

## show aaa servers sg

To display counters (information about the number of packets sent to and received from authentication, authorization, and accounting [AAA] servers) for all the servers that are members of a specific server group, use the **show aaa servers sg** command in privileged EXEC mode.

**show aaa servers sg** *sg-name*

Syntax Description	<i>sg-name</i>	Name of the server group for which you want to display counters for each server in the group.
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**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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** Use the **show aaa servers sg** command to display counters for all the servers in a specified server group. The command displays information about packets sent and received for all AAA transaction types.

**Examples** The following example displays information about each RADIUS servers that are a member of the “group1” server group:

```
router# show aaa servers sg group1

RADIUS: id 3, priority 0, host 1.1.1.1, auth-port 1645, acct-port 1646
  State: current UP, duration 159574s, previous duration 0s
  Dead: total time 0s, count 0
  Authen: request 0, timeouts 0
           Response: unexpected 0, server error 0, incorrect 0, time 0ms
           Transaction: success 0, failure 0
  Author: request 0, timeouts 0
           Response: unexpected 0, server error 0, incorrect 0, time 0ms
           Transaction: success 0, failure 0
  Account: request 0, timeouts 0
           Response: unexpected 0, server error 0, incorrect 0, time 0ms
           Transaction: success 0, failure 0
  Elapsed time since counters last cleared: 1d20h19m

RADIUS: id 4, priority 0, host 2.2.2.2, auth-port 1645, acct-port 1646
  State: current UP, duration 159574s, previous duration 0s
  Dead: total time 0s, count 0
  Authen: request 0, timeouts 0
```

```

Response: unexpected 0, server error 0, incorrect 0, time 0ms
Transaction: success 0, failure 0
Author: request 0, timeouts 0
Response: unexpected 0, server error 0, incorrect 0, time 0ms
Transaction: success 0, failure 0
Account: request 0, timeouts 0
Response: unexpected 0, server error 0, incorrect 0, time 0ms
Transaction: success 0, failure 0
Elapsed time since counters last cleared: 1d20h19m

RADIUS: id 5, priority 0, host 3.3.3.3, auth-port 1645, acct-port 1646
State: current UP, duration 159575s, previous duration 0s
Dead: total time 0s, count 0
Authen: request 0, timeouts 0
Response: unexpected 0, server error 0, incorrect 0, time 0ms
Transaction: success 0, failure 0
Author: request 0, timeouts 0
Response: unexpected 0, server error 0, incorrect 0, time 0ms
Transaction: success 0, failure 0
Account: request 0, timeouts 0
Response: unexpected 0, server error 0, incorrect 0, time 0ms
Transaction: success 0, failure 0
Elapsed time since counters last cleared: 1d20h19m

```

Table 3 describes the fields shown in the display.

**Table 3** *show aaa servers sg Field Descriptions*

Field	Description
id	An identifier that uniquely identifies the server on the router.
priority	The priority by which the server will be tried within the server group.
host	The IP address of the AAA server.
auth-port	The port on the AAA server that is used for authentication and authorization requests.
acct-port	The port on the AAA server that is used for accounting requests.
State	Indicates the assumed state of the AAA server. The following states are possible: <ul style="list-style-type: none"> <li>UP—Indicates that the server is currently considered alive and attempts will be made to communicate with it.</li> <li>DEAD—Indicates that the server is currently presumed dead and, in the case of failovers, this server will be skipped unless it is the last server in the group.</li> <li>duration—Is the amount of time the server is assumed to be in the current state, either UP or DEAD.</li> <li>previous duration—Is the amount of time the server was considered to be in the previous state.</li> </ul>
Dead	Indicates the number of times that this server has been marked dead, and the cumulative amount of time, in seconds, that it spent in that state.

**Table 3** *show aaa servers sg Field Descriptions*

Field	Description
Authen	<p>Provides information about authentication packets that were sent to and received from a server, and authentication transactions that were successful or that failed. The following information may be reported in this field:</p> <ul style="list-style-type: none"> <li>• request—Number of authentication requests that were sent to the AAA server.</li> <li>• timeouts—Number of timeouts (no responses) that were observed, when a transmission was sent to this server.</li> <li>• Response—Provides statistics about responses that were observed from the server and includes the following reports: <ul style="list-style-type: none"> <li>– unexpected—Number of unexpected responses. A response is considered unexpected when it is received after the timeout period for the packet has expired. This may happen if the link to the server is severely congested, for example. An unexpected response can also be produced when a server generates a response for no apparent reason.</li> <li>– server error—Number of server errors. This category is a catchall for error packets that do not any of the previous categories.</li> <li>– incorrect—Number of incorrect responses. A response is considered incorrect if it is of the wrong format expected by the protocol. This frequently happens when an incorrect server key is configured on the router.</li> </ul> </li> <li>• Transaction—These fields provide information about AAA transactions related to the server. A transaction is defined as a request for authentication, authorization, or accounting information that is sent by the AAA module, or by an AAA client (such as PPP) to an AAA protocol (RADIUS or TACACS+), which may involve multiple packet transmissions and retransmissions. Transactions may require packet retransmissions to one or more servers in a single server group, to verify success or failure. Success or failure is reported to AAA by the RADIUS and TACACS+ protocols, as follows <ul style="list-style-type: none"> <li>– success—Incremented when a transaction is successful.</li> <li>– failure—Incremented when a transaction fails (for example, packet retransmissions to another server in the server group failed due to failover or did not succeed. (A negative response to an Access Request, such as Access Reject, is considered to be a successful transaction).</li> </ul> </li> </ul>
Author	<p>The fields in this category are similar to those in the Authen fields. An important difference, however, is that because authorization information is carried in authentication packets for the RADIUS protocol, these fields are not incremented when using RADIUS.</p>

**Table 3** *show aaa servers sg Field Descriptions*

<b>Field</b>	<b>Description</b>
Account	The fields in this category are similar to those in the Authen fields, but provide accounting transaction and packet statistics.
Elapsed time since counters last cleared	Displays the amount of time in days, hours, and minutes, that has passed since the counters were last cleared.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>clear aaa counters server sg</b>	Clears and resets the counters to zero for all servers in a specific server group.

# show data-store

To display the status of the Persistent Storage Device (PSD) client and PSD server-related information, use the **show data-store** command in privileged EXEC mode.

## show data-store

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.3(14)YU	This command was introduced.
	12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.
	12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

**Usage Guidelines** Use the **show data-store** command to display the status of the PSD client and PSD server information.

**Examples** The following is sample output of the **show data-store** command:

```
router# show data-store

-----
  Server      Retrieve  Link   Current   Operating   Disk   Data
IP address   Only     State  Status    Mode         State  Present
-----
172.17.17.17  YES      DOWN   IDLE      -            AVAILABLE  YES
192.10.5.1   NO       UP     IDLE      STANDBY     AVAILABLE  NO
-----
Auto retrieval          :ENABLED
Client                  :GGSN Charging
```

[Table 4](#) describes the fields shown in the display.

**Table 4** *show data-store Field Descriptions*

Field	Description
Server IP Address	IP address of the PSD.
Retrieve Only	Whether or not the PSD is a “retrieve-only” PSD. Possible values are YES or NO.
Link State	Status of link between the GGSN and PSD. Possible values are UP or DOWN.

**Table 4** *show data-store Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Current Status	Whether or not activity is occurring on the link. Possible values are: <ul style="list-style-type: none"> <li>• <b>IDLE</b>—PSD server is available. When a PSD moves from a Writing to Idle state, the pending write requests are copied and sent to the active charging gateway.</li> <li>• <b>WRITING</b>—G-CDRs are in the process of being backed up to the PSD. Once the PSD disk state is full, the PSD moves to an Idle state.</li> <li>• <b>RETRIEVING</b>—G-CDRs are being retrieved and forwarded to the active charging gateway. Once all records are retrieved, the PSD state moves to idle.</li> </ul>
Operating Mode	Operational state of the PSD. Possible values are: <ul style="list-style-type: none"> <li>• <b>UNDEFINED</b>—PSD is configured on the GGSN but no connection established.</li> <li>• <b>STANDBY</b>—PSD is configured and connection is established, but the PSD is in Standby mode (no writing or retrieving activity is occurring).</li> <li>• <b>ACTIVE</b>—G-CDRs are being backed up to the PSD. In this state, aggregation characteristics and throttles that normally apply to the charging gateways are applied to the PSD.</li> </ul>
Disk State	Whether or not disk space is available on the PSD. Possible values are <b>AVAILABLE</b> or <b>FULL</b> .
Data Present	Whether or not data currently exists on a disk. Possible values are <b>YES</b> or <b>NO</b> .
Auto retrieval	Whether or not the auto-retrieval feature has been configured for a PSD server group.
Client	PSD client.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>auto-retrieve</b>	Configures the GGSN to automatically initiate a retrieval of G-CDRs from PSDs defined in a PSD server group.
<b>clear data-store statistics</b>	Clears PSD-related statistics.
<b>data-store</b>	Configures a PSD server group on the GGSN to use for GGSN-to-PSD communication.
<b>show data-store statistics</b>	Displays PSD client statistics.

# show data-store statistics

To display statistics related to the Persistent Storage Device (PSD) client, including the number of requests sent and DRT responses received, use the **show data-store statistics** command in privileged EXEC mode.

## show data-store statistics

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.3(14)YU	This command was introduced.
	12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.
	12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

**Usage Guidelines** Use the **show data-store statistics** command to display statistics related to the PSD client (for example, number of Read/Write requests sent and responses received).

**Examples** The following is sample output of the **show data-store** command:

```
router# show data-store statistics

Requests sent:
  FIFO Write. . . . . = 0
  FIFO Read . . . . . = 12
  FIFO Read/Write retransmissions . . . . . = 12

DRT Responses rcvd:
  Retrieved msgs forwarded. . . . . = 8
  Disk full transitions. . . . . = 0
```

[Table 5](#) describes the fields shown in the display.

**Table 5** *show data-store statistics* Field Descriptions

Field	Description
Requests sent: FIFO Write	First-in, first-our Write requests sent.
Requests sent: FIFO Read	First-in, first-our Read requests sent.
Requests sent: FIFO Read/Write retransmissions	First-in, first-our Read/Write requests sent.

**Table 5** *show data-store statistics Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
DRT Responses rcvd: Retrieved msgs forwarded	
DRT Responses rcvd:Disc full transitions	

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>auto-retrieve</b>	Configures the GGSN to automatically initiate a retrieval of G-CDRs from PSDs defined in a PSD server group.
<b>clear data-store statistics</b>	Clears PSD-related statistics.
<b>data-store</b>	Configures a PSD server group on the GGSN to use for GGSN-to-PSD communication.
<b>show data-store</b>	Displays the status of the PSD client and PSD server-related information.



# show diameter peer

To display information about the state of a Diameter peer, including various counters, use the **show diameter peer** command in privilege EXEC mode.

**show diameter peer** [*name* | **all**]

## Syntax Description

<i>name</i>	Name of the Diameter peer for which you want to display state information.
<b>all</b>	Displays information for all Diameter peers.

## Defaults

No default behavior or values.

## Command Modes

Privilege EXEC

## 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.

## Examples

The following configuration example displays information about the state of Diameter peer “peerA”:

```
show diameter peer peerA
Peer information for peerA
-----
Peer name :peerA
Peer type :Server
Peer transport protocol :TCP
Peer listening port :3688
Peer security protocol :IPSEC
Peer connection timer value :30 seconds
Peer watch dog timer value :35 seconds.
Peer vrf name :default
Peer connection status :UP.
```

[Table 18](#) describes the fields shown in the display.

**Table 6** *show diameter peer Field Descriptions*

Field	Description
Peer Name	Name of the Diameter peer.
Peer Type	Type of Diameter peer. Possible values are Server and Client.
Peer transport protocol	Transport protocol used to connect to peer.
Peer listening port	Port being used listen for peer communication.

**Table 6** *show diameter peer Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Peer security protocol	Security protocol being used for peer-to-peer communication. Possible value is IPSEC.
Peer connection timer	Timeout period for attempting to connect to the peer after a connection has been dropped.
Peer watch dog timer	Maximum period of time this node will wait for the Diameter peer to respond to a watchdog packet.
Peer vrf name	Name of VRF associated with the Diameter peer.
Peer connection status	Status of the connection to the peer. Possible values are UP or DOWN.

# show ggsn csg

To display the parameters configured for a Content Services Group (CSG) group or the number of path and quota management messages sent and received by a quota server, use the **show ggsn csg** command in privilege EXEC mode.

**show ggsn csg [parameters | statistics]**

Syntax Description	parameters	statistics
	Displays the parameters configured for a CSG group.	Displays the number of path and quota management messages sent and received by a quota server.

**Defaults** No default behavior or values.

**Command Modes** Privilege EXEC

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.

**Examples** Example 1 displays the parameters used by the CSG group. Example 2 displays the number of path and management messages sent and received by the quota server.

## Example 1

```
ggsn1#show ggsn csg parameters
GGSN CSG parameters:
  Group name:          csg1
  virtual/alias address:5.5.5.14
  Port on CSG:        3386
  Path state:         UP
  Peal addresses:     5.1.1.1 5.1.1.2
  Active real's address:5.1.1.2
```

## Example 2

```
ggsn1#show ggsn csg statistics
GGSN CSG path statistics:
  Outbound msg count: 224
  Outbound byte count: 1344
  Inbound msg count: 222
  Inbound byte count: 1554
GGSN CSG path msg statistics:
  Service Auth Req: 0
  Service Auth Resp: 0
  Service Reauth Req: 0
  Service Stop: 0
```

```

Quota Return:          0
Quota Return Req:     0
Quota Push Resp:      0
Service Stop Req:     0
Quota Push:           0
Quota Push resp:      0
GTP' Acknowledgements:0
ggsn1#

```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ggsn csg-group</b>	Configures a CSG group on the GGSN for quota server-to-CSG communication.
<b>port</b>	Configures the port number on which the CSG listens for quota server traffic.
<b>real-address</b>	Configures the IP address of a real CSG for source checking on inbound messages from a CSG.
<b>virtual-address</b>	Configures a virtual IP address to which the quota server will send all requests.

# show ggsn quota-server

To display quota server parameters or quota server-related statistics, use the **show ggsn quota-server** command in privilege EXEC mode.

**show ggsn quota-server [parameters | statistics]**

Syntax Description	parameters	Displays the quota server configuration.
	statistics	Displays quota server-related message and error counts.

**Defaults** No default behavior or values.

**Command Modes** Privilege EXEC

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 **show ggsn quota-server** command to display the quota server configuration or quota server-related statistics on messages and error counts.

Quota server-related statistics can be cleared using the **clear ggsn quota-server statistics** command.

**Examples** Example 1 displays the quota server configuration on a GGSN. Example 2 displays quota server-related statistics.

