGSN waits before attempting to contact an alternate charging gateway. The default value is 60 seconds.	

Defaults   60 seconds

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs charging server-switch-timer** command to specify a timeout value that determines when the GGSN contacts an alternate charging gateway after the current charging gateway becomes unusable or cannot be located.

To specify immediate switchover to an alternate charging gateway, specify a value of 0.

Examples   The following example configures a timeout value of 30 seconds:

```
gprs charging server-switch-timer 30
```

Related Commands	Command	Description
	show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging service-mode

To configure the service-mode state of the charging function of a gateway GPRS support node (GGSN), use the **gprs charging service-mode** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs charging service-mode {operational | maintenance}

no gprs charging service-mode {operational | maintenance}

Syntax Description		
operational	Specifies that the charging service-mode state of the GGSN is operational.	
maintenance	Specifies that the charging service-mode state of the GGSN is maintenance.	

Defaults Operational

Command Modes Global configuration

Command History

Release	Modification
12.3(8)XU	This command was introduced.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines Use the **gprs charging service-mode** command to place the charging function of a GGSN in maintenance mode. When the charging function is in maintenance mode, you can add, delete, or modify charging gateways (CGs). For example, you can change the IP addresses of charging gateways (CGs), their priority, and the number of CGs.

When the charging function is in maintenance mode, call detail records (CDRs) are not transmitted to CGs. However, the collection of CDRs is not affected. Once the service-mode state of the charging function has been returned to operational, any pending messages are sent to the newly configured CG and the charging function operates normally. If all CGs were deleted while the GGSN was in charging maintenance mode, CDRs and messages in the pending queue are stored in the GGSN.

> **Note** When the charging function is in maintenance mode, CDRs stored on the GGSN, including those in the pending queue, can be manually cleared using the **clear gprs charging cdr all no-transfer** command.

Examples The following example places the charging function of a GGSN in maintenance mode:

```
gprs charging service-mode maintenance
```

Related Commands	**Command**	**Description**
	clear gprs charging cdr all no-transfer	Clears stored CDRs, including those in the pending queue, when a GGSN is in charging maintenance mode.
	gprs service-mode	Configures the service-mode state of a GGSN.
	service-mode	Configures the service-mode state of an APN.
	gprs service-mode test imsi	Configures a test user for which you can Create PDP Contexts to test an APN configuration.
	show gprs service-mode	Displays the current global service mode state of the GGSN and the last time it was changed.

gprs charging service-record include

To configure the GGSN to include the public land mobile network (PLMN) ID and radio access technology (RAT) fields in the Service Record information element (IE), use the **gprs charging service-record include** command in global configuration mode. To return to the default value, use the **no** form of the command

gprs charging service-record include [**rat** | **plmn-id**]

no gprs charging service-record include [**rat** | **plmn-id**]

Syntax Description		
rat	Configures the GGSN to include the PLMN field in the Service Record IE. The RAT indicates whether the SGSN serves the user equipment (UE) UMTS or GSM/EDGE RAN (GERAN).
plmn-id	Configures the GGSN to include the RAT field in the Service Record IE.

Defaults   The PLMN ID and RAT fields are not included.

Command Modes   Global configuration

Command History

Release	Modification
12.4(9)XG	This command was introduced.
12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ.
12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T.

Usage Guidelines   The **gprs charging service-record include** command controls whether or not the GGSN includes the RAT or PLMN-ID in the Service Record IE.

If RAT and/or PLMN ID triggers are configured in the charging profile (using the **content postpaid** charging profile configuration command), the GGSN must be configured to include the related field in the Service Record IE by using the **gprs charging service-record include** command. If the **gprs charging service-record include** command has not been configured,then even if the triggers are configured, they are not activated and are ignored for service-aware PDPs (no quota reauthorization will occur when the trigger values change).

Examples   The following example configures the GGSN to include the RAT field in the Service Record IE:

```
Router(config)# gprs charging service-record include rat
```

Related Commands	Command	Description
	content postpaid	Configures a type of condition in the charging profile used for postpaid users, that when the condition occurs, triggers the GGSN to request quota reauthorization for a PDP context.
	trigger	Specifies a type of change that, when it occurs, triggers the GGSN (functioning as a DCCA client) to request quota-reauthorization and generate an eG-CDR for a service-aware prepaid PDP context.

gprs charging switchover priority

To configure the gateway GPRS support node (GGSN) to switch over to the gateway of higher priority when that gateway becomes active, use the **gprs charging switchover priority** command in global configuration mode.

> **gprs charging switchover priority**

> **no gprs charging switchover priority**

Syntax Description   This command has no arguments or keywords.

Defaults   Disabled

Command Modes   Global configuration

Command History

Release	Modification
12.3(8)XU	This command was introduced.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   When configured for priority switchover using the **gprs charging switchover priority** charging gateway configuration command, regardless of the state of the current active charging gateway, when a higher priority gateway comes up, the GGSN will switch over and send call detail records (CDRs) to that gateway.

Examples   The following enables switch over to a higher priority charging gateway when that gateway becomes active:

```
gprs charging switchover priority
```

Related Commands

Command	Description
gprs default charging-gateway	Specifies the default charging gateways, in the order of their priority (primary, secondary, and tertiary).
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs charging tariff-time

To specify a time of day when gateway GPRS support node (GGSN) charging tariffs change, use the **gprs charging tariff-time** command in global configuration mode. To remove an existing tariff time, use the **no** form of this command.