## Example 1

```
ggsn1#show ggsn quota-server parameters
GGSN Quota Server parameters:
  Server name:  qs
  Interface:   Loopback1
  IP address:  10.1.1.1
  Table ID:    0
  Port on QS:  3386
  Echo interval:60 secs
  N3 number:   5
  T3 time:     1 secs
  CSG group:   csg1
```

## Example 2

```
ggsn1#show ggsn quota-server statistics
GGSN Quota Server statistics
Quota management statistics:
  Requests rcvd: 35
```

```

Responses rcvd: 16
Requests sent: 16
Responses sent: 27
Overall path management statistics:
Requests rcvd: 5717
Responses rcvd: 5818
Requests sent: 5825
Responses sent: 5717
Error statistics:
Negative responses rcvd:0
Requests unreplied: 0
Segment failures: 0
Dropped msgs: 10
Unknown msgs: 0
Unknown responses: 0
Msgs with IE error: 0
Bad source address msgs:0
Version not supported: 0
Mandatory TLV missing: 0
Mandatory TLV incorrect:2
Invalid Msg format: 0
No response: 1

```

**Related Commands .**

<b>Command</b>	<b>Description</b>
<b>clear ggsn quota-server statistics</b>	Clears the quota server-related statistics displayed using the <b>show ggsn quota-server statistics</b> command.
<b>csg-group</b>	Associates the quota server to a CSG group that is to be used for quota server-to-CSG communication.
<b>echo-interval</b>	Specifies the number of seconds that the quota server waits before sending an echo-request message to the CSG.
<b>ggsn quota-server</b>	Configures the quota server process that interfaces with the CSG for enhanced service-aware billing.
<b>interface</b>	Specifies the logical interface, by name, that the quota server will use to communicate with the CSG.
<b>n3-requests</b>	Specifies the maximum number of times that the quota server attempts to send a signaling request to the CSG.
<b>t3-response</b>	Specifies the initial time that the quota server waits before resending a signaling request message when a response to a request has not been received.

# show gprs

To display statistics for a gateway GPRS support node (GGSN), use the **show gprs** command in privileged EXEC mode.

**show gprs**

Syntax Description		
	<i>access-point-index</i>	Index number of an access point. Statistics for that access point are shown.
	<b>all</b>	Statistics for all access points on the GGSN are shown.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs** command to display statistics collected for the GGSN during the interval defined using the **gprs interval** global configuration command.

**Examples** The following example displays statistics for the GGSN:

```
Router#show gprs
Collection interval - 3 min, Last collected at - 1 min back
  upstream data volume in octets: 0
  downstream data volume in octets: 0
  upstream packet count: 0
  downstream packet count: 0
Collection interval - 4 min, Last collected at - 2 min back
  upstream data volume in octets: 0
  downstream data volume in octets: 0
  upstream packet count: 0
  downstream packet count: 0
Router#
```

Related Commands	Command	Description
	<b>gprs interval</b>	Configures the interval at which the GGSN collects data for APNs.

# show gprs access-point

To display information about access points on the gateway GPRS support node (GGSN), use the **show gprs access-point** command in privileged EXEC mode.

**show gprs access-point** {access-point-index [**address-allocation**] | **all**}

Syntax Description		
<i>access-point-index</i>		Integer (from 1 to 65535) that identifies a GGSN access point. Information about that access point is shown.
<b>address-allocation</b>		Tunnel ID (TID) and dynamically allocated mobile station (MS) addresses (by either a DHCP or RADIUS server) are shown for packet data protocol (PDP) contexts on the specified access point.
<b>all</b>		Information about all access points on the GGSN is shown.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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.	



Release	Modification
12.2(4)MX	<p>This command was integrated into Cisco IOS Release 12.2(4)MX.</p> <ul style="list-style-type: none"> <li>• The following output fields were added to the display: <ul style="list-style-type: none"> <li>- accounting</li> <li>- aggregate</li> <li>- apn_accounting_server_group</li> <li>- apn_authentication_server_group</li> <li>- apn-type</li> <li>- apn_username</li> <li>- apn_password</li> <li>- Block Roamer Mode</li> <li>- GPRS vaccess interface</li> <li>- VPN</li> <li>- wait_accounting</li> </ul> </li> <li>• The following output fields were removed from the display: <ul style="list-style-type: none"> <li>- apn_charging_gw</li> <li>- apn_backup_charging_gw</li> <li>- apn_radius_server</li> </ul> </li> <li>• Several output field results were changed from binary 0 and 1 to Yes and No.</li> <li>• The following output fields were added to the <b>all</b> version of this command: <ul style="list-style-type: none"> <li>- Access-type</li> <li>- ppp-regeneration (max-session, setup time)</li> <li>- VRF Name</li> </ul> </li> </ul>
12.2(8)YD	<p>This command was integrated into Cisco IOS Release 12.2(8)YD and the Block Roamer Mode output field was changed to Block Foreign-MS Mode output field.</p>
12.2(8)YW	<p>This command was integrated into Cisco IOS Release 12.2(8)YW.</p> <ul style="list-style-type: none"> <li>• The following output fields were added to the display: <ul style="list-style-type: none"> <li>- input ACL</li> <li>- output ACL</li> <li>- backup</li> <li>- RADIUS attribute suppress MSISDN</li> <li>- RADIUS attribute suppress IMSI</li> <li>- RADIUS attribute suppress SGSN Address</li> <li>- RADIUS attribute suppress QoS</li> </ul> </li> <li>• The format of the apn_username: , apn_password: display fields was changed to apn_username: apn_password:.</li> </ul>

Release	Modification
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(2)XU. The following fields were added to the display: <ul style="list-style-type: none"> <li>• cac policy</li> <li>• idle timeout</li> <li>• input bandwidth pool</li> <li>• input service-policy</li> <li>• output bandwidth pool</li> <li>• Service Mode</li> <li>• session timeout</li> </ul>
12.3(8)XU2	This command was integrated into Cisco IOS Release 12.3(2)XU2 and the <b>single pdp-session</b> field was the display.
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 and the following field was added to the display: <ul style="list-style-type: none"> <li>• apn_type: Virtual pre-authenticate</li> </ul>
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB and the following field was added to the display: <ul style="list-style-type: none"> <li>• P-CSCF group name</li> </ul>
12.4(9)XG	This command was integrated into Cisco IOS Release 12.4(9)XG and the following fields were added to the <b>show gprs access-point access-point-index</b> display: <ul style="list-style-type: none"> <li>• IPV6 enable</li> <li>• IPV6 base template</li> <li>• IPV6 uplink access list</li> <li>• IPV6 downline access list</li> <li>• IPV6 dynamic_address_pool</li> <li>• IPV6 local prefix pool</li> <li>• IPV6 primary dns</li> <li>• IPV6secondary dns</li> </ul>
12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ and the following field was added to the display: <ul style="list-style-type: none"> <li>• Delete PDP upon update failure</li> <li>• Interim periodic accounting</li> </ul>

**Usage Guidelines**

Use the `access-point-index` argument to specify a particular access point number for which you want to obtain information.

Use the **address-allocation** keyword to obtain information about dynamically allocated MS addresses and lease terms per access point.

Use the **all** keyword to obtain information about all access points in an abbreviated format.

**Examples****Example 1**

The following is sample output from the **show gprs access-point** command for access point 1, which is a real access point:

```
Router# show gprs access-point 1

apn_index 1          apn_name = gprs.corporate.com
apn_mode: transparent
apn-type: Real
accounting: Disable
interim accounting: Disable
interim periodic: Disable
wait_accounting: Disable
interim periodic accounting:
input ACL: None, output ACL: None
dynamic_address_pool: dhcp-proxy-client
apn_dhcp_server: 10.99.100.5    backup: 10.99.100.4
apn_dhcp_gateway_addr: 10.27.1.1
apn_authentication_server_group: abc
apn_accounting_server_group: abc1
apn_username:  apn_password:
subscribe_required: No
deactivate_pdp_context_on violation: Yes
Block Foreign-MS Mode: Disable
VPN: Disable (VRF Name : None)
GPRS vaccess interface: Virtual-Access2
RADIUS attribute suppress MSISDN: Disabled
RADIUS attribute suppress IMSI: Disabled
RADIUS attribute suppress SGSN Address: Disabled
RADIUS attribute suppress QoS: Disabled
number of ip_address_allocated 0
session timeout: 0
idle timeout: 0
Security features
  Verify mobile source addr: enable
  Verify mobile destination addr: enable

Traffic redirection:
  Mobile-to-mobile: destination 1.1.1.1

Total number of PDP in this APN :0

aggregate:
In APN:    Disable

In Global: Disable

primary dns: 0.0.0.0
secondary dns: 0.0.0.0
primary nbns: 0.0.0.0
secondary nbns: 0.0.0.0
Service Mode: Operational
```

```

cac policy: p1
input bandwidth pool: pool1
output bandwidth pool: pool2
input service-policy: pdp-class-pdp
single pdp-session: Mandatory

P-CSCF group name: GroupA
IPV6 enable
Delete PDP upon update failure
IPV6 base vtemplate : 10
IPV6 uplink access list: NONE
IPV6 downlink access list : NONE
IPV6 dynamic_address_pool : local
IPV6 local prefix pool : localv6
IPV6 primary dns : 2001:1:2:3::123
IPV6 secondary dns: 3001:1:2:3::123

DHCP address release sent by GGSN    0

```

Table 7 describes the fields show in the example.

**Table 7** show gprs access-point Field Descriptions

Field	Description
apn_index	Number assigned to the access point.
apn_name	Access point name.
apn_mode	Current setting for the <b>access-mode</b> command: <ul style="list-style-type: none"> <li>• Transparent—Users are allowed access without authorization or authentication.</li> <li>• Non-transparent—Users must be authenticated by the GGSN acting as a proxy for the authentication.</li> </ul>
apn-type	Current setting for the <b>access-type</b> command: <ul style="list-style-type: none"> <li>• Real—APN type that corresponds to a physical interface to an external network on the GGSN.</li> <li>• Virtual—APN type that is not associated with any specific physical target network.</li> <li>• Virtual pre-authenticate—Pre-authentication-based APN type that uses AAA-based user profiles to return the target APN to which the Create PDP Context request is next routed.</li> </ul>
charging service mode	Indicates whether the charging functions of a GGSN are in operational or maintenance mode.
Delete PDP upon update failure	Current setting for the <b>gtp update qos-fail delete</b> command: <ul style="list-style-type: none"> <li>• Enabled—The GGSN deletes a PDP context if a GGSN-initiated QoS update fails.</li> <li>• Disabled—The GGSN does not delete a PDP context if a GGSN-initiated QoS update fails.</li> </ul>

Table 7 *show gprs access-point Field Descriptions (continued)*

Field	Description
accounting	<p>Current status of accounting services at the APN:</p> <ul style="list-style-type: none"> <li>• Enable—Accounting services are enabled at the APN. This is the default for non-transparent access APNs.</li> <li>• Disable—Accounting services are disabled at the APN. This is the default for transparent access APNs.</li> </ul> <p>You can configure an APN for accounting services by using the <b>aaa-accounting</b> command in access point configuration mode.</p>
interim accounting	<p>Indicates whether the ability to send interim accounting records to an accounting server after a routing area update or QoS change has been made is configured by using the <b>aaa-accounting interim update</b> command. The possible values are enabled or disabled.</p>
interim periodic	<p>Indicates the time interval at which the periodic accounting records are sent by the GGSN. The possible values are Disabled' and Enabled (with periodic interval value in minutes) or Enabled with (use Attribute 85).</p>
wait_accounting	<p>Current status of RADIUS accounting response message waiting at the APN:</p> <ul style="list-style-type: none"> <li>• Enable—GGSN waits for an accounting response message from the RADIUS server before sending an Activate PDP Context request to the SGSN.</li> <li>• Disable—GGSN sends an Activate PDP Context request to the SGSN after sending an accounting request to the RADIUS server. The GGSN does not wait for a RADIUS accounting response.</li> </ul> <p>You can configure RADIUS accounting response message waiting by using the <b>gprs gtp response-message wait-accounting</b> command in global configuration mode, or the <b>response-message wait-accounting</b> command in access point configuration mode.</p>
input ACL	IP access list for inbound packets (Gi to Gn interfaces).
output ACL	IP access list for outbound packets (Gn to Gi interfaces).
dynamic_address_pool	Current setting for the <b>ip-address-pool</b> command.
apn_dhcp_server	IP address of the DHCP server, if configured.
backup	IP address of the backup DHCP server, if configured.
apn_dhcp_gateway_addr	IP address of the DHCP gateway, if an address has been configured.
apn_authentication_server_group	Name of the AAA server group that is providing authentication services.
apn_accounting_server_group	Name of the AAA server group that is providing accounting services.
apn_username	Username specified in the <b>anonymous user</b> command. If the <b>anonymous user</b> command is not configured, this field will be blank.