> **gprs charging tariff-time** *time*

> **no gprs charging tariff-time** *time*

Syntax Description		
time	A time of day when the charging tariff changes. Specify the time format as hh:mm:ss.	

Defaults No default behavior or values.

Command Modes Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines Use the **gprs charging tariff-time** command to specify when the charging tariff for using GPRS/UMTS will change. When the tariff time changes, a container is attached to the call detail record (CDR) for the user.

You can set up a maximum of 32 tariff change times.

Note If the system software clock is manually set using the the **clock set** privileged EXEC command at the supervisor console prompt, the time a tariff change will occur must be be reconfigured.

Examples The following example specifies 14:30:00 as the time when the charging tariff changes:

```
gprs charging tariff-time 14:30:00
```

Related Commands

Command	Description
show gprs charging parameters	Displays information about the current GGSN charging configuration.
tariff-time	Specifies that a charging profile use the tariff changes configured using the **gprs charging tariff-time** global configuration command.

gprs charging transfer interval

To specify the number of seconds that the gateway GPRS support node (GGSN) waits before it transfers charging data to the charging gateway, use the **gprs charging transfer interval** command in global configuration mode. To return to the default value, use the **no** form of this command.

> **gprs charging transfer interval** *seconds*

> **no gprs charging transfer interval** *seconds*

Syntax Description

seconds	Interval between charging transfers, in seconds. Can be a value between 1 and 4294967295 seconds. The default is 105 seconds.

Defaults

105 seconds

Command Modes

Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)B	This command was integrated into Cisco IOS Release 12.2(8)B.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines

Use the **gprs charging transfer interval** command to specify how often the GGSN transfers charging data for a given packet data protocol (PDP) context (mobile session) to a charging gateway.

Examples

The following example specifies an interval of 512 seconds:

```
gprs charging transfer interval 512
```

Related Commands	Command	Description
	show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs compliance 3gpp ggsn r4.0

To change the gateway GPRS support node (GGSN) compliance baseline in GGSN 5.0 (TSG#18) to that of GGSN 4.0 (TSG#16), use the **gprs compliance 3gpp ggsn r4.0** command in global configuration mode. To return the compliance baseline to TSG#18, use the **no** form of this command.

> **gprs compliance 3gpp ggsn r4.0**

> **no gprs compliance 3gpp ggsn r4.0**

Syntax Description   This command has no arguments or keywords.

Defaults   GGSN 5.0 compliance baseline (TSG#18)

Command Modes   Global configuration

Command History

Release	Modification
12.3(8)XU	This command was introduced.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs compliance 3gpp ggsn r4.0** global configuration command to change the compliance baseline from TSG#18 to that of GGSN 4.0 (TSG#16).

The 3rd Generation Partnership Project (3GPP) compliance baseline for GGSN 5.0 is as follows:

- R98—Same as in GGSN Release 4.0.
- R99—Upgraded to TSG #18.
- R4—New support with compliance baseline up to TSG #18

By default, the 3GPP compliance baseline is TSG #18. However, it can be shifted to that of GGSN 4.0 (TSG #16) using the **gprs compliance 3gpp ggsn r4.0** global configuration command.

Examples   The following example changes the compliance baseline to that in GGSN Release 4.0 (TSG#16):

```
GGSN(conf)# gprs compliance 3gpp ggsn r4.0
```

gprs dcca profile

To enable the Diameter credit control application (DCCA) client process on the gateway GPRS support node (GGSN) and enter DCCA profile configuration mode, use the **gprs dcca profile** command in global configuration mode. To remove a DCCA client configuration, use the **no** form of this command

gprs dcca profile *profile-name*

no gprs dcca profile *profile-name*

Syntax Description

profile-name	Name of the DCCA client profile.

Defaults   No default behavior or values.

Command Modes   Global configuration

Command History

Release	Modification
12.3(14)YQ	This command was introduced.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs dcca profile** command to enable the DCCA client process on the GGSN and enter DCCA profile configuration mode.

The GGSN functions as a DCCA client when interacting with a DCCA server to request and obtain quota. As a DCCA client, the GGSN sends Credit Control requests (CCR) to and receives Credit Control responses (CCR) from a DCCA server.

To complete the DCCA client configuration, while in DCCA client profile configuration mode, you must also complete the following tasks:

- Define a method list used to specify the Diameter authentication, authorization, and accounting (AAA) groups using the **authorization** DCCA profile configuration command.

- Configure a transmission timer to monitor the communication of CCRs with a Diameter server using the **tx-timeout** DCCA profile configuration command.

- Configure a default for the Credit Control Failure Handling (CCFH) attribute-value pair (AVP) using the **ccfh** DCCA profile configuration command.

- Specify whether session failover is supported using the **session-failover** DCCA profile configuration command.

- Configure the destination realm to be sent in CCR initial requests to the DCCA server using the **destination-realm** DCCA profile configuration command.

- Specify whether serving GPRS support node (SGSN) or quality of service (QoS) changes trigger quota-reauthorization using the **trigger** DCCA profile configuration command.