**Table 7** *show gprs access-point Field Descriptions (continued)*

Field	Description
apn_password	Password specified in the <b>anonymous user</b> command. If the <b>anonymous user</b> command is not configured, this field will be blank.
subscribe_required	Current setting for the <b>subscription-required</b> command: <ul style="list-style-type: none"> <li>• No—No subscription is required.</li> <li>• Yes—Subscription is required for access point users. The GGSN looks for the “subscription verified” selection mode in the Create PDP Context request to establish the session.</li> </ul>
deactivate_pdp_context_on_violation	Current setting for the <b>access-violation</b> command: <ul style="list-style-type: none"> <li>• No—User packets are discarded.</li> <li>• Yes—Mobile sessions are terminated when there is an access violation.</li> </ul>
Block Foreign-MS Mode	Current setting for the <b>block-foreign-ms</b> command: <ul style="list-style-type: none"> <li>• Enable—Blocking for foreign MSs is configured.</li> <li>• Disable—Blocking for foreign MSs is not configured.</li> </ul>
VPN	Indicates whether a Virtual Private Network (VPN) is enabled or disabled at the access point. <p><b>Note</b> VRF is not supported for IPv6 PDPs. Therefore, if the <b>ipv6</b> command is configured on an APN on which VRF is enabled, the IPv4 PDPs are routed in VRF, but the IPv6 PDPs are routed in the global routing table.</p>
GPRS vaccess interface	Name of the virtual access interface associated with the VPN. If no VPN is configured at the access point, the name of the virtual access interface for the GGSN virtual template is shown, which is always Virtual-Access1.
RADIUS attribute suppress MSISDN	Current setting for the <b>msisdn suppression</b> command: <ul style="list-style-type: none"> <li>• Enabled—GGSN overrides or suppresses the Mobile Subscriber ISDN (MSISDN) number in its RADIUS authentication.</li> <li>• Disabled—GGSN does not override or suppress the MSISDN number in its RADIUS authentication.</li> </ul>
RADIUS attribute suppress IMSI	Current setting for the <b>radius attribute suppress imsi</b> command: <ul style="list-style-type: none"> <li>• Enabled—GGSN suppresses the 3GPP-IMSI number in its authentication and accounting requests to a RADIUS server.</li> <li>• Disabled—GGSN does not suppress the 3GPP-IMSI number in its authentication and accounting requests to a RADIUS server.</li> </ul>

Table 7 *show gprs access-point Field Descriptions (continued)*

Field	Description
RADIUS attribute suppress SGSN Address	Current setting for the <b>radius attribute suppress sgsn-address</b> command: <ul style="list-style-type: none"> <li>• Enabled—GGSN suppresses the 3rd Generation Partnership Program (3GPP) Vendor-Specific Attribute (VSA) 3GPP-SGSN-Address subattribute in its RADIUS authentication and accounting requests.</li> <li>• Disabled—GGSN does not suppress the 3GPP VSA 3GPP-SGSN-Address subattribute in its RADIUS authentication and accounting requests.</li> </ul>
RADIUS attribute suppress QoS	Current setting for the <b>radius attribute suppress qos</b> command: <ul style="list-style-type: none"> <li>• Enabled—GGSN suppresses the 3GPP VSA 3GPP-QoS-Profile subattribute in its RADIUS authentication and accounting requests.</li> <li>• Disabled—GGSN does not suppress the 3GPP VSA 3GPP-QoS-Profile subattribute in its RADIUS authentication and accounting requests.</li> </ul>
number of ip_address_allocated	Number of IP addresses allocated to MS users.
session timeout	Amount of time that the GGSN waits before purging mobile sessions for the access point configured by using the <b>gtp pdp-context timeout session</b> command in access point configuration mode.
idle_timeout	Number of seconds the GGSN allows a PDP context to be idle before terminating the context as configured by using the <b>gprs gtp pdp-context timeout idle</b> global configuration command.
Verify mobile source addr	Current setting for the <b>security verify source</b> command: <ul style="list-style-type: none"> <li>• Enabled—GGSN verifies the source IP address of upstream Transport Protocol Data Unit (TPDUs) against addresses previously assigned to MSs.</li> <li>• Disabled—GGSN does not verify the source IP address of upstream TPDUs against addresses previously assigned to MSs.</li> </ul>
Verify mobile destination addr	Current setting for the <b>security verify destination</b> command: <ul style="list-style-type: none"> <li>• Enabled—GGSN verifies the destination address of upstream TPDUs against the global list of Public Land Mobile Network (PLMN) addresses specified using the <b>gprs plmn ip address</b> command.</li> <li>• Disabled—GGSN does not verify the destination address of upstream TPDUs against the global list of PLMN addresses specified using the <b>gprs plmn ip address</b> command.</li> </ul>
Mobile-to-Mobile	Current setting for the <b>redirect intermobile ip</b> command.
Total number of PDP in this APN	Number of active PDP contexts for this access point.

Table 7 show gprs access-point Field Descriptions (continued)

Field	Description
aggregate	<p>Route aggregation configuration information on the GGSN.</p> <p>The output display includes the “In APN” field for configuration information for the access point, and the “In global” field for global configuration on the GGSN.</p> <p>The output field may contain the following information:</p> <ul style="list-style-type: none"> <li>• IP network address and mask for which PDP requests on the access point will be collectively routed over the virtual template interface on the GGSN. IP address and mask information appears if an aggregate range has been configured on the GGSN.</li> <li>• auto—Indicates that the GGSN uses the allocated IP mask from the DHCP (IPv4 PDPs) or RADIUS server to perform route aggregation on the APN. The keyword auto appears when the APN has been configured with the <b>aggregate auto</b> command in access point configuration mode. This value applies only to the APN.</li> <li>• Disable—Indicates that route aggregation is not configured at either the APN or global level.</li> </ul>
primary dns	IP address of the primary DNS to be sent in Create PDP Context responses at the access point.
secondary dns	IP address of the secondary (backup) DNS to be sent in Create PDP Context responses at the access point
primary nbns	IP address of the primary NetBIOS Name Service (NBNS) to be sent in Create PDP Context responses at the access point.
secondary nbns	IP address of the secondary (backup) NBNS to be sent in Create PDP Context response at the access point.
Service Mode	Indicates whether a GGSN is in operational mode or maintenance mode.
cac policy	Name of the CAC maximum QoS policy applied to the APN, if any.
input bandwidth pool	Name of the bandwidth pool, if any, applied to the output (Gn) interface in the downlink direction.
output bandwidth pool	Name of the bandwidth pool, if any, applied to the output (Gi) interface in the uplink direction.
input service-policy	Service policy attached to the APN using the <b>service-policy</b> access point configuration command.



Table 7 show gprs access-point Field Descriptions (continued)

Field	Description
single pdp-session	<p>Whether the GGSN has been configured to delete the primary PDP context, and any associated secondary PDP contexts, of a <i>hanging</i> PDP session upon receiving a new Create PDP Context request from the same MS that shares the same IP address of the hanging PDP context.</p> <p>Possible values are:</p> <ul style="list-style-type: none"> <li>• Enabled—The feature is enabled on the APN and applies to all users for whom the “gtp-pdp-session=single-session” Cisco VSA has been defined in their RADIUS user profile.</li> <li>• Disabled—The feature is disabled on the access point and does not apply to any user regardless of the RADIUS user profile configuration.</li> <li>• Mandatory—The feature is enabled on the APN and applies to all users on that APN regardless of the RADIUS user profile configuration.</li> </ul>
P-CSCF group name	Name of the P-CSCF server group(s) used by this APN for P-CSCF Discovery.
IPV6 enable	<p>Current setting for the <b>ipv6</b> command:</p> <ul style="list-style-type: none"> <li>• Enabled—Access point is configured to allow both IPv4 and IPv6 PDP contexts.</li> <li>• Exclusive—Access point is configured to allow only IPv6 PDP contexts.</li> </ul>
IPV6 base template	Virtual template interface, which contains IPv6 routing advertisements (RAs) parameters, for an APN to copy to create virtual subinterfaces for IPv6 PDP contexts.
IPV6 uplink access list	IPv6 access list for inbound packets.
IPV6 downlink access list	IPv6 access list for outbound packets.
IPV6 dynamic_address_pool	Current setting for the <b>ipv6 ipv6-address-pool</b> command.
IPV6 local prefix pool	Local IPv6 prefix pool.
IPV6 primary dns	IPv6 address of the primary IPv6 DNS to be sent in Create PDP Context responses at the access point.
IPV6 secondary dns	IPv6 address of the secondary (backup) IPv6 DNS to be sent in Create PDP Context responses at the access point
VRF name	Name assigned to the VPN Routing and Forwarding instance. A value of None appears when VRF is not enabled at the access point.

**Example 2**

The following is sample output from the **show gprs access-point address-allocation** command:

```
router# show gprs access-point 8 address-allocation
```

```
TID                PDP_ADDRESS
1111111100000099  10.88.105.227
1111111100000191  10.88.105.7
1111111100000192  10.88.105.70
1111111100000297  10.88.106.162
1111111100000298  10.88.106.169
1111111100000299  10.88.106.161
1111111100000391  10.88.106.150
1111111100000392  10.88.106.25
1111111100000442  10.88.106.196
1111111100000443  10.88.106.197
1111111100000886  10.88.108.153
1111111100000887  10.88.108.158
2222222200000000  10.88.111.255
```

Table 8 describes the fields show in the display.

**Table 8** show gprs access-point address-allocation Field Descriptions

Field	Description
TID	Tunnel ID for the Create PDP Context request on the APN.
PDP_ADDRESS	IP address assigned to the Create PDP Context request on the APN.

**Example 3**

The following is sample output of the **show gprs access-point all** command:

```
router# show gprs access-point all
```

There are 3 Access-Points configured

```
Index  Mode                Access-type  AccessPointName  VRF Name
-----
1      transparent         Real         corporate_1.com  corporate_1.com
      ppp-regeneration (max-session: 10000, setup-time: 60)
-----
2      non-transparent     Real         corporate_2.com
-----
3      transparent         Virtual      corporate_3.com
-----
```

Table 9 describes the fields show in the display.

**Table 9** *show gprs access-point all Field Descriptions*

Field	Description
Index	Integer assigned to the access point in the GGSN configuration. The index number is used to reference an APN in GGSN commands.
Mode	Authorization configured on the access point. The possible values are: <ul style="list-style-type: none"> <li>transparent—Users who access the PDN through the access point associated with the current virtual template are allowed access without authorization or authentication.</li> <li>non-transparent—Users who access the PDN through the current virtual template must be authenticated by the GGSN acting as a proxy for the authentication.</li> </ul>
Access-type	Type of access point. The possible values are: <ul style="list-style-type: none"> <li>Real—APN type that corresponds to an external physical network on the GGSN. This is the default value.</li> <li>Virtual—APN type that is not associated with any specific physical target network on the GGSN. Virtual APNs are used to simply HLR provisioning in the PLMN.</li> </ul>
AccessPointName	Access point network ID, which is commonly an Internet domain name.
VRF Name	Name of the VPN routing and forwarding instance associated with the APN.
ppp-regeneration (max-session, setup-time)	PPP regeneration session parameters configured at the access point: <ul style="list-style-type: none"> <li>max-session—Maximum number of PPP regenerated sessions allowed at the access point.</li> <li>setup-time—Maximum amount of time (between 1 and 65535 seconds) within which a PPP regenerated session must be established.</li> </ul>

#### Related Commands

Command	Description
<b>access-point</b>	Specifies an access point number and enters access point configuration mode.

## show gprs access-point statistics

To display data volume and packet data protocol (PDP) activation and deactivation statistics for access points on the gateway GPRS support node (GGSN), use the **show gprs access-point statistics** command in privileged EXEC mode.

To display data volume and PDP activation and deactivation statistics for access points on the gateway GPRS support node (GGSN), use the **show gprs access-point statistics** command in privileged EXEC mode.

```
show gprs access-point statistics {access-point-index | all}
```

Syntax Description	access-point-index	Index number of an access point. Statistics for that access point are shown.
	all	Statistics for all access points on the GGSN are shown.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 and the following new output fields were added: <ul style="list-style-type: none"> <li>DHCP address requests sent by GGSN</li> <li>DHCP address requests successful</li> <li>DHCP address release sent by GGSN</li> <li>downstream packet count</li> <li>upstream packet count</li> </ul>
	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.

Release	Modification
12.4(9)XG	<p>This command was integrated into Cisco IOS Release 12.4(9)XG and the following IPv6-related fields were added to the <b>show gprs access-point statistics access-point-index</b> command display:</p> <ul style="list-style-type: none"> <li>• ms init ipv6 pdp activation</li> <li>• successful ms init ipv6 pdp activation</li> <li>• dynamic ipv6 PDP activation</li> <li>• successful dynamic ipv6 activation</li> <li>• ms init ipv6 pdp deactivation</li> <li>• successful ms init ipv6 pdp deactivation</li> <li>• ggsn init ipv6 pdp deactivation</li> <li>• successful ggsn init ipv6 pdp deactivation</li> <li>• network init ipv6 pdp deactivation</li> <li>• successful network init ipv6 pdp deactivation</li> <li>• upstream ipv6 data bytes</li> <li>• upstream ipv6 data pak</li> <li>• downstream ipv6 data bytes</li> <li>• downstream ipv6 pak</li> </ul>
12.4(15)XQ	<p>This command was integrated into Cisco IOS Release 12.4(15)XQ and the following fields were added to the display:</p> <ul style="list-style-type: none"> <li>• PDP update initiated by GGSN</li> <li>• Successful PDP update initiated by GGSN</li> <li>• Total number of successful COA requests</li> <li>• Number of times direct tunnel enabled</li> </ul>

### Usage Guidelines

Use the **show gprs access-point statistics** command to display data volume and PDP activation and deactivation statistics for access points on the GGSN.

Use the *access-point-index* argument to specify a particular access point number for which you want to obtain information.

Use the **all** keyword to obtain information about all access points in an abbreviated format.

**Examples**

The following example displays PDP context activation and deactivation statistics for all access points on the GGSN:

```

router# show gprs access-point statistics 3
PDP activation initiated by MS:                11
PDP update initiated by GGSN                  0
Successful PDP update initiated by GGSN       0
Successful PDP activation initiated by MS:     8
*Dynamic PDP activation initiated by MS:      11
Successful dynamic activation initiated by MS: 8
PDP deactivation initiated by MS:             0
Successful PDP deactivation initiated by MS:   0
Network initiated PDP activation:             0
Successful network initiated PDP activation:  0
PDP deactivation initiated by GGSN:           4
Successful PDP deactivation initiated by GGSN: 3
upstream data volume in octets:               0
*downstream data volume in octets:            0
upstream packet count:                        0
downstream packet count:                      0
*DHCP address requests sent by GGSN:          0
*DHCP address requests successful:            0
*DHCP address release sent by GGSN:           0

ms init ipv6 pdp activation                    11
successful ms init ipv6 pdp activation         8
dynamic ipv6 pdp activation                    11
successful dynamic v6 pdp activation           8
ms init ipv6 pdp deactivation                  0
successful ms init v6 pdp deactivation         0
ggsn init ipv6 pdp deactivation               4
successful ggsn init v6 pdp deactivation       3
network init ipv6 pdp deactivation            0
successful network init ipv6 pdp deactivation  0

upstream ipv6 data bytes                       192
upstream ipv6 data pak                         3
downstream ipv6 data bytes                     3552
downstream ipv6 data pak                       48

Total number of successful COA requests        0
Number of times direct tunnel enabled          0
    
```

**Table 10** show gprs access-point statistics Field Descriptions

Field	Description
active PDP	Number of IPv4 PDP contexts that are currently established on the GGSN.
downstream data volume in octets	Number of bytes of data received by the GGSN from the PDN, or network.
downstream packet count	Downstream traffic byte counts.
DHCP address release sent by GGSN	Number of DHCP release packets sent by a DHCP server to the GGSN.
DHCP address requests sent by GGSN	Number of DHCP request packets sent to a DHCP server by the GGSN.
DHCP address requests successful	Number of DHCP requests that were successful.