Examples   The following configuration example configures a DCCA client profile with the name dcca-profile1:

```
gprs dcca profile dcca-profile1
```

Related Commands

Command	Description
authorization	Defines a method of authorization (AAA method list), in the DCCA client profile, that specifies the Diameter server groups.
ccfh	Configures the Credit Control Failure Handling (CCFH) AVP locally to use for a credit-control session when the Credit Control Answer (CCA) sent by the DCCA server does not contain CCFH value.
content dcca profile	Defines the DCCA client profile in a GGSN charging profile.
destination-realm	Configures the destination realm to be sent in CCR initial requests to a DCCA server.
session-failover	Configures Credit Control Session Failover (CCSF) AVP support when a credit control answer (CCA) message from the DCCA server does not contain a value for the CCSF AVP.
trigger	Specifies that SGSN and QoS changes will trigger a DCCA client to request quota-reauthorization
tx-timeout	Configures a TX timeout value used by the DCCA client to monitor the communication of Credit Control Requests (CCRs) with a Diameter server.

gprs default aaa-accounting

To configure a global default periodic accounting interval, use the **gprs default aaa-accounting interim periodic** command in global configuration mode. To return to the default, use the **no** form of this command

gprs default aaa-accounting interim periodic *minutes*

no gprs default aaa-accounting interim periodic *minutes*

Syntax Description

minutes	Amount of time, in minutes, at which to send periodic accounting records. Valid values are 15 to 71582.

Defaults

There is no periodic timer configured globally. The APN-level periodic interval is used, if configured.

Command Modes

Global configuration

Command History

Release	Modification
12.3(15)XQ	This command was introduced.
12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T.

Usage Guidelines

Use the **gprs default aaa-accounting interim periodic** command to configure a global default periodic accounting interval that can be used for all APNs, eliminating the need to configure a periodic accounting interval for each APN.

Examples

The following configuration example configures a global default periodic timer:

```
gprs default aaa-accounting interim periodic 60
```

Related Commands

Command	Description
aaa-accounting interim periodic	Enables interim periodic accounting records to be sent to an accounting server on regular configured intervals.

gprs default aaa-group

To specify a default authentication, authorization, and accounting (AAA) server group and assign the type of AAA services to be supported by the server group for all access points on the gateway GPRS support node (GGSN), use the **gprs default aaa-group** command in global configuration mode. To remove the default AAA server group, use the **no** form of this command.

gprs default aaa-group {**authentication** | **accounting**} *server-group*

no gprs default aaa-group {**authentication** | **accounting**} *server-group*

Syntax Description

authentication	Assigns the selected server group for authentication services on all access point names (APNs).
accounting	Assigns the selected server group for accounting services on all APNs.
server-group	Specifies the name of an AAA server group to be used for AAA services on all APNs.

> **Note** The name of the AAA server group that you specify must correspond to a server group that you configure using the **aaa group server** command.

Defaults

No default behavior or values.

Command Modes

Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines The Cisco Systems GGSN supports authentication and accounting at APNs using AAA server groups. By using AAA server groups, you gain the following benefits:

- You can selectively implement groups of servers for authentication and accounting at different APNs.

- You can configure different server groups for authentication services and accounting services in the same APN.

- You can control which RADIUS services you want to enable at a particular APN, such as AAA accounting.

The GGSN supports the implementation of AAA server groups at both the global and access-point configuration levels. You can minimize your configuration by specifying the configuration that you want to support across most APNs, at the global configuration level. Then, at the access-point configuration level, you can selectively modify the services and server groups that you want to support at a particular APN. Therefore, you can override the AAA server global configuration at the APN configuration level.

To configure a default AAA server group to be used for all APNs on the GGSN, use the **gprs default aaa-group** global configuration command. To specify a different AAA server group to be used at a particular APN for authentication or accounting, use the **aaa-group** access-point configuration command.

If accounting is enabled on the APN, then the GGSN looks for an accounting server group at the APN or globally in the following order:

- First, at the APN for an accounting server group—configured in the **aaa-group accounting** command.

- Second, for a global GPRS default accounting server group—configured in the **gprs default aaa-group accounting** command.

- Third, at the APN for an authentication server group—configured in the **aaa-group authentication** command.

- Last, for a global GPRS default authentication server group—configured in the **gprs default aaa-group authentication** command.

If authentication is enabled on the APN, then the GGSN first looks for an authentication server group at the APN. If an authentication server group is not found at the APN, then the GGSN looks for a globally configured, GPRS default authentication server group.

To complete the configuration, you must specify the following configuration elements on the GGSN:

- Configure the RADIUS servers, using the **radius-server host** command.

- Define a server group with the IP addresses of the AAA servers in that group, using the **aaa group server** global configuration command.

- Enable the type of AAA services (accounting and authentication) to be supported on the APN.

    – The GGSN enables accounting by default for non-transparent APNs.

      You can disable accounting services at the APN by using the **aaa-accounting disable** command.

    – You can enable authentication at the APN level by configuring the **access-mode non-transparent** command. When you enable authentication, the GGSN automatically enables accounting on the APN. There is not a global configuration command to enable or disable authentication.

- Configure AAA accounting and authentication using the **aaa accounting** and **aaa authentication** global configuration commands.

Note For more information about AAA and RADIUS global configuration commands, refer to the *Cisco IOS Security Command Reference.*

Examples

The following configuration example defines four AAA server groups on the GGSN: foo, foo1, foo2, and foo3, shown by the **aaa group server** commands.

Using the **gprs default aaa-group** command, two of these server groups are globally defined as default server groups: foo2 for authentication, and foo3 for accounting.

At access point 1, which is enabled for authentication, the default global authentication server group of foo2 is overridden, and the server group named foo is designated to provide authentication services on the APN. Notice that accounting services are not explicitly configured at that access point, but are automatically enabled because authentication is enabled. Because there is a globally defined accounting server group defined, the server named foo3 will be used for accounting services.

At access point 4, which is enabled for accounting using the **aaa-accounting enable** command, the default accounting server group of foo3 is overridden, and the server group named foo1 is designated to provide accounting services on the APN.

Access point 5 does not support any AAA services because it is configured for transparent access mode.

```
aaa new-model
!
aaa group server radius foo
 server 10.2.3.4
 server 10.6.7.8
aaa group server radius foo1
 server 10.10.0.1
aaa group server radius foo2
 server 10.2.3.4
 server 10.10.0.1
aaa group server foo3
 server 10.6.7.8
 server 10.10.0.1
!
aaa authentication ppp foo group foo
aaa authentication ppp foo2 group foo2
aaa authorization network default group radius
aaa accounting exec default start-stop group foo
aaa accounting network foo1 start-stop group foo1
aaa accounting network foo2 start-stop group foo2
aaa accounting network foo3 start-stop group foo3
!
gprs access-point-list gprs
 access-point 1
  access-mode non-transparent
  access-point-name www.pdn1.com
  aaa-group authentication foo
!
 access-point 4
  access-mode transparent
  access-point-name www.pdn2.com
  aaa-accounting enable
  aaa-group accounting foo1
!
 access-point 5
  access-mode transparent
  access-point-name www.pdn3.com
!
```

```
gprs default aaa-group authentication foo2
gprs default aaa-group accounting foo3
!
radius-server host 10.2.3.4 auth-port 1645 acct-port 1646 non-standard
radius-server host 10.6.7.8 auth-port 1645 acct-port 1646 non-standard
radius-server host 10.10.0.1 auth-port 1645 acct-port 1646 non-standard
radius-server key ggsntel
```

Related Commands	Command	Description
	aaa accounting	Enables AAA accounting of requested services for billing or security purposes.
	aaa authorization	Sets parameters that restrict user access to a network.
	aaa group server	Groups different server hosts into distinct lists and distinct methods.
	aaa-accounting	Enables or disables accounting for a particular access point on the GGSN.
	aaa-group	Specifies a RADIUS server group and assigns the type of AAA services to be supported by the server group for a particular access point on the GGSN.
	radius-server host	Specifies a RADIUS server host.

gprs default aggregate

To configure the gateway GPRS support node (GGSN) to create an aggregate route in its IP routing table when receiving packet data protocol (PDP) requests from mobile stations (MSs) on the specified network for any access point on the GGSN, use the **gprs default aggregate** command in global configuration mode. To remove a global aggregate route, use the **no** form of this command.

gprs default aggregate *ip-network-prefix* {**/***mask-bit-length* | *ip-mask*}

no gprs default aggregate *ip-network-prefix* {**/***mask-bit-length* | *ip-mask*}

Syntax Description

ip-network-prefix	Dotted decimal notation of the IP network address to be used by the GGSN for route aggregation, in the format *a.b.c.d*.
/*mask-bit-length*	Number of bits (as an integer) that represent the network portion of the specified IP network address. A forward slash is required before the integer. **Note** There is no space between the *ip-network-prefix* and the slash (*/*).
ip-mask	Dotted decimal notation of the IP network mask (in the format *e.f.g.h.*), which represents the network and host portion of the specified IP network address.

Defaults   No default behavior or values.

Command Modes   Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   The GGSN uses a static host route to forward user data packets received from the Gi interface to the Gn interface, using the virtual template interface of the GPRS tunneling protocol (GTP) tunnel.

Without the **gprs default aggregate** command or **aggregate** command, the GGSN creates a static host route for each PDP request. For example, for 45,000 PDP contexts supported, the GGSN creates 45,000 static host routes in its IP routing table.

You can use the **gprs default aggregate** command to reduce the number of static routes implemented by the GGSN for PDP requests at all access points on the GGSN. The **gprs default aggregate** command allows you to specify an IP network prefix to combine the routes of PDP requests from the same network as a single route on the GGSN.

If you use the **gprs default aggregate** command to globally define an aggregate IP network address range for all access points on the GGSN, you can use the **aggregate** command to override this default address range at a particular access point. Automatic route aggregation can be configured at the access-point configuration level only on the GGSN. The **gprs default aggregate** command does not support the **auto** option; therefore, you cannot configure automatic route aggregation globally on the GGSN.

When route aggregation is configured as in the following scenarios, the GGSN manages routes for MSs through an access point as follows:

- No aggregation is configured on the GGSN, at the APN or globally—The GGSN inserts the 32-bit host route of the MS into its routing table as a static route.

- A default aggregate route is configured globally, but no aggregation is configured at the APN:
  - If a statically or dynamically derived address for an MS matches the default aggregate route range, the GGSN inserts an aggregate route into its routing table.
  - If the MS address does not match the default aggregate route, the GGSN inserts the 32-bit host route as a static route into the routing table.

- A default aggregate route is configured globally, and automatic route aggregation is configured at the APN:
  - If a statically derived address for an MS matches the default aggregate route range, the GGSN inserts an aggregate route into its routing table.
  - If a statically derived address for an MS does not match the default aggregate route, the GGSN inserts the 32-bit host route as a static route into its routing table.
  - If a dynamically derived address for an MS is received, the GGSN aggregates the route-based on the address and mask returned by the DHCP or RADIUS server.