**Table 10** *show gprs access-point statistics Field Descriptions (continued)*

Field	Description
Dest addr violation	Number of IPv4 packets (and bytes) dropped by the GGSN because of a source address violation. This field displays only when the <b>security verify destination</b> command is configured.  This field does not apply to APNs using VRF. In addition, verification of destination addresses does not apply to GTP-PPP regeneration or GTP-PPP with L2TP.
Dynamic PDP activation initiated by MS	Number of Create PDP Context Request messages received by the GGSN from an MS without a PDP address. (Duplicate requests are not counted.)
downstream ipv6 data bytes	Number of bytes of IPv6 data received by the GGSN from the PDN, or network.
downstream ipv6 pak	Downstream IPv6 traffic byte counts.
dynamic ipv6 PDP activation	Number of IPv6 Create PDP Context requests received by the GGSN from an MS requesting dynamic IPv6 address allocation.
ggsn init ipv6 pdp deactivation	Number of IPv6 PDP context deactivation requests initiated by the GGSN.
upstream ipv6 data bytes	Number of bytes of IPv6 data received by the GGSN from the SGSN.
upstream ipv6 data pak	Upstream IPv6 traffic byte counts.
ms init ipv6 pdp activation	Number of IPv6 Create PDP Context requests received by the GGSN that were initiated by the MS.
ms init ipv6 pdp deactivation	Number of IPv6 Delete PDP Context requests received by the GGSN that were initiated by the MS.
Number of times direct tunnel enabled	Number of direct tunnel PDPs established.
network init ipv6 pdp deactivation	Number of IPv6 Create PDP Context Request messages received by the GGSN that were network-initiated.
successful dynamic ipv6 activation	Number of successful IPv6 PDP context creations initiated by mobile user that used dynamic ipv6 address allocation.
successful ggsn init ipv6 pdp deactivation	Number of IPv6 PDP contexts that were successfully deactivated by a GGSN-initiated request.
successful ms init ipv6 pdp activation	Number of successful IPv6 PDP context creations initiated by a SGSN-initiated request.
successful ms init ipv6 pdp deactivation	Number of IPv6 PDP contexts that were successfully deactivated by a SGSN-initiated request.
successful network init ipv6 pdp activation	Number of IPv6 PDP contexts that were successfully activated by a network-initiated request.
successful network init ipv6 pdp deactivation	Number of IPv6 PDP contexts that were successfully deactivated by a network-initiated request.

Table 10 show gprs access-point statistics Field Descriptions (continued)

Field	Description
Network initiated PDP activation	Number of Create PDP Context Request messages received by the GGSN from network initiation.
PDP activation initiated by MS	Number of Create PDP Context Request messages received by the GGSN from an SGSN. (Duplicate requests are not counted.)
PDP deactivation initiated by GGSN	Number of Delete PDP Context Request messages sent by the GGSN to an SGSN.
PDP deactivation initiated by MS	Number of Delete PDP Context Request messages received by the GGSN from an SGSN. (Duplicate messages are not counted.)
PDP update initiated by GGSN	Number of Update PDP Context Requests that were initiated by the GGSN.
ppp-regeneration (max-session, setup-time)	PPP regeneration session parameters configured at the access point: max-session—Maximum number of PPP regenerated sessions allowed at the access point. setup-time—Maximum amount of time (between 1 and 65535 seconds) within which a PPP regenerated session must be established.
Redirected mobile-to-mobile traffic	Number of IPv4 packets (and bytes) dropped at the APN from which they exit because mobile-to-mobile traffic has been redirected. This field displays only when the <b>redirect intermobile ip</b> command is configured.
Src addr violation	Number of IPv4 packets (and bytes) dropped because of source address violation. This field displays only when the <b>security verify source</b> command is configured.
Successful dynamic activation initiated by MS	Number of Create PDP Context Response messages sent by the GGSN with a cause value of “GTP_RES_REQACCEPTED”, indicating that the PDP address has been dynamically assigned.
Successful network initiated PDP activation	Number of PDP contexts activated on the GGSN that were initiated by the network.
Successful PDP activation initiated by MS	Number of Create PDP Context Response messages sent by the GGSN with a cause value of “GTP_RES_REQACCEPTED.”
Successful PDP deactivation initiated by GGSN	Number of Delete PDP Context Response messages received by the GGSN from an SGSN.
Successful PDP deactivation initiated by MS	Number of Delete PDP Context Response messages sent by the GGSN to an SGSN with a cause value of “GTP_RES_REQACCEPTED”.
Successful PDP update initiated by GGSN	Number of Update PDP Context Requests initiated by the GGSN that were successful.
Total number of successful CoA requests	Number of CoA requests, containing new QoS, that were successful.
upstream data volume in octets	Number of bytes of data received by the GGSN from the SGSN.
upstream packet count	Upstream traffic byte counts.



**Related Commands**

<b>Command</b>	<b>Description</b>
<b>clear gprs access-point statistics</b>	Clears statistics counters for a specific access point or for all access points on the GGSN.
<b>show gprs access-point</b>	Displays information about access points on the GGSN.

# show gprs access-point throughput statistics

To display throughput statistics for access points on a gateway GPRS support node (GGSN), use the **show gprs access-point throughput statistics** command in privileged EXEC mode.

```
show gprs access-point throughput statistics {access-point-index | all}
```

Syntax Description		
	<i>access-point-index</i>	Index number of an access point. Statistics for that access point are shown.
	<b>all</b>	Statistics for all access points on the GGSN are shown.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs access-point throughput statistics** command to display throughput statistics for access points on the GGSN.

Use the *access-point-index* argument to specify a particular access point number for which you want to obtain information.

Use the **all** keyword to obtain information about all access points in an abbreviated format.

**Examples** The following example displays throughput statistics for access point 1:

```
GGSN# show gprs access-point throughput statistics 1

Collection interval - 1 min, Last collected at - 1 min back
  upstream data volume in octets:    0
  downstream data volume in octets:  0
  upstream packet count:             0
  downstream packet count:          0

Collection interval - 2 min, Last collected at - 2 min back
  upstream data volume in octets:    0
  downstream data volume in octets:  0
  upstream packet count:             0
  downstream packet count:          0
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>clear gprs access-point statistics</b>	Clears statistics counters for a specific access point or for all access points on the GGSN.
<b>gprs throughput interval</b>	Configures the interval at which the GGSN collects throughput data for APNs.
<b>show gprs access-point</b>	Displays information about access points on the GGSN.

# show gprs bandwidth-pool status

To display a list of configured CAC bandwidth pools, along with their status, use the **show gprs bandwidth-pool status** command in privileged EXEC mode.

**show gprs bandwidth-pool status** *pool-name*

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs bandwidth-pool status** command to display a list of configured bandwidth pools and their status.

**Examples** The following is sample output of the **show gprs bandwidth-pool status** command:

```

GGSN#show gprs bandwidth-pool status bwpool1

BW Name:bwpool1
Total BW:1000000
Available BW:0
=====
conversational      Total BW:400000    Available BW:400000
streaming           Total BW:300000    Available BW:300000
interactive          Total BW:200000    Available BW:200000
background          Total BW:100000    Available BW:100000
    
```

Table 8 describes the fields shown in the display.

**Table 11** *show gprs bandwidth-pool status Field Descriptions*

Field	Description
BW Name	Name of the bandwidth pool as defined using the <b>gprs bandwidth-pool</b> global configuration command and each sub traffic class -based pools defined using the <b>traffic-class</b> bandwidth pool configuration command.
Total BW	Total amount of bandwidth, in kilobits per second, allocated to a bandwidth pool using the <b>bandwidth</b> bandwidth pool configuration command. Also, the total bandwidth allocated to a sub traffic class-based pool, defined as a percentage or absolute value using the <b>traffic-class</b> bandwidth pool configuration command.
Available BW	Remaining amount of bandwidth, in kilobits per second, for a bandwidth pool and the remaining available bandwidth (in percentage or absolute value) for each sub traffic class-based pool.
conversational	Amount of the bandwidth pool bandwidth, in kilobits per second or as a percentage, allocated to the Conversational traffic class and the bandwidth currently available.
streaming	Amount of the bandwidth pool bandwidth, in kilobits per second or as a percentage, allocated to the Streaming traffic class and the bandwidth currently available.
interactive	Amount of the bandwidth pool bandwidth, in kilobits per second or as a percentage, allocated to the Interactive traffic class and the bandwidth currently available.
background	Amount of the bandwidth pool bandwidth, in kilobits per second or as a percentage, allocated to the Background traffic class and the bandwidth currently available.

#### Related Commands

Command	Description
<b>bandwidth</b>	Defines the total bandwidth, in kilobits per second, for a bandwidth pool.
<b>bandwidth-pool</b>	Applies a bandwidth pool to an APN.
<b>gprs qos bandwidth-pool</b>	Creates or modifies a bandwidth pool.
<b>traffic-class</b>	Allocates bandwidth pool bandwidth to a specific traffic class.

# show gprs charging parameters

To display information about the current gateway GPRS support node (GGSN) charging configuration, use the **show gprs charging parameters** command in privileged EXEC mode.

## show gprs charging parameters

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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.  The following output fields were added to the display: <ul style="list-style-type: none"> <li>• Charging CDR Option Local Record Sequence Number</li> <li>• Charging CDR Option No Partial CDR Generation</li> <li>• Charging CDR Option Node ID</li> <li>• Charging CDR Option Packet Count</li> <li>• Charging Change Condition Limit</li> <li>• Charging Send Buffer Size</li> <li>• Charging GTP' Port Number</li> <li>• Charging MCC Code</li> <li>• Charging MNC Code</li> <li>• Charging Roamers CDR Only</li> <li>• Charging HPLMN Matching Criteria</li> <li>• Charging SGSN Limit</li> </ul> The following output fields were removed from the display: <ul style="list-style-type: none"> <li>• Charging MCC Code</li> <li>• Charging MNC Code</li> <li>• Charging HPLMN Matching Criteria</li> </ul>
	12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD.

<b>Release</b>	<b>Modification</b>
12.2(8)YW	<p>This command was integrated into the Cisco IOS Release 12.2(8)YW.</p> <ul style="list-style-type: none"> <li>• The Charging Path Protocol field was changed from binary 0 and 1 to udp and tcp.</li> <li>• The Charging qos-info output field was changed to Charging release.</li> <li>• The following output fields were added to the display: <ul style="list-style-type: none"> <li>– Charging Time Limit</li> <li>– Charging qos-info</li> <li>– Charging Transfer Format.</li> <li>– GTP' use short header</li> </ul> </li> </ul>
12.3(2)XB	<p>This command was integrated into Cisco IOS Release 12.3(2)XB.</p>
12.3(8)XU	<p>This command was integrated into Cisco IOS Release 12.3(8)XU and the following fields were added to the display:</p> <ul style="list-style-type: none"> <li>• Access Point Name</li> <li>• ChCh Selection Mode</li> <li>• Default Tertiary Charging Gateway Address</li> <li>• Dynamic Address</li> <li>• External Charging ID</li> <li>• PDP Type</li> <li>• Served PDP Address</li> <li>• Service Mode</li> <li>• SGSN PLMN ID</li> </ul>
12.3(11)YJ	<p>This command was integrated into Cisco IOS Release 12.3(11)YJ.</p>
12.3(14)YQ	<p>This command was integrated into Cisco IOS Release 12.3(14)YQ.</p>
12.3(14)YU	<p>This command was integrated into the Cisco IOS Release 12.3(14)YU and the following fields were added to the display:</p> <ul style="list-style-type: none"> <li>• Access Point Name Virtual</li> <li>• Camel Charging Info</li> <li>• IMEISV</li> <li>• MS Time Zone</li> <li>• Radio Access Technology</li> <li>• User Location Information</li> </ul>
12.4(2)XB	<p>This command was integrated into Cisco IOS Release 12.4(2)XB.</p>
12.4(9)XG	<p>This command was integrated into Cisco IOS Release 12.4(9)XG.</p>
12.4(15)XQ	<p>This command was integrated into Cisco IOS Release 12.4(15)XQ and the following fields were added to the display:</p> <ul style="list-style-type: none"> <li>• GGSN's iSCSI profile</li> <li>• Charging Source Interface</li> </ul>

**Usage Guidelines**

Use the **show gprs charging parameters** command to display the currently active charging parameters for the GGSN.

**Examples**

The following is sample output of the **show gprs charging parameters** command:

```
Router# show gprs charging parameters

GPRS Charging Protocol Parameters
=====

* Default Charging Gateway Address:          <172.17.1.2>
* Default Backup Charging Gateway Address:   UNDEFINED.
* Default Tertiary Charging Gateway Address: UNDEFINED.
* Backup data store (PSD) Address:          UNDEFINED
* Retrieve only data store (PSD) Address    UNDEFINED
* GGSN's iSCSI profile:                     TARGET_LINUX
* Current Active Charging Gateway Address:   <172.17.1.2>
* Current Backup Charging Gateway Address:   UNDEFINED.
* Charging Server Switch-Over Timer:        <60> seconds.
* Charging Path Protocol:                   udp
* GTP' use short header:                    DISABLED
* Charging Message Options:
  Transfer Request:
  - Packet Transfer Command IE:             DISABLED.
  Transfer Response:
  - Number Responded:                       DISABLED.
* Charging MAP DATA TOS:                   <3>
* Charging Transfer Interval:                <105> seconds.
* Charging Transfer Threshold:               <1048576> bytes.
* Charging CDR Aggregation Limit:            <255> CDRs per msg.
* Charging Packet Queue Size:                <128> messages.
* Charging Gateway Path Request Timer:       <0> Minutes.
* Charging Change Condition Limit:           <5>
* Charging SGSN Limit:                       DISABLED.
* Charging Time Limit:                       <0>
* Charging Send Buffer Size:                  <1460>
* Charging Port Number:                      <3386>
* Charging Roamers CDR Only:                 DISABLED.
* Charging CDR Option:
- Local Record Sequence Number:             DISABLED.
- APN Selection Mode:                       DISABLED.
- ChCh Selection Mode:                     DISABLED.
- Radio Access Type - RAT:                  DISABLED.
- User Location Information:                 ENABLED.
- MS Time Zone:                             ENABLED.
- IMEISV:                                   DISABLED.
- CAMEL Charging Info:                      ENABLED.
- SGSN PLMN ID:                             DISABLED.
- Dynamic Address:                          ENABLED.
- Served PDP Address:                       ENABLED.
- PDP Type:                                 ENABLED.
- Access Point Name:                        ENABLED.
- Network Initiated PDP:                    ENABLED.
- No Partial CDR Generation:                 DISABLED.
- Node ID:                                  DISABLED.
- Packet Count:                             DISABLED.
- Served MSISDN:                            DISABLED.
- Private Echo:                              DISABLED.
* Charging release:                          5
* Charging Tariff Time Changes:
- NO Tariff Time Changes
```



```

* Charging Service Mode:                OPERATIONAL
* Charging Source Interface              loopbackX
* Backup data store (PSD) Address:      172.28.28.28
* Retrieve only data store (PSD) Address 192.13.13.13

```

Table 12 describes the fields shown in the display.

**Table 12** *show gprs charging parameters Field Descriptions*

Field	Description
Backup data store (PSD) Address	IP address of the local Persistent Storage Device (PSD) to which G-CDRs are backed up if a charging gateway is unavailable.
Charging CDR Aggregation Limit	Maximum number of CDRs that the GGSN aggregates in a charging data transfer message to the charging gateway. You can configure this limit using the <b>gprs charging cdr-aggregation-limit</b> command.
Charging CDR Option: Access Point Name Charging CDR Option: Access Point Name Virtual	Status indicating if the GGSN provides the APN or virtual APN parameter in G-CDRs. Possible values are enabled or disabled. You can enable the GGSN to provide the APN or virtual PAN parameter in G-CDRs using the <b>gprs charging cdr-option apn</b> and <b>gprs charging cdr-option apn virtual</b> commands.
Charging CDR Option: APN Selection Mode	Status indicating if the GGSN provides the reason code for APN selection in G-CDRs. The possible values are enabled or disabled. You can enable the GGSN to provide the APN selection mode in G-CDRs using the <b>gprs charging cdr-option apn-selection-mode</b> command.
Charging CDR Option: CAMEL Charging Info	Status indicating if the GGSN includes a copy of the tag and length of the Customized Application for Mobile Enhanced Logic (CAMEL) from the S-CDR in G-CDRs. You can enable the GGSN to include a copy of the tag and length of the CAMEL in G-CDRs using the <b>gprs charging cdr-option camel-charge-info</b> command.
Charging CDR Option: ChCh Selection Mode	Status indicating if the GGSN includes the charging characteristics selection mode parameter in G-CDRs. Possible values are enabled or disabled.
Charging CDR Option: Dynamic Address	Status indicating if the GGSN includes the dynamic address flag parameter in G-CDRs. Possible values are enabled or disabled. You can enable the GGSN to provide the APN parameter in G-CDRs using the <b>gprs charging cdr-option dynamic-address</b> command.

Table 12 show gprs charging parameters Field Descriptions (continued)

Field	Description
Charging CDR Option: IMEISV	<p>Status indicating if the GGSN includes the International Mobile Equipment Identity IMEI software version (IMEISIV) in G-CDRs.</p> <p>You can enable the GGSN to include the IMEISIV IE in G-CDRs using the <b>gprs charging cdr-option imeisv</b> command.</p>
Charging CDR Option: Local Record Sequence Number	<p>Status indicating if the GGSN uses the local record sequence field in G-CDRs. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to use the local record sequence field in G-CDRs using the <b>gprs charging cdr-option local-record-sequence-number</b> command.</p>
Charging CDR Option: MS Time Zone	<p>Status indicating if the GGSN includes the MS time zone (MSTZ) in G-CDRs.</p> <p>You can enable the GGSN to provide MSTZ in G-CDRs using the <b>gprs charging cdr-option ms-time-zone</b> command.</p>
Charging CDR Option: Network Initiated PDP	<p>Status indicating if the GGSN includes the NIP parameter in G-CDRs. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to use the local record sequence field in G-CDRs using the <b>gprs charging cdr-option nip</b> command.</p>
Charging CDR Option: No Partial CDR Generation	<p>Status indicating if the GGSN can create partial CDRs. The possible values are enabled or disabled.</p> <p>You can disable partial CDR generation by the GGSN using the <b>gprs charging cdr-option no-partial-cdr-generation</b> command.</p>
Charging CDR Option: Node ID	<p>Status indicating if the GGSN specifies the name of the node that generated the CDR in the node ID field of the G-CDR. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to use the node ID field in G-CDRs using the <b>gprs charging cdr-option node-id</b> command.</p>
Charging CDR Option: Packet Count	<p>Status indicating if the GGSN provides uplink and downlink packet counts in the optional record extension field of a G-CDR. The possible values are ON or OFF.</p> <p>You can enable the GGSN to provide packet counts using the <b>gprs charging cdr-option packet-count</b> command.</p>
Charging CDR Option: PDP Type	<p>Status indicating if the GGSN includes the PDP type parameter in G-CDRs. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to provide packet counts using the <b>gprs charging cdr-option pdp-type</b> command.</p>

**Table 12** *show gprs charging parameters Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Charging CDR Option: Private Echo	<p>Status indicating if the GGSN uses private echo signaling for flow control. The possible values are enabled or disabled.</p> <p>You can enable private echo signaling using the <b>gprs charging flow-control private-echo</b> command.</p>
Charging CDR Option: Radio Access Type-RAT	<p>Status indicating if the GGSN includes the radio access technology (RAT) IE in G-CDRs.</p> <p>You can enable the GGSN to provide the RAT IE in G-CDRs using the <b>gprs charging cdr-option rat-type</b> command.</p>
Charging CDR Option: Served MSISDN	<p>Status indicating if the GGSN provides the mobile station integrated services digital network number from the Create PDP Context request in a G-CDR. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to provide the MSISDN number using the <b>gprs charging cdr-option served-msisdn</b> command.</p>
Charging CDR Option: Served PDP Address	<p>Status indicating if the GGSN provides the PDP address from the Create PDP Context request in a G-CDR. Possible values are enabled or disabled.</p> <p>You can enable this feature using the <b>gprs charging cdr-option pdp-address</b> command.</p>
Charging CDR Option: SGSN PLMN ID	<p>Status indicating if the GGSN includes the SGSN PLMN identifier in G-CDRs. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to include the SGSN PLMN identifier using the <b>gprs charging cdr-option sgsn-plmn</b> command.</p>
Charging CDR Option: User Location Information	<p>Status indicating if the GGSN includes the user location information (ULI) IE in G-CDRs.</p> <p>You can configure the GGSN to include the ULI IE in G-CDRs using the <b>gprs charging cdr-option user-loc-info</b> command.</p>
Charging Change Condition Limit	<p>Maximum number of charging containers in each G-CDR.</p> <p>You can configure the change condition limit using the <b>gprs charging container change-limit</b> command.</p>
Charging Gateway Path Request Timer	<p>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.</p> <p>You can configure the path request timer using the <b>gprs charging cg-path-requests</b> command.</p>

**Table 12** *show gprs charging parameters Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Charging Gateway Priority Switchover	<p>Whether or not the GGSN switches over to a charging gateway of higher priority when that gateway becomes active.</p> <p>The possible values are ENABLED (the GGSN switches over to a charging gateway of higher priority when that gateway becomes active) or DISABLED (the GGSN does not switch over to gateways of higher priority when such a gateway becomes active).</p> <p>You can enable the GGSN to switch over to a higher priority charging gateway using the <b>gprs charging switchover priority</b> command.</p>
Charging MAP DATA TOS	<p>Type of service (ToS) priority currently configured for GGSN charging packets. Value (between 0 and 5) is set in the precedence bits of the IP header of charging packets.</p> <p>You can configure the ToS mapping using the <b>gprs charging map data tos</b> command.</p>
Charging Message Options: Number Responded	<p>Status indicating if the GGSN uses the Number of Requests Responded field instead of the Length field in the Requests Responded IE of Data Record Transfer Response messages. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to use the Number of Requests Responded field using the <b>gprs charging message transfer-response number-responded</b> command.</p>
Charging Message Options: Packet Transfer Command IE	<p>Status indicating if the GGSN includes the Packet Transfer Command IE in the Data Record Transfer Request messages. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to include the Packet Transfer Command IE in the Data Record Transfer Request messages using the <b>gprs charging message transfer-request command-ie</b> command.</p>
Charging Message Options: Send Possibly Duplicated CDR	<p>Status indicating if the GGSN retransmits 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). The possible values are enabled or disabled.</p> <p>To configure the GGSN to retransmit Data Record Transfer Request messages with the value of the Packet Transfer Request IE set to 2, use the <b>gprs charging message transfer-request possibly-duplicate</b> command.</p>

**Table 12** *show gprs charging parameters Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Charging Message Options: Transfer Request	<p>Whether the GGSN includes the Packet Transfer Command IE in the Data Record Transfer Response messages.</p> <p>The possible values are ENABLED (the GGSN includes the Packet Transfer Command IE) or DISABLED (the GGSN does not include the IE).</p>
Charging Messages Options: Transfer Response	<p>Whether the GGSN is using the Number of Requests Responded field instead or the Length field in the Requests Responded IE of Data Record Transfer Response messages.</p> <p>The possible values are ENABLED (the GGSN uses the Number of Requests Responded field) or DISABLED (the GGSN uses the Length field).</p>
Charging Packet Queue Size	<p>Maximum number of unacknowledged charging data transfer requests that the GGSN maintains in its queue.</p> <p>You can configure the maximum queue size using the <b>gprs charging packet-queue-size</b> command.</p>
Charging Path Protocol	<p>Protocol in use between the GGSN and the charging gateway. The possible values are udp or tcp.</p> <p>You can configure the charging path protocol using the <b>gprs charging path-protocol</b> command.</p>
Charging Port Number	<p>Destination port of the charging gateway.</p> <p>You can configure the destination port using the <b>gprs charging port</b> command.</p>
Charging release	<p>Charging release with which the GGSN is to comply when presenting G-CDRs. Possible values are 98, 99, 4, or 5.</p> <p>You can configure the charging release using the <b>gprs charging release</b> command.</p>
Charging Roamers CDR Only	<p>Status of the charging for roamers feature on the GGSN. The possible values are enabled or disabled.</p> <p>You can configure the GGSN to support creation of CDRs for roaming subscribers using the <b>gprs charging roamers</b> command.</p>
Charging Send Buffer Size	<p>Size (in bytes) of the buffer that contains the GTP' PDU and signaling messages on the GGSN.</p> <p>You can configure the buffer size using the <b>gprs charging send-buffer</b> command.</p>
Charging Server Switch-Over Timer	<p>Amount of time (in seconds) that the GGSN waits before sending charging data to the backup charging gateway, after the active charging gateway fails.</p> <p>You can configure this period of time using the <b>gprs charging server-switch-timer</b> command.</p>

**Table 12** *show gprs charging parameters Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Charging SGSN Limit	Maximum number of SGSN changes that can occur before the GGSN closes a G-CDR for a particular PDP context.
Charging Source Interface	Loopback interface being used for charging traffic.
Charging Tariff Time Changes	Time of day when GGSN charging tariffs change. You can configure this time using the <b>gprs charging tariff-time</b> command.
Charging Transfer Interval	Amount of time (in seconds) that the GGSN waits before checking and sending any closed CDRs to the charging gateway. You can configure this period of time using the <b>gprs charging transfer interval</b> command.
Charging Transfer Threshold	Maximum size (in bytes) that the GGSN maintains in a charging container before closing it and updating the CDR. You can configure the container volume using the <b>gprs charging container volume-threshold</b> command.
Current Active Charging Gateway Address	IP address of the charging gateway to which the GGSN is currently sending charging data. You can configure the primary charging gateway using the <b>gprs default charging-gateway</b> command.
Current Backup Charging Gateway Address	IP address of the backup charging gateway to which the GGSN will send charging data if the current active charging gateway becomes unavailable. You can configure the backup charging gateway using the <b>gprs default charging-gateway</b> command.
Default Backup Charging Gateway Address	IP address of the default secondary (backup) charging gateway. You can configure the default backup charging gateway using the <b>gprs default charging-gateway</b> command.
Default Tertiary Charging Gateway Address	IP address of the default tertiary (backup) charging gateway. You can configure the default backup charging gateway using the <b>gprs default charging-gateway</b> command.
Default Charging Gateway Address	IP address of the default primary charging gateway. You can configure the default primary charging gateway using the <b>gprs default charging-gateway</b> command.
GGSN's iSCSI profile	Name of the iSCSI target interface profile configured on the GGSN.

**Table 12** *show gprs charging parameters Field Descriptions (continued)*

Field	Description
GTP' use short header	Whether the GGSN is using the GTP short header (6-byte header). The possible values are ENABLED (the GGSN is using the GTP short header) or DISABLED (the GGSN is using the GTP long header).  You can configure the GGSN to use the GTP short header using the <b>gprs charging header short</b> command.
Retrieve only data store (PSD) Address	IP address of the remote Persistent Storage Device (PSD) from which G-CDRs are only retrieved.

**Related Commands**

Command	Description
<b>show gprs charging statistics</b>	Displays cumulative charging statistics for the GGSN.

# show gprs charging statistics

To display cumulative charging statistics for the gateway GPRS support node (GGSN), use the **show gprs charging statistics** command in privileged EXEC mode.

## show gprs charging statistics

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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, and the statistics were changed to be cumulative since the last restart of the GGSN and the keyword options were removed.
	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 **show gprs charging statistics** command to display cumulative charging statistics since the last restart of the GGSN.



**Examples**

The following is sample output of the **show gprs charging statistics** command:

```
router# show gprs charging statistics all
      GPRS Charging Protocol Statistics
      =====
* Total Number of CDRs for Charging:          <200>
* Total Number of Containers for Charging:    <104>
* Total Number of CDR_Output_Msgs sent:      <22>

-- Charging Gateway Statistics --
* Charging Gateway Down Count:                <1>
* Last Charging Gateway Down Time = 2001/11/29 15:23:0
```

Table 10 describes the fields shown in the display.

**Table 13** *show gprs charging statistics Field Descriptions*

Field	Description
Total Number of CDRs for Charging	Cumulative number of open and closed G-CDRs on the GGSN since the last startup of the GGSN.
Total Number of Containers for Charging	Cumulative number of all open and closed charging containers for all G-CDRs on the GGSN since the last startup of the GGSN.
Total Number of CDR_Output_Msgs sent	Cumulative number of G-CDR output messages that the GGSN sent to the charging gateway and received acknowledgment for since the last startup of the GGSN.
Charging Gateway Down Count	Number of times that the charging gateway has transitioned its state (from up or unknown, to down) since the last startup of the GGSN.
Last Charging Gateway Down Time	Recorded system time when the charging gateway was last in a down state. This statistics only appears if a charging gateway has been down.

**Related Commands**

Command	Description
<b>show gprs charging parameters</b>	Displays information about the current GGSN charging configuration.
<b>show gprs charging status</b>	Displays current charging statistics for the GGSN.

# show gprs charging status

To display current charging statistics for the gateway GPRS support node (GGSN), use the **show gprs charging status** command in privileged EXEC mode.

**show gprs charging status** { *tid tunnel\_id* | **access-point** *access-point-index* | **all** }

Syntax Description	Parameter	Description
	<b>tid</b> <i>tunnel_id</i>	Specifies a tunnel ID for which you want to display charging statistics.
	<b>access-point</b> <i>access-point-index</i>	Specifies the index of the access point for which you want to display charging statistics.
	<b>all</b>	Requests display of all charging statistics.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 and the Number of partial CDRs output field was changed to the Number of closed CDRs buffered.
	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 and the sgsn_plmn_id field was added to the display.
	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 **show gprs charging status** command to display current charging statistics for the GGSN since the last G-CDR was sent.

## Examples

### Example 1

The following is sample output of the **show gprs charging status tid** command:

```
router# show gprs charging status tid 1102334415151515
      GPRS Charging Protocol Status for TID
      =====
* Number of CDRs :                               <1>
```

```

* Number of closed CDRs buffered:          <0>
* Number of Containers:                    <0>