- A default aggregate route is configured globally, and an aggregate route is also configured at the APN:
  - If a statically or dynamically derived address for an MS matches the aggregate range at the APN through which it was processed, or otherwise matches the default aggregate range, the GGSN inserts an aggregate route into its routing table.
  - If a statically or dynamically derived address for an MS does not match either the aggregate range at the APN or the global default aggregate range, the GGSN inserts the 32-bit host route as a static route into its routing table.

Use care when assigning IP addresses to an MS before you configure the aggregation ranges on the GGSN. A basic guideline is to aggregate as many addresses as possible, but to minimize your use of aggregation with respect to the total amount of IP address space being used by the access point.

Note The **aggregate** command and **gprs default aggregate** commands affect routing on the GGSN. Use care when planning and configuring IP address aggregation.

Examples

The following example shows a route aggregation configuration for access point 8 using DHCP on the GGSN, along with the associated output from the **show gprs gtp pdp-context all** command and the **show ip route** commands.

Notice that the **aggregate auto** command is configured at the access point where DHCP is being used. The **dhcp-gateway-address** command specifies the subnet addresses to be returned by the DHCP server. This address should match the IP address of a loopback interface on the GGSN. In addition, to accommodate route aggregation for another subnet, 10.80.0.0, the **gprs default aggregate** command is used.

In this example, the GGSN aggregates routes for dynamically derived addresses for MSs through access point 8-based on the address and mask returned by the DHCP server. For PDP context requests received for statically derived addresses on the 10.80.0.0 network, the GGSN also implements an aggregate route into its routing table, as configured by the **gprs default aggregate** command.

```
interface Loopback0
 ip address 10.80.0.1 255.255.255.255
!
interface Loopback2
 ip address 10.88.0.1 255.255.255.255
!
gprs access-point-list gprs
 access-point 8
   access-point-name pdn.aaaa.com
   ip-address-pool dhcp-proxy-client
   aggregate auto
   dhcp-server 172.16.43.35
   dhcp-gateway-address 10.88.0.1
   exit
!
gprs default aggregate 10.80.0.0 255.255.255.0
```

In the following output for the **show gprs gtp pdp-context all** command, five PDP context requests are active on the GGSN for pdn.aaaa.com from the 10.88.0.0/24 network:

```
Router# show gprs gtp pdp-context all
TID             MS Addr       Source  SGSN Addr      APN
6161616161610001 10.88.0.1    DHCP    172.16.123.1   pdn.aaaa.com
6161616161610002 10.88.0.2    DHCP    172.16.123.1   pdn.aaaa.com
6161616161610003 10.88.0.3    DHCP    172.16.123.1   pdn.aaaa.com
6161616161610004 10.88.0.4    DHCP    172.16.123.1   pdn.aaaa.com
6161616161610005 10.88.0.5    DHCP    172.16.123.1   pdn.aaaa.com
```

The following output for the **show ip route** command shows a single static route in the IP routing table for the GGSN, which routes the traffic for the 10.88.0.0/24 subnet through the virtual template (or Virtual-Access1) interface:

```
Router# show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter
area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.80.0.0/16 is subnetted, 1 subnets
C       10.80.0.0 is directly connected, Loopback0
     10.113.0.0/16 is subnetted, 1 subnets
```

```
C       10.113.0.0 is directly connected, Virtual-Access1
      172.16.0.0/16 is variably subnetted, 3 subnets, 3 masks
C       172.16.43.192/28 is directly connected, FastEthernet0/0
S       172.16.43.0/24 is directly connected, FastEthernet0/0
S       172.16.43.35/32 is directly connected, Ethernet2/3
      10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
U       10.88.0.0/24 [1/0] via 0.0.0.0, Virtual-Access1
C       10.88.0.0/16 is directly connected, Loopback2
```

Related Commands	Command	Description
	aggregate	Configures the GGSN to create an aggregate route in its IP routing table when receiving PDP requests from MSs on the specified network for a particular access point on the GGSN.
	show gprs access-point	Displays information about access points on the GGSN.

gprs default charging-gateway

To specify the default charging gateways, in the order of their priority (primary, secondary, and tertiary), use the **gprs default charging gateway** command in global configuration mode. To remove a charging gateway, use the **no** form of this command.

gprs default charging-gateway {*ip-address* | *name*} [{*ip-address* | *name*}] [{*ip-address* | *name*}]

no gprs default charging-gateway

Syntax Description		
	ip-address	IP address of a default gateway.
	name	Host name for a default gateway.

Defaults   No default charging gateway is assigned.

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU and the ability to configure a third charging gateway was added.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs default charging-gateway** command to specify the IP address or host name of a default charging gateway that the gateway GPRS support node (GGSN) uses to communicate charging information. If you specify three gateways, then the first gateway is the primary gateway, and the second and third charging gateways are backups.

All charging gateways share the same global parameters.

When the GGSN is configured for priority switchover using the **gprs charging switchover priority** global configuration command, regardless of the state of the current active charging gateway, when the higher priority gateway comes up, the GGSN will switch over and send G-CDRs to that charging gateway.

Examples

The following example specifies three default charging gateway IP addresses:

```
gprs default charging-gateway 10.100.0.3 10.100.0.2 10.100.0.3
```

Related Commands

Command	Description
gprs charging container volume-threshold	Specifies the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the CDR.
gprs charging flow-control private-echo	Implements an echo request with private extensions for maintaining flow control on packets transmitted to the charging gateway.
gprs charging packet-queue-size	Specifies the maximum number of unacknowledged charging data transfer requests that the GGSN maintains in its queue.
gprs charging server-switch-timer	Specifies a timeout value that determines when the GGSN attempts to find an alternate charging gateway after a destination charging gateway cannot be located or becomes unusable.
gprs charging tariff-time	Specifies a time of day when GGSN charging tariffs change.
gprs charging message transfer-response number-responded	Specifies the number of seconds that the GGSN waits before it transfers charging data to the charging gateway.
gprs charging switchover priority	Configures the GGSN to switch over to the gateway of higher priority whenever a higher priority charging gateway becomes active.
show gprs charging parameters	Displays information about the current GGSN charging configuration.

gprs default dhcp-server

To specify a default DHCP server from which the gateway GPRS support node (GGSN) obtains IP address leases for mobile users, use the **gprs default dhcp-server** command in global configuration mode. To remove the default DHCP server, use the **no** form of this command.

> **gprs default dhcp-server** {*ip-address* | *name*} [{*ip-address* | *name*}]

> **no gprs default dhcp-server**

Syntax Description		
	ip-address	IP address of a DHCP server. The first IP address is the name of the primary DHCP server. The second (optional) *ip-address* argument specifies the IP address of a backup DHCP server.
	name	Host name of a DHCP server. The second (optional) *name* argument specifies the host name of a backup DHCP server.

Defaults No default behavior or values.

Command Modes Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines Use the **gprs default dhcp-server** command to specify a DHCP server from which the GGSN obtains IP address leases for mobile users across all access points. Use the optional second set of arguments to specify the name, or IP address, of a backup DHCP server to use if the primary DHCP server is unavailable. If you do not specify a backup DHCP server, then no backup DHCP server is available.

In addition to specifying a DHCP server for the GGSN, you must also specify the GGSN as a DHCP proxy client. You can configure the GGSN as a DHCP proxy client using either the **gprs default ip-address-pool dhcp-proxy-client** global configuration command or the **ip-address-pool dhcp-proxy-client** access-point configuration command.

You can override the DHCP server that is configured globally, and specify a different DHCP server for a particular access point using the **dhcp-server** access-point configuration command. If you do not specify a DHCP server for a specified access point, then the DHCP server specified with the **gprs default dhcp-server** command is used for that access point.

Note   You cannot specify a DHCP server that is located within a private network using VPN routing and forwarding (VRF) with the **gprs default dhcp-server global configuration** command. To specify a DHCP server that is within a VRF address space, you must use the **dhcp-server** access-point configuration command.

Examples   The following example specifies 10.101.100.3 as the GPRS/UMTS default DHCP server for GGSN, using the **gprs default dhcp-server** command. Although this DHCP server is also configured globally on the router or instance of Cisco IOS software using the **ip dhcp-server** global configuration command, this is not required.

Because DHCP is the default dynamic addressing method specified by the **gprs default ip-address-pool dhcp-proxy-client** command, access point 3 will use the DHCP server located at 10.101.100.3 for IP addressing support. Access point 1 and access point 2 override the default DHCP server using the **dhcp-server** access-point configuration command to specify alternative DHCP servers:

```
interface Loopback1
 ip address 10.30.30.30 255.255.255.255
!
interface Loopback2
 ip address 10.27.27.27 255.255.255.255
!
interface Loopback3
 ip address 10.25.25.25 255.255.255.255
!
interface loopback 1
 ip address 10.15.10.1 255.255.255.0
!
interface Virtual-Template1
 ip unnumber loopback 1
 no ip directed-broadcast
 encapsulation gtp
 gprs access-point-list abc
!
gprs access-point-list abc
 access-point 1
  access-point-name gprs.pdn1.com
  dhcp-server 10.102.100.3
  dhcp-gateway-address 10.30.30.30
  exit
!
```

```
 access-point 2
  access-point-name gprs.pdn2.com
  dhcp-server 10.60.0.1
  dhcp-gateway-address 10.27.27.27
  exit
!
 access-point 3
  access-point-name www.pdn3.com
  access-mode non-transparent
  dhcp-gateway-address 10.25.25.25
  exit
!
gprs default ip-address-pool dhcp-proxy-client
gprs default dhcp-server 10.101.100.3
```

Related Commands	Command	Description
	dhcp-server	Specifies a primary (and backup) DHCP server to allocate IP addresses to MS users entering a particular PDN access point.
	gprs default ip-address-pool	Specifies a dynamic address allocation method using IP address pools for the GGSN.
	ip-address-pool	Specifies a dynamic address allocation method using IP address pools for the current access point.

gprs default ip-address-pool

To specify a dynamic address allocation method using IP address pools for the gateway GPRS support node (GGSN), use the **gprs default ip-address-pool** command in global configuration mode. To disable dynamic address allocation, use the **no** form of this command.

gprs default ip-address-pool {**dhcp-proxy-client** | **disable** | **radius-client**}

no gprs default ip-address-pool {**dhcp-proxy-client** | **disable** | **radius-client**}

Syntax Description

dhcp-proxy-client	GGSN dynamically acquires IP addresses for an MS from a DHCP server.
disable	Disables dynamic address allocation by the GGSN.
radius-client	GGSN dynamically acquires IP addresses for an MS from a RADIUS server.