      ** Detail fields of CDR entry **
      =====
- served_imsi = 0x112 3344151515F5
- sgsn_plmn_id = 0x21F354
- ggsn_address = 10.10.10.1
- charging_id = 68960026
- SGSN change list (total=[1]): [4.4.4.4]
- apn = www.gprs_companya.fr
- pdp_type: - pdp_type_org = 1
- pdp_type_num = 33
- dynamic_addr_flag = 1
- pdp_type.chrg_data_vol_list:
- rec_opening_time = 2003/5/9 10:2:12 <tz_offset:0>
- duration = 0 - cause_rec_closing = 0
- rec_seq_number = 0

```

Table 11 describes the fields shown in the display.

**Table 14** *show gprs charging status tid Field Descriptions*

Field	Description
Number of CDRs	Number of currently open and closed G-CDRs on the GGSN for the specified TID, since the last G-CDR was successfully sent to the charging gateway.
Number of closed CDRs buffered	Number of currently closed G-CDRs that the GGSN has not yet sent to the charging gateway for the specified TID.
Number of Containers	Number of all currently open and closed charging containers for the specified TID, since the last G-CDR was successfully sent to the charging gateway.

### Example 2

The following is sample output of the **show gprs charging status access-point** command:

```

router# show gprs charging status access-point 1

      GPRS Charging Protocol Status for APN
      =====

* Number of CDRs:          <96>
* Number of closed CDRs buffered: <0>
* Number of Containers:    <0>

```

Table 12 describes the fields shown in the display.

**Table 15** *show gprs charging status access-point Field Descriptions*

Field	Description
Number of CDRs	Number of currently open and closed G-CDRs on the GGSN for the specified access point, since the last G-CDR was successfully sent to the charging gateway.

**Table 15** *show gprs charging status access-point Field Descriptions (continued)*

Field	Description
Number of closed CDRs buffered	Number of currently closed G-CDRs that the GGSN has not yet sent to the charging gateway for the specified access point.
Number of Containers	Number of all currently open and closed charging containers for the specified access point, since the last G-CDR was successfully sent to the charging gateway.

**Example 3**

The following is sample output of the **show gprs charging status all** command:

```

router# show gprs charging status all
      GPRS Charging Protocol Status
      =====
* Number of APNs :                               <1>
* Number of CDRs :                               <96>
* Number of closed CDRs buffered:                <0>
* Number of Containers buffered:                 <0>
* Number of pending unack. CDR_Output_Msgs:    <1>
    
```

Table 13 describes the fields shown in the display.

**Table 16** *show gprs charging status Field Descriptions*

Field	Description
Number of APNs	Number of access points for which charging data has currently been collected. This statistic appears in the <b>all</b> version of this command only.
Number of CDRs	Number of currently open and closed G-CDRs on the GGSN since the last G-CDR was successfully sent to the charging gateway. For the <b>tid</b> and <b>access-point</b> versions of this command, this is the number of currently open and closed G-CDRs for the specified TID or access point.
Number of closed CDRs buffered	Number of currently closed G-CDRs that the GGSN has not yet sent to the charging gateway. For the <b>tid</b> and <b>access-point</b> versions of this command, this is the number of currently closed G-CDRs for the specified TID or access-point that have not yet been sent to the charging gateway.
Number of Containers buffered	Number of all currently open and closed charging containers since the last G-CDR was successfully sent to the charging gateway.
Number of pending unack. CDR_Output_Msgs	Number of G-CDR output messages sent by the GGSN that are not acknowledged by the charging gateway.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show gprs charging parameters</b>	Displays information about the current GGSN charging configuration.
<b>show gprs charging statistics</b>	Displays cumulative charging statistics for the GGSN.

# show gprs gtp ms

To display the currently active MSs on the gateway GPRS support node (GGSN), use the **show gprs gtp ms** command in privileged EXEC mode.

```
show gprs gtp ms {imsi imsi | access-point access-point-index | all}
```

Syntax Description	Parameter	Description
	<b>imsi</b> <i>imsi</i>	Displays MSs by International Mobile Subscriber Identity (IMSI). The IMSI can be up to 15 numeric digits. You can obtain the IMSI from the output for the <b>show gprs gtp ms all</b> command or the <b>show gprs gtp pdp-context tid</b> command.
	<b>access-point</b> <i>access-point-index</i>	Displays MSs by access point.
	<b>all</b>	Displays all MSs.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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. <ul style="list-style-type: none"> <li>The MS Addr field was updated to reflect the virtual interface identifier for PPP PDP contexts and the status of PPP PDP with L2TP contexts.</li> <li>The SGSN MCC/MNC field was added</li> </ul>
	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 **show gprs gtp ms** command to display information about the mobile stations that are currently active on the GGSN. You can display the MS information according to access-point or IMSI. You can also display information for all MSs.

**Examples**

The following example displays information for all MSs:

```
router# show gprs gtp ms all
IMSI                SGSN MCCMNC        MS ADDRESS          APN
112233445565437    12345              10.3.0.1            gprsa.apn.com

223456788765437    67891              10.2.0.1 (Vi5)     gprsb.apn.com
```

The following example displays information for all MSs on access-point 1:

```
router# show gprs gtp ms access-point 1
IMSI                SGSN MCCMNC        MS ADDRESS          APN
112233445565437    12345              10.3.0.1            gprsa.apn.com
```

The following example displays information for all MSs on IMSI 110406080002045:

```
router# show gprs gtp ms imsi 110406080002045
IMSI                SGSN MCCMNC        MS ADDRESS          APN
110406080002045    12345              10.10.10.2          gprsc.apn.com

number of pdp:2
reference count:1
```

Table 14 describes the fields shown in the display.

**Table 17** *show gprs gtp ms Field Descriptions*

Field	Description
IMSI	International mobile subscriber identity for the MSs.
MS ADDRESS	The IP address for the MSs. <b>Note</b> For PPP PDP contexts, this field will also display the virtual interface identifier. For PPP PDP with L2TP contexts, this field will also display the state of the PDP context. Possible states are Pending, Forwarded, or Terminating.
APN	Access point name.
number of pdp	Number of PDP contexts on the MSs.
reference count	Internal data structure field. It is used only for internal troubleshooting purposes.
SGSN MCCMNC	MCC/MNC of the SGSN.

**Related Commands**

Command	Description
<b>show gprs gtp pdp-context</b>	Displays a list of the currently active PDP contexts (mobile sessions).
<b>show gprs gtp status</b>	Displays information about the current status of the GTP on the GGSN (such as activated PDP contexts, throughput, and QoS statistics).

# show gprs gtp parameters

To display information about the current GPRS Tunneling Protocol (GTP) configuration on the gateway GPRS support node (GGSN), use the **show gprs gtp parameters** command in privileged EXEC mode.

## show gprs gtp parameters

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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.  The following output fields were added to the display: <ul style="list-style-type: none"> <li>• Charging MCC Code</li> <li>• Charging MNC Code</li> <li>• Charging HPLMN Matching Criteria</li> <li>• GTP dynamic echo-timer minimum</li> <li>• GTP dynamic echo-timer smooth factor</li> </ul> The following output field was removed: <ul style="list-style-type: none"> <li>• GTP max hold time for old gsn PDUs T3_tunnel</li> </ul>
	12.2(8)YD	This command was integrated into Cisco IOS Release 12.2(8)YD and the following output field was removed from the display: <ul style="list-style-type: none"> <li>• GPRS HPLMN Matching Criteria</li> </ul>
	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 following output fields were removed from the display: <ul style="list-style-type: none"> <li>• GPRS MCC Code</li> <li>• GPRS MNC Code</li> </ul>
	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.



**Usage Guidelines**

Use the **show gprs gtp parameters** command to display the current GTP parameters configured on the GGSN.

**Examples**

The following is sample output of the **show gprs gtp parameters** command:

```
router# show gprs gtp parameters
      GTP path echo interval                = 60
      GTP signal max wait time T3_response  = 1
      GTP max retry N3_request              = 5
      GTP dynamic echo-timer minimum        = 5
      GTP dynamic echo-timer smooth factor  = 2
      GTP buffer size for receiving N3_buffer = 8192
      GTP max pdp context                   = 45000
```

[Table 15](#) describes the fields shown in the display.

**Table 18** *show gprs gtp parameters Field Descriptions*

Field	Description
GTP buffer size for receiving N3_buffer	Current size of the receive buffer (in bytes) that the GGSN uses to receive GTP signaling messages and packets sent through the tunneling protocol.  You can configure the N3 buffer using the <b>gprs gtp n3-buffer-size</b> command.
GTP dynamic echo-timer minimum	Current minimum time period (in seconds) used by the dynamic echo timer.  You can configure the minimum value using the <b>gprs gtp echo-timer dynamic minimum</b> command.
GTP dynamic echo-timer smooth factor	Current multiplier used by the GGSN to calculate the T-dynamic for the dynamic echo timer.  You can configure the smooth factor using the <b>gprs gtp echo-timer dynamic smooth-factor</b> command.
GTP max pdp context	Current maximum number of PDP contexts (mobile sessions) that can be activated on the GGSN.  You can configure the maximum number of PDP context requests using the <b>gprs maximum-pdp-context-allowed</b> command.
GTP max retry N3_request	Maximum number of times that the GGSN attempts to send a signaling request to an SGSN.  You can configure the maximum number of signaling requests made by the GGSN using the <b>gprs gtp n3-requests</b> command.

**Table 18** *show gprs gtp parameters Field Descriptions (continued)*

Field	Description
GTP path echo interval	Interval, in seconds, that the GGSN waits before sending an echo-request message to the SGSN.  You can configure the path echo interval using the <b>gprs gtp path-echo-interval</b> command.
GTP signal max wait time T3_response	Interval, in seconds, that the GGSN waits before responding to a signaling request message.  You can configure the maximum interval using the <b>gprs gtp t3-response</b> command.

**Related Commands**

Command	Description
<b>show gprs gtp statistics</b>	Displays the current GTP statistics for the GGSN (such as IE, GTP signaling, and GTP PDU statistics).
<b>show gprs gtp status</b>	Displays information about the current status of the GTP on the GGSN (such as activated PDP contexts, throughput, and QoS statistics).

## show gprs gtp path

To display information about one or more GTP paths between the gateway GPRS support node (GGSN) and other GPRS/UMTS devices, use the **show gprs gtp path** command in privileged EXEC mode.

```
show gprs gtp path {all | remote-address ip-address [remote-port remote-port] | version
gtp-version}
```

Syntax Description		
<b>all</b>		Displays information for all GTP paths.
<b>remote-address</b> <i>ip-address</i>		Displays GTP path information for a specified remote IP address. Optionally, displays GTP path information for a specified remote IP address and port number.
<b>remote-port</b> <i>remote_port_num</i>	(Optional)	Displays GTP path information for a specified remote IP address and port number.
<b>version</b> <i>gtp-version</i>		Displays the of GTP paths by the GTP version (0 or 1).

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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

**Usage Guidelines** Use the **show gprs gtp path** command to display information for one or more GTP paths from the GGSN.

**Examples**

**Example 1**

The following example shows the output for all GTP paths on the GGSN:

```
GGSN# show gprs gtp path all
Total number of path:1

Local address          Remote address          GTP version  Dynamic echo
timer
33.33.33.1(3386)      11.0.0.1(3386)         0            Disabled

Collection interval - 5 min, Last collected at - 3 min back
  upstream data volume in octets:  480
  downstream data volume in octets: 0
  upstream packet count:           4
  downstream packet count:         0

Collection interval - 10 min, Last collected at - 8 min back
  upstream data volume in octets:  120
  downstream data volume in octets: 0
  upstream packet count:           1
  downstream packet count:         0
```

Table 22 describes the fields shown in the display.

**Table 19** show gprs gtp path Field Descriptions

Field	Description
Total number of path	Total number of GTP paths currently established.
Local address	IP address and port number for the local end of the GTP path.
Remote address	IP address and port number for the remote end of the GTP path, such as the address of the SGSN.
GTP version	Version of the GTP protocol (version 0 or 1) supported by the path.
Dynamic echo timer	Current setting (in seconds) for the dynamic echo timer. "Disabled" appears when the dynamic echo timer is not in use.

# show gprs gtp path statistics history

To display statistics (such as the local address and remote port of the path, the GTP version, and the time that the path was deleted) for GTP path entries stored in history, use the **show gprs gtp path statistics history** command in privileged EXEC mode.

**show gprs gtp path statistics history** *number*

<b>Syntax Description</b>	<i>number</i>	Number of path entries for which to display statistics.
<b>Command Modes</b>	Privileged EXEC	
<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.4(9)XG	This command was introduced.
	12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ and the following fields were added to the display: <ul style="list-style-type: none"> <li>• Total Update requests sent</li> <li>• Total Update responses rcvd</li> <li>• Number of times DT enabled</li> </ul>
	12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T.

**Usage Guidelines** Use the **show gprs gtp path statistics history** command to display statistics for the path entries stored in the path history table. The statistics includes information such as the local address, remote address, GTP version of the path, and the time at which the path was deleted.

The first group of statistics in the list are those of the most recently-deleted path.

The maximum number of path entries stored in the history table is configured by using the **gprs gtp path history** global configuration command.

**Examples** The following is sample output from the **show gprs gtp path statistics history** command:

```
Router#show gprs gtp path statistics history
Path: IP address: 172.21.21.21, Remote port: 2152
GPRS GTP Path Statistics:
  Unexpected Data Message          0          Received PDU message          0
  Total Data dropped                0          Sent PDU message              0
  Received PDU bytes                0          Number of short messages      0
  Sent PDU bytes                    0          Number of unknown message     0
  Unexpected signaling message      0          Roaming trusted PDPs          0
  Roaming non-trusted PDPs         0          Non-roaming PDPs              0
  Source Violations                 0          Unsupported extension hdr recd 0
  Path failures                     0          Path fail due to local delete  0
  Total packets dropped              0          Signaling messages dropped     0
  Signaling msg received             2          Signaling msg sent             3
  Number of PDPs created             0          Number of PDPs deleted        0
  Number of PPP PDPs created         0          Number of PPP PDPs deleted    0
```

Single PDP cleared	0	Creates received as update	0
Local delete: version upgrade	0	Local delete due to no sgsn	0
Local delete: version fallback	0	Create collide with delete	0
Version changes	0	Retransmit for create	0
IPv6 PDP activation rejected	0	IPv6 PDPs created	0
IPv6 PDPs deleted	0	IPv6 signaling msg rcvd	0
IPv6 signaling msg sent	0	IPv6 pdus received	0
IPv6 pdus sent	0	IPv6 bytes received	0
IPv6 bytes sent	0	Total update requests sent	0
Total update responses rcvd	0	Number of times DT enabled	0

Path: IP address: 172.21.21.21, Remote port: 2123

GPRS GTP Path Statistics:

Unexpected Data Message	0	Received PDU message	0
Total Data dropped	0	Sent PDU message	0
Received PDU bytes	0	Number of short messages	0
Sent PDU bytes	0	Number of unknown message	0
Unexpected signaling message	0	Roaming trusted PDPs	0
Roaming non-trusted PDPs	0	Non-roaming PDPs	0
Source Violations	0	Unsupported extension hdr recd	0
Path failures	0	Path fail due to local delete	0
Total packets dropped	0	Signaling messages dropped	0
Signaling msg received	6	Signaling msg sent	12
Number of PDPs created	0	Number of PDPs deleted	0
Number of PPP PDPs created	0	Number of PPP PDPs deleted	0
Single PDP cleared	0	Creates received as update	0
Local delete: version upgrade	0	Local delete due to no sgsn	0
Local delete: version fallback	0	Create collide with delete	0
Version changes	0	Retransmit for create	3
IPv6 PDP activation rejected	0	IPv6 PDPs created	0
IPv6 PDPs deleted	0	IPv6 signaling msg rcvd	0
IPv6 signaling msg sent	0	IPv6 pdus received	0
IPv6 pdus sent	0	IPv6 bytes received	0
IPv6 bytes sent	0	Total update requests sent	0
Total update responses rcvd	0	Number of times DT enabled	0

Path: IP address: 172.10.1.1, Remote port: 2152

GPRS GTP Path Statistics:

Unexpected Data Message	0	Received PDU message	0
Total Data dropped	0	Sent PDU message	0
Received PDU bytes	0	Number of short messages	0
Sent PDU bytes	0	Number of unknown message	0
Unexpected signaling message	0	Roaming trusted PDPs	0
Roaming non-trusted PDPs	0	Non-roaming PDPs	0
Source Violations	0	Unsupported extension hdr recd	0
Path failures	0	Path fail due to local delete	0
Total packets dropped	0	Signaling messages dropped	0
Signaling msg received	1	Signaling msg sent	2
Number of PDPs created	1	Number of PDPs deleted	1
Number of PPP PDPs created	0	Number of PPP PDPs deleted	0
Single PDP cleared	0	Creates received as update	0
Local delete: version upgrade	0	Local delete due to no sgsn	0
Local delete: version fallback	0	Create collide with delete	0
Version changes	0	Retransmit for create	0
IPv6 PDP activation rejected	0	IPv6 PDPs created	0
IPv6 PDPs deleted	0	IPv6 signaling msg rcvd	0
IPv6 signaling msg sent	0	IPv6 pdus received	0
IPv6 pdus sent	0	IPv6 bytes received	0
IPv6 bytes sent	0	Total update requests sent	0
Total update responses rcvd	0	Number of times DT enabled	0

Path: IP address: 172.10.1.1, Remote port: 2123

GPRS GTP Path Statistics:

Unexpected Data Message	0	Received PDU message	0
-------------------------	---	----------------------	---

```

Total Data dropped          0          Sent PDU message          0
Received PDU bytes         0          Number of short messages  0
Sent PDU bytes             0          Number of unknown message 0
Unexpected signaling message 0          Roaming trusted PDPs      0
Roaming non-trusted PDPs   0          Non-roaming PDPs         0
Source Violations          0          Unsupported extension hdr recd 0
Path failures              0          Path fail due to local delete 0
Total packets dropped      0          Signaling messages dropped  0
Signaling msg received     0          Signaling msg sent        0
Number of PDPs created     0          Number of PDPs deleted    0
Number of PPP PDPs created 0          Number of PPP PDPs deleted 0
Single PDP cleared         0          Creates received as update 0
Local delete: version upgrade 0          Local delete due to no sgsn 0
Local delete: version fallback 0          Create collide with delete 0
Version changes            0          Retransmit for create      0
IPv6 PDP activation rejected 0          IPv6 PDPs created         0
IPv6 PDPs deleted         0          IPv6 signaling msg rcvd   0
IPv6 signaling msg sent   0          IPv6 pdus received        0
IPv6 pdus sent            0          IPv6 bytes received       0
IPv6 bytes sent           0          Total update requests sent 0
Total update responses rcvd 0          Number of times DT enabled 0

```

Router#

Table 20 describes the fields shown in the display.

**Table 20** *show gprs gtp path statistics history Command Field Descriptions*

Field	Description
Creates collide with delete	Number of create PDP context requests that collided with a delete PDP context request.
Creates received as update	Number of create PDP context requests received as an update PDP context request.
IPv6 bytes received	Number of IPv6 bytes received.
IPv6 bytes sent	Number of IPv6 bytes sent.
IPv6 PDP activation rejected	Number of activate IPv6 PDP context request rejected.
IPv6 PDPs created	Number of IPv6 PDP contexts created.
IPv6 PDPs deleted	Number of IPv6 PDP contexts deleted.
IPv6 pdus received	Number of IPv6 PDUs received.
IPv6 pdus sent	Number of IPv6 PDUs sent.
IPv6 signaling msg rcvd	Number of IPv6 signaling messages received.
IPv6 signaling msg sent	Number of IPv6 signaling messages sent.
Local delete due to no sgsn	Number of PDPs deleted locally because of no SGSN.
Local delete: version fallback	Number of PDPs deleted because of a version fallback.
Local delete: version upgrade	Number of PDPs deleted because of a version upgrade.

**Table 20** *show gprs gtp path statistics history Command Field Descriptions (continued)*

Non-roaming PDPs	Number of non-roaming PDPs.
Number of PDPs created	Number of IPv4 PDP contexts created.
Number of PDPs deleted	Number of IPv4 PDP contexts deleted.
Number of PPP PDPs created	Number of PPP PDP contexts created.
Number of PPP PDPs deleted	Number of PPP PDP contexts deleted.
Number of short messages	Number of GTP messages received which are too short.
Number of times DT enabled	Number of times direct tunnel was enabled for a PDP context.
Number of unknown messages	Number of unknown GTP messages received.
Path failures	Number of path failures.
Path fail due to local delete	Number of path failure due to a local delete PDP context request.
Received PDU bytes	Number of IPv4 PDU bytes transmitted.
Received PDU message	Number of IPv4 PDU messages received.
Retransmit for create	Number of retransmitted create PDP context requests received.
Roaming non-trusted PDPs	Number of roaming PDPs not in a trusted PLMN.
Roaming trusted PDPs	Number of roaming PDPs in a trusted PLMN.
Sent PDU bytes	Number of IPv4 PDU bytes transmitted.
Sent PDU message	Number of IPv4 PDU messages transmitted.
Signaling messages dropped	Number of GTP signaling messages dropped.
Signaling msg received	Number of signaling messages received.
Signaling msg sent	Number of signaling messages sent.
Single PDP cleared	Number of hanging single PDP contexts cleared on the GGSN.
Source Violations	Number of PDPs terminated due to an access violation.
Total Data dropped	Total data dropped.
Total Update requests sent	Total number of GGSN-initiated Update PDP Context Requests sent.
Total Update responses rcvd	Total number responses to GGSN-initiated Update PDP Context Requests.



**Table 20** *show gprs gtp path statistics history Command Field Descriptions (continued)*

Total packets dropped	Total number of packets dropped.
Unexpected Data Message	Number of GTP PDUs received for nonexistent PDP contexts.
Unexpected signaling message	Number of unexpected GTP signaling messages received.
Unsupported extension hdr recd	Number of create PDP context requests received with unsupported extension headers when GGSN comprehension is required.
Version changes	Number of GTP version changes that have occurred on the SGSN path

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>gprs gtp path history</b>	Configures the maximum number of path entries for which the GGSN stores statistics after the path is deleted.
<b>show gprs gtp path statistics remote-address</b>	Displays the statistics for a specific GTP path.

# show gprs gtp path statistics remote-address

To display statistics for a specific path, use the **show gprs gtp path statistics remote-address** command in privileged EXEC mode.

**show gprs gtp path statistics remote-address** *ip-address* [**remote-port** *port-num*]

Syntax Description	remote-address <i>ip-address</i>	IP address of the SGSN for which you want to view path details.
	<b>remote-port</b> <i>port-num</i>	Port number on the SGSN of the entry for which you want to view details.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.4(9)XG	This command was introduced.
	12.4(9)XG2	This command was integrated into Cisco IOS Release 12.4(9)XG2 and the following fields were added to the display: <ul style="list-style-type: none"> <li>Local delete: no req to sgsn</li> <li>Local delete: no wait sgsn</li> </ul>
	12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ and the following fields were added to the display: <ul style="list-style-type: none"> <li>Number of time DT enabled</li> <li>Total Update requests sent</li> <li>Total Update responses rcvd</li> </ul>
	12.4(24)T	This command was integrated into Cisco IOS Release 12.4(24)T.

**Usage Guidelines** Use the **show gprs gtp path statistics remote-address** command to display statistics for a specific GTP path. These details include the local address and remote address of the path, the GTP version used, and the time at which the path was deleted.

If a remote port is not specified, statistics for all entries of the path are displayed.

If the path specified does not currently exist, the statistics stored in the path history table will be searched and displayed if the entry exists in history.

**Examples** The following is sample output from the **show gprs gtp path statistics remote-address** command:

```
router#show gprs gtp path statistics remote-address 172.10.10.10
Path: IP address: 172.10.10.10, Remote port: 2123

GPRS GTP Path Statistics:
  Unexpected Data Message      0      Received PDU message      0
  Total Data dropped           0      Sent PDU message         0
  Received PDU bytes           0      Number of short messages  0
```

```

Sent PDU bytes 0 Number of unknown message 0
Unexpected signaling message 0 Roaming trusted PDPs 0
Roaming non-trusted PDPs 0 Non-roaming PDPs 0
Source Violations 0 Unsupported extension hdr recd 0
Path failures 0 Path fail due to local delete 0
Total packets dropped 0 Signaling messages dropped 0
Signaling msg received 26504 Signaling msg sent 26504
Number of PDPs created 26504 Number of PDPs deleted 35
Number of PPP PDPs created 0 Number of PPP PDPs deleted 0
Number of times DT enabled 0 Single PDP cleared 0
Creates received as update 0 Local delete: version upgrade 0
Local delete due to no sgsn 0 Local delete: version fallback 0
Create collide with delete 0 Local delete: no wait sgsn 0
Local delete: no req to sgsn 0 Version changes 0
Retransmit for create 0 IPv6 PDP activation rejected 0
IPv6 PDPs created 0 IPv6 PDPs deleted 0
IPv6 signaling msg rcvd 0 IPv6 signaling msg sent 0
IPv6 pdus received 0 IPv6 pdus sent 0
IPv6 bytes received 0 IPv6 bytes sent 0
Total Update requests sent 2 Total Update responses rcvd 1

```

Path: IP address: 10.102.5.92, Remote port: 2152

GPRS GTP Path Statistics:

```

Unexpected Data Message 0 Received PDU message 0
Total Data dropped 0 Sent PDU message 0
Received PDU bytes 0 Number of short messages 0
Sent PDU bytes 0 Number of unknown message 0
Unexpected signaling message 0 Roaming trusted PDPs 0
Roaming non-trusted PDPs 0 Non-roaming PDPs 0
Source Violations 0 Unsupported extension hdr recd 0
Path failures 0 Path fail due to local delete 0
Total packets dropped 0 Signaling messages dropped 0
Signaling msg received 26504 Signaling msg sent 26504
Number of PDPs created 26504 Number of PDPs deleted 35
Number of PPP PDPs created 0 Number of PPP PDPs deleted 0
Number of times DT enabled 0 Single PDP cleared 0
Creates received as update 0 Local delete: version upgrade 0
Local delete due to no sgsn 0 Local delete: version fallback 0
Create collide with delete 0 Local delete: no wait sgsn 0
Local delete: no req to sgsn 0 Version changes 0
Retransmit for create 0 IPv6 PDP activation rejected 0
IPv6 PDPs created 0 IPv6 PDPs deleted 0
IPv6 signaling msg rcvd 0 IPv6 signaling msg sent 0
IPv6 pdus received 0 IPv6 pdus sent 0
IPv6 bytes received 0 IPv6 bytes sent 0
Total Update requests sent 2 Total Update responses rcvd 1

```

router#

Table 21 describes the fields shown in the display.

**Table 21** *show gprs gtp path statistics remote-address Command Field Descriptions*

Field	Description
Creates collide with delete	Number of create PDP context requests that collided with a delete PDP context request.
Creates received as update	Number of create PDP context requests received as an update PDP context request.
IPv6 bytes received	Number of IPv6 bytes received.
IPv6 bytes sent	Number of IPv6 bytes sent.

**Table 21** *show gprs gtp path statistics remote-address Command Field Descriptions*

IPv6 PDP activation rejected	Number of activate IPv6 PDP context request rejected.
IPv6 PDPs created	Number of IPv6 PDP contexts created.
IPv6 PDPs deleted	Number of IPv6 PDP contexts deleted.
IPv6 pdus received	Number of IPv6 PDUs received.
IPv6 pdus sent	Number of IPv6 PDUs sent.
IPv6 signaling msg rcvd	Number of IPv6 signaling messages received.
IPv6 signaling msg sent	Number of IPv6 signaling messages sent.
Local delete due to no sgsn	Number of PDPs deleted locally because of no SGSN.
Local delete: version fallback	Number of PDPs deleted because of a version fallback.
Local delete: version upgrade	Number of PDPs deleted because of a version upgrade.
Local delete: no req to sgsn	Number of PDPs deleted when the GGSN is configured to delete PDP contexts locally without sending a delete PDP context request to the SGSN.
Local delete: no wait sgsn	Number of PDPs deleted when the GGSN is configured to not wait for the SGSN to respond to its delete PDP context request before deleting the PDP context.
Non-roaming PDPs	Number of non-roaming PDPs.
Number of times DT enabled	Number of direct tunnel PDP contexts created.
Number of PDPs created	Number of IPv4 PDP contexts created.
Number of PDPs deleted	Number of IPv4 PDP contexts deleted.
Number of PPP PDPs created	Number of PPP PDP contexts created.
Number of PPP PDPs deleted	Number of PPP PDP contexts deleted.
Number of short messages	Number of GTP messages received which are too short.
Number of unknown messages	Number of unknown GTP messages received.
Path failures	Number of path failures.
Path fail due to local delete	Number of path failure due to a local delete PDP context request.
Received PDU bytes	Number of IPv4 PDU bytes transmitted.
Received PDU message	Number of IPv4 PDU messages received.
Retransmit for create	Number of retransmitted create PDP context requests received.
Roaming non-trusted PDPs	Number of roaming PDPs not in a trusted PLMN.
Roaming trusted PDPs	Number of roaming PDPs in a trusted PLMN.
Sent PDU bytes	Number of IPv4 PDU bytes transmitted.
Sent PDU message	Number of IPv4 PDU messages transmitted.
Signaling messages dropped	Number of GTP signaling message dropped.
Signaling msg received	Number of signaling messages received.
Signaling msg sent	Number of signaling messages sent.
Single PDP cleared	Number of hanging single PDP contexts cleared on the GGSN.
Source Violations	Number of PDPs terminated due to a access violation.

**Table 21** *show gprs gtp path statistics remote-address Command Field Descriptions*

Total Data dropped	Total data dropped.
Total packets dropped	Total number of packets dropped.
Total Update requests sent	Total number of GGSN-initiated Update PDP Context Requests sent.
Total Update responses rcvd	Total number responses to GGSN-initiated Update PDP Context Requests.
Unexpected Data Message	Number of GTP PDUs received for nonexistent PDP contexts.
Unexpected signaling message	Number of unexpected GTP signaling messages received.
Unsupported extension hdr recd	Number of create PDP context requests received with unsupported extension headers when GGSN comprehension is required.
Version changes	Number of GTP version changes that have occurred on the SGSN path.

**Related Commands**

<b>Command</b>	<b>Description</b>
gprs gtp path history	Configures the maximum number of path entries for which the GGSN stores statistics after the path is deleted.
<b>show gprs gtp path statistics history</b>	Displays summary of the counters for past GTP path entries stored in history.

# show gprs gtp path throughput

To display throughput information for one or more GTP paths between a gateway GPRS support node (GGSN) and other GPRS/UMTS devices, use the **show gprs gtp path throughput** command in privileged EXEC mode.