Defaults   Disabled

Command Modes   Global configuration

Command History

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs default ip-address-pool** command to specify the method by which the GGSN obtains address leases for mobile stations (MSs) across all access points.

If you specify **dhcp-proxy-client** for the GPRS/UMTS default IP address pool, then you must specify a DHCP server for address allocation. To specify a DHCP server, use either the **gprs default dhcp-server** global configuration command or the **dhcp-server** access-point configuration command.

If you specify **radius-client** as the method for IP address allocation, then you must configure RADIUS services at the GGSN. This involves configuring authentication, authorization, and accounting (AAA) server groups using the **gprs default aaa-group** or **aaa-group** commands and configuring the **radius-server hos**t commands to specify the RADIUS servers that provide the address pool. You also need to configure AAA on the GGSN. For more information about configuring RADIUS on the GGSN, refer to the "Usage Guidelines" section for the **aaa-group** and **gprs default aaa-group** commands.

To disable the selected IP address allocation method, use the **no** form of this command or issue the command with the **disable** keyword (the default form of this command).

Examples   The following example specifies **gprs default ip-address-pool dhcp-proxy-client** as the dynamic address allocation method for the GGSN across all access points.

Access point 3 overrides the default by specifying **ip-address-pool radius-client** as the dynamic address allocation method for that access point. The corresponding RADIUS and AAA configurations are also shown as examples.

```
aaa new-model
!
aaa group server radius foo
 server 10.2.3.4
 server 10.6.7.8
!
aaa authentication ppp foo group foo
aaa authorization network default group radius
aaa accounting exec default start-stop group foo
!
interface Loopback1
 ip address 10.30.30.30 255.255.255.255
!
interface Loopback2
 ip address 10.27.27.27 255.255.255.255
!
interface loopback 1
 ip address 10.15.10.1 255.255.255.0
!
interface Virtual-Template1
 ip unnumber loopback 1
 encapsulation gtp
 gprs access-point-list abc
!
gprs access-point-list abc
 access-point 1
  access-point-name gprs.pdn1.com
  dhcp-server 10.102.100.3
  dhcp-gateway-address 10.30.30.30
  exit
!
 access-point 2
  access-point-name gprs.pdn2.com
  dhcp-server 10.60.0.1
  dhcp-gateway-address 10.27.27.27
  exit
!
 access-point 3
  access-point-name www.pdn3.com
  access-mode non-transparent
  ip-address-pool radius-client
  aaa-group authentication foo
  exit
!
```

```
gprs default ip-address-pool dhcp-proxy-client
gprs default dhcp-server 10.101.100.3
!
radius-server host 10.2.3.4 auth-port 1645 acct-port 1646 non-standard
radius-server host 10.6.7.8 auth-port 1645 acct-port 1646 non-standard
radius-server key ggsntel
```

Related Commands

Command	Description
dhcp-server	Specifies a primary (and backup) DHCP server to allocate IP addresses to MS users entering a particular PDN access point.
gprs default dhcp-server	Specifies a default DHCP server from which the GGSN obtains IP address leases for mobile users.
ip-address-pool	Specifies a dynamic address allocation method using IP address pools for the current access point.
aaa-group	Specifies an AAA server group and assigns the type of AAA services to be supported by the server group for a particular access point on the GGSN.
gprs default aaa-group	Specifies a default AAA server group and assigns the type of AAA services to be supported by the server group for all access points on the GGSN

gprs default map-converting-gsn

To specify the IP address or host name of the primary (and backup) GPRS support node (GSN) to communicate with the home location register (HLR) in sending and receiving Mobile Application Protocol (MAP) messages, use the **gprs default map-converting-gsn** command in global configuration mode. To remove the GSN configuration, use the **no** form of this command.

gprs default map-converting-gsn {*ip-address* | *hostname*} [*ip-address* | *hostname*]

no gprs default map-converting-gsn {*ip-address* | *hostname*} [*ip-address* | *hostname*]

Syntax Description		
ip-address		IP address of the GSN handling MAP messages with the HLR. The first *ip-address* argument specifies the IP address of the primary GSN. The second (optional) *ip-address* argument specifies the IP address of a backup GSN.
hostname		Host name of the GSN handling MAP messages with the HLR. The second (optional) *name* argument specifies the host name of a backup GSN.

Defaults No default behavior or values.

Command Modes Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs default map-converting-gsn** command to identify an GSN that can convert GPRS tunneling protocol (GTP) messages to and from MAP messages. This GTP-to-MAP and MAP-to-GTP conversion allows the GSN to communicate with an HLR.

The gateway GPRS support node (GGSN) supports a maximum of two protocol-converting GSNs. Therefore, you can specify both a primary GSN and a backup GSN by using a single **gprs default map-converting-gsn** command. However, you cannot configure more than one instance of the **gprs default map-converting-gsn** command.

The GGSN uses the backup GSN when the GGSN reaches the maximum signaling threshold (N3 GTP signaling requests x T3).

Examples   The following example configures the GSN, located at IP address 172.16.10.10, to convert MAP messages between the HLR and the GGSN:

```
gprs default map-converting-gsn 172.16.10.10
```

gprs delay-qos map tos

To specify a quality of service (QoS) mapping from the delay QoS classes to an IP type of service (ToS) precedence value, use the **gprs delay-qos map tos class** command in global configuration mode. To return to the default values, use the **no** form of this command.

> **gprs delay-qos map tos class1** *tos-value* [**class2** *tos-value* [**class3** *tos-value* [**class-best-effort** *tos-value*]]]

> **no gprs delay-qos map tos class1** *tos-value* [**class2** *tos-value* [**class3** *tos-value* [**class-best-effort** *tos-value*]]]

Syntax Description

class1 *tos-value*	ToS mapping for a delay1 class QoS. The *tos-value* can be a number from 0 to 4. The default is 3.
class2 *tos-value*	ToS mapping for a delay2 class QoS. The *tos-value* can be a number from 0 to 4. The default is 2.
class3 *tos-value*	ToS mapping for a delay3 class QoS. The *tos-value* can be a number from 0 to 4. The default is 1.
class-best-effort *tos-value*	ToS mapping for a delay best-effort class QoS. The *tos-value* can be a number from 0 to 4. The default is 0.

Defaults

The default value for the class1 ToS category is 3.

The default value for the class2 ToS category is 2.

The default value for the class3 ToS category is 1.

The default value for the class-best-effort ToS category is 0.

Command Modes

Global configuration

Command History

Release	Modification
12.2(4)MX	This command was introduced.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines   Use the **gprs delay-qos map tos** command to specify a mapping between various QoS categories and the ToS precedence bits in the IP header for packets transmitted over the Gn interface (GPRS tunneling protocol [GTP] tunnels).

Note   You must enable delay QoS mapping by configuring the **gprs qos map delay** command *before* you configure the **gprs delay-qos map tos** command.

The **class2**, **class3,** and **class-best-effort** keyword arguments are optional. However, if you specify a value for the **class3** argument, you must specify a value for the **class2** argument. And, if you specify a value for the **class-best-effort** argument, then you must specify a value for both the **class2** and **class3** arguments.

Only ToS classes 0 through 5 will be used for gateway GPRS support node (GGSN) signaling and user data. The GTP signaling message should have the highest precedence. ToS class 5 is the default ToS for GTP signaling. Use the **gprs gtp map signalling tos** command to specify an IP ToS mapping for GTP signaling packets.

The ToS precedence classes are defined as follows:

0 Routine

1 Priority

2 Immediate

3 Flash

4 Flash Override

5 Critical ECP

6 Internetwork Control

7 Network Control

Examples   The following example specifies a QoS mapping from the delay QoS classes to a class1 ToS category of 4, a class2 ToS category of 3, a class3 ToS category of 2, and a best-effort ToS category of 1.

```
gprs delay-qos map tos class1 4 class2 3 class3 2 class-best-effort 1
```

Related Commands

Command	Description
gprs gtp map signalling tos	Specifies an IP ToS mapping for GPRS signaling packets.
gprs qos default-response requested	Configures the GGSN to set its default QoS values in the response message exactly as requested in the Create PDP Context request message.
gprs qos map delay	Enables mapping of GPRS QoS categories to a delay QoS method that includes the delay best-effort, delay1, delay2, and delay3 classes.

gprs dfp max-weight

To specify the maximum weight sent to a dynamic feedback protocol (DFP) manager by a gateway GPRS support node (GGSN) acting as a DFP agent, use the **gprs dfp max-weight** command in global configuration mode. To return to the default value, use the **no** form of this command.

gprs dfp max-weight [*max-weight-value*]

no gprs dfp max-weight [*max-weight-value*]

Syntax Description

max-weight-value	Specifies the maximum weight sent by the GGSN, acting as a DFP agent, to a DFP manager. The valid range is 1 to 100. The default value is 8.

Defaults 8

Command Modes Global configuration

Command History

Release	Modification
12.1(9)E	This command was introduced.
12.2(4)MX	This command was integrated into Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.
12.2(8)YW	This command was integrated into Cisco IOS Release 12.2(8)YW.
12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU.
12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ.
12.3(14)YU	This command was integrated into Cisco IOS Release 12.3(14)YU.
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

Usage Guidelines If you use DFP with GPRS tunneling protocol (GTP) load balancing, you must also specify a maximum number of packet data protocol (PDP) contexts for each GGSN, using the **gprs maximum-pdp-context-allowed** command. *Do not* accept the default value of 10000 PDP contexts.

We recommend using a value of 45000. Significantly lower values can impact performance in a GTP load-balancing environment.

Note DFP weighs PPP PDPs against IP PDPs (one PPP PDP equals 8 IP PDPs).

> **Note** For more information about configuring GTP load balancing, refer to the *IOS Server Load Balancing*, 12.1(9)E documentation located at Cisco.com at the following URL:
>
> http://www.cisco.com/univercd/cc/td/doc/product/software/ios121/121newft/121limit/121e/121e9/index.htm

Examples The following example sets the maximum weight sent by GGSN to 43:

```
gprs dfp max-weight 43
```

Related Commands

Command	Description
agent	Identifies a DFP agent to which Cisco IOS SLB can connect.
gprs maximum-pdp-context-allowed	Specifies the maximum number of PDP contexts (mobile sessions) that can be activated on the GGSN.
ip dfp agent	Identifies a DFP agent subsystem and enters DFP agent configuration mode.
ip slb dfp	Configures DFP, supplies an optional password, and enters DFP configuration mode.