```
show gprs gtp path throughput {all | remote-address ip-address [remote-port remote-port] |
version gtp-version}
```

Syntax Description		
<b>all</b>		Displays information for all GTP paths.
<b>remote-address</b> <i>ip-address</i>		Displays GTP path throughput information for a specified remote IP address. Optionally, displays GTP path throughput information for a specified remote IP address and port number.
<b>remote-port</b> <i>remote_port_num</i>	(Optional)	Displays GTP path throughput information for a specified remote IP address and port number.
<b>version</b> <i>gtp-version</i>		Displays the throughput of GTP paths by the GTP version (0 or 1).

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs gtp path throughput** command to display throughput information for one or more GTP paths from the GGSN.

**Examples****Example 1**

The following example shows the output for all GTP paths on the GGSN:

```
GGSN# show gprs gtp path throughput all
Total number of path:1

Local address          Remote address          GTP version    Dynamic echo
timer
33.33.33.1(3386)      11.0.0.1(3386)         0              Disabled

Collection interval - 5 min, Last collected at - 3 min back
  upstream data volume in octets:    480
  downstream data volume in octets:   0
  upstream packet count:              4
  downstream packet count:           0

Collection interval - 10 min, Last collected at - 8 min back
  upstream data volume in octets:     120
  downstream data volume in octets:   0
  upstream packet count:              1
  downstream packet count:           0
```

Table 17 describes the fields shown in the display.

**Table 22** *show gprs gtp path throughput Field Descriptions*

Field	Description
Total number of path	Total number of GTP paths currently established.
Local address	IP address and port number for the local end of the GTP path.
Remote address	IP address and port number for the remote end of the GTP path, such as the address of the SGSN.
GTP version	Version of the GTP protocol (version 0 or 1) supported by the path.
Dynamic echo timer	Current setting (in seconds) for the dynamic echo timer. "Disabled" appears when the dynamic echo timer is not in use.

## show gprs gtp pdp-context

To display a list of the currently active PDP contexts (mobile sessions), use the **show gprs gtp pdp-context** command in privileged EXEC mode.

```
show gprs gtp pdp-context {tid tunnel_id [service [all | id id_string]] | ms-address ip_address
[access-point access-point-index] | imsi imsi [nsapi nsapi [tft]] | path ip_address
[remote-port-num] | access-point access-point-index | pdp-type {ip | ppp} | qos-umts-class
{background | conversational | interactive | streaming} | qos-precedence {low | normal |
high} | qos-delay {class1 | class2 | class3 | classbesteffort} | version gtp-version} |
msisdn [msisdn] | all}
```

### Syntax Description

<b>tid</b> <i>tunnel_id</i> [service [all   id <i>id_string</i> ]]	Displays PDP contexts by tunnel ID. This value corresponds to the IMSI plus NSAPI and can be up to 16 numeric digits. Optionally, displays the service category in a PDP context.
<b>ms-address</b> <i>ip_address</i>	Displays PDP contexts for the specified mobile station IP address (in dotted-decimal format).
<b>apn-index</b> <i>access-point-index</i>	(Optional) Displays PDP contexts for the specified mobile station IP address at a particular access point. This option is required to display mobile stations that are accessing a private VPN.
<b>imsi</b> <i>imsi</i>	Displays PDP contexts by International Mobile Subscriber Identity (IMSI). The IMSI value can be up to 15 numeric digits.
<b>nsapi</b> <i>nsapi</i> [tft]	(Optional) Displays a particular PDP context by Network Service Access Point Identifier (NSAPI) for the specified IMSI. Optionally, displays the traffic flow template (TFT) filters associated with the NSAPI.
<b>path</b> <i>ip_address</i> [remote_port_num]	Displays PDP contexts by path. Optionally, displays PDP contexts by remote IP address and port number.
<b>access-point</b> <i>access-point-index</i>	Displays PDP contexts by access point. Possible values are 1 to 65535.
<b>pdp-type</b> {ip   ppp}	Displays PDP contexts that are transmitted using either IP or PPP.
<b>qos-umts-class</b>	Displays PDPs by UMTS QoS traffic class. You can specify the following traffic classes: <b>background</b> , <b>conversational</b> , <b>interactive</b> , and <b>streaming</b> . This option is available when UMTS QoS is enabled.
<b>qos-precedence</b>	Displays PDP contexts for a specified GPRS QoS precedence type. You can specify the following precedence types: <b>low</b> , <b>normal</b> , and <b>high</b> . This option is available when GPRS QoS canonical QoS is enabled.
<b>qos-delay</b>	Displays PDP contexts for a specified GPRS quality of service delay class type. You can specify the following delay class types: <b>class1</b> , <b>class2</b> , <b>class3</b> , and <b>classbesteffort</b> . This option is available when GPRS QoS delayed-based QoS is enabled.
<b>version</b> <i>gtp-version</i>	Displays PDP contexts by GTP version. The possible values are 0 or 1.
<b>msisdn</b> [ <i>msisdn</i> ]	Displays all PDP contexts with MSISDN information. Optionally, displays particular PDPs filtered by the longest prefix match of the specified MSISDN.
<b>all</b>	Displays all PDP contexts.



**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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(1)	The MS International PSTN/ISDN Number (MSISDN) field was added to the output display.
	12.2(4)MX	<p>This command was integrated into Cisco IOS Release 12.2(4)MX.</p> <ul style="list-style-type: none"> <li>• The <b>pdp-type ppp</b> and <b>qos-delay</b> options were added to the command.</li> <li>• The following fields were added to the output display of the <b>tid</b> version of this command: <ul style="list-style-type: none"> <li>– cef_down_byte</li> <li>– cef_down_pkt</li> <li>– cef_drop</li> <li>– cef_up_byte</li> <li>– cef_up_pkt</li> <li>– gtp pdp idle time</li> </ul> </li> <li>• The Network Init Information section was added to the output display of the <b>tid</b> version of this command with the following new fields: <ul style="list-style-type: none"> <li>– Buf.Bytes</li> <li>– MNRG Flag</li> <li>– NIP State</li> <li>– PDU Discard Flag</li> <li>– SGSN Addr</li> </ul> </li> <li>• The following fields were removed from the output display of the <b>tid</b> version of this command: <ul style="list-style-type: none"> <li>– fast_up_pkt</li> <li>– fast_up_byte</li> <li>– fast_down_pkt</li> <li>– fast_down_byte</li> <li>– fast_drop</li> </ul> </li> <li>• The “dynamic?” and “Dynamic” fields were removed from the output display of the <b>all</b> and <b>tid</b> versions of this command, and were replaced by the Source field.</li> </ul>

Release	Modification
12.2(8)YD	<p>This command was integrated into Cisco IOS Release 12.2(8)YD and the following fields were added to the output display of the <b>tid</b> version of this command:</p> <ul style="list-style-type: none"> <li>• primary dns</li> <li>• secondary dns</li> <li>• primary nbns</li> <li>• secondary nbns</li> </ul>
12.2(8)YW	<p>This command was integrated into the 12.2(8)YW.</p> <ul style="list-style-type: none"> <li>• The the option of displaying PDP contexts by remote IP address and port number was added.</li> <li>• The delay Qos class(req.) output field was added to the display of the <b>tid</b> version of this command when the mapping of GPRS QoS categories to delay QoS classes is enabled.</li> <li>• The <b>ms-address</b>, <b>imsi</b>, <b>qos-umts-class</b> and <b>version</b> options were added to the command.</li> <li>• The ggsn_addr_signal field was changed to the sgsn_addr_data in the output display of the <b>tid</b> version of this command.</li> <li>• The following fields were added to the output display of the <b>tid</b> version of this command: <ul style="list-style-type: none"> <li>- control teid local</li> <li>- control teid remote</li> <li>- data teid local</li> <li>- data teid remote</li> <li>- primary pdp</li> <li>- nsapi</li> </ul> </li> </ul>
12.3(2)XB	<p>This command was integrated into Cisco IOS Release 12.3(2)XB and the MS Addr field updated to reflect the virtual interface identifier for PPP PDP and PPP Regen contexts and the status of PPP PDP with L2TP contexts.</p>

Release	Modification
12.3(8)XU	<p>This command was integrated into Cisco IOS Release 12.3(8)XU.</p> <ul style="list-style-type: none"> <li>• The following fields were added to the output display of the <b>tid</b> version of this command: <ul style="list-style-type: none"> <li>- charging characteristics</li> <li>- charging characteristics received</li> <li>- Framed_route</li> <li>- idle timeout</li> <li>- mask</li> <li>- roamer</li> <li>- session timeout</li> <li>- visitor</li> </ul> </li> <li>• The gtp pdp idle time field were removed from the output display of the <b>tid</b> version of this command.</li> <li>• An overflow indicator (+) was added to the following fields of the output display of the <b>tid</b> version of this command: <ul style="list-style-type: none"> <li>- cef_down_pkt</li> <li>- cef_up_pkt</li> <li>- rcv_pkt_count</li> <li>- send_pkt_count</li> </ul> </li> </ul>
12.3(8)XU2	<p>This command was integrated into Cisco IOS Release 12.3(8)XU2 and the single pdp-session field was added to the output display of the <b>tid</b> version of this command.</p>
12.3(11)YJ	<p>This command was integrated into Cisco IOS Release 12.3(11)YJ.</p>

Release	Modification
12.3(14)YQ	<p>This command was integrated into the Cisco IOS Release 12.3(14)YQ.</p> <ul style="list-style-type: none"> <li>• The option of display the service category in a PDP context was added.</li> <li>• The following fields were added to the <b>tid</b> version of this command when the <b>service</b> keyword option is specified: <ul style="list-style-type: none"> <li>- Diameter Credit Control</li> <li>- Current Billing Status</li> <li>- Reason to convert to postpaid</li> <li>- DCCA profile name and Source</li> <li>- Rule base id and Source</li> <li>- ServiceID</li> <li>- State</li> <li>- Quota(octets)</li> <li>- Time</li> <li>- flags</li> <li>- Last pushed quota <ul style="list-style-type: none"> <li>- Tariff Time Change</li> <li>- Time Quota</li> <li>- Volume Quota</li> <li>- Validity Time</li> <li>- Quota ConsumptionTime</li> <li>- Quota Holding time</li> <li>- Time Quota Threshold</li> <li>- Volume Quota Threshold</li> <li>- Trigger Flags</li> </ul> </li> <li>- Last received quota <ul style="list-style-type: none"> <li>- Tariff_time_change</li> <li>- Time_quota</li> <li>- Volume_quota</li> <li>- Validity_time</li> <li>- Quota ConsumptionTime</li> <li>- Quota Holding_Time</li> <li>- Time Quota Threshold</li> <li>- Volume Quota Threshold</li> <li>- Trigger Flags</li> </ul> </li> </ul> </li> </ul>

Release	Modification
12.3(14)YU	This command was integrated into the Cisco IOS Release 12.3(14)YU and the <b>msisdn</b> [ <i>msisdn</i> ] keyword option was added.  Additionally, the QoS for charging field was removed from the <b>show gprs gtp pdp-context tid</b> command display and when a PDP is created via a virtual APN, the following field has been added to the <b>show gprs gtp pdp-context tid</b> command display: <ul style="list-style-type: none"> <li>virtual-apn: <i>virtual-apn-name</i></li> </ul>
12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB.

### Usage Guidelines

Use the **show gprs gtp pdp-context** command to display the currently active PDP contexts on the GGSN. You can display PDP contexts by tunnel ID, by IMSI, by access point, by PDP type, and by GPRS QoS precedence, UMTS QoS traffic class, or you can display all PDP contexts.

Several versions of the **show gprs gtp pdp-context** command display similar output. The examples provided show these two different types of output.

#### Interpreting the Effective Bandwidth

Example 2 provides sample output from the **show gprs gtp pdp-context tid** command, which includes the field called effective bandwidth (in bps). The effective bandwidth is determined according to the GPRS QoS canonical QoS class (premium, normal, or best effort) for the PDP context; it does not represent the actual bandwidth in use by the PDP context. The potential number of supported PDP contexts for that class of QoS can then be calculated according to the total amount of bandwidth (GSN resource) available to the GGSN.

For more information about GPRS QoS canonical QoS and resources on the GGSN, see the “Configuring QoS on the GGSN” chapter in the *Cisco IOS Mobile Wireless Configuration Guide*.

### Examples

#### Example 1

The following is sample output of the **show gprs gtp pdp-context all** command:

```
router# show gprs gtp pdp-context all
TID           MS Addr      Source  SGSN Addr      APN
1234567890123456 10.11.1.1    Radius  10.4.4.11     www.pdn1.com
2345678901234567 Forwarded (Vi5) IPCP    10.4.4.11     www.pdn2.com
3456789012345678 10.21.1.1   (Vi7) IPCP    10.1.4.11     www.pdn3.com
4567890123456789 10.31.1.1   (Vi9) IPCP    10.1.4.11     www.pdn4.com
5678901234567890 10.41.1.1    Static  10.4.4.11     www.pdn5.com
```



#### Note

The same output fields shown in Example 1 also appear when you use the **access-point**, **path**, **pdp-type**, **qos-delay**, or **qos-precedence** keyword options of the **show gprs gtp pdp-context** command.

Table 18 describes the fields shown in the display.

**Table 23** *show gprs gtp pdp-context all Field Descriptions*

Field	Description
APN	Access point name where the PDP context is active.
MS Addr	IP address of the mobile station.  <b>Note</b> For PPP PDP and PPP Regen contexts, this field will also display the virtual interface identifier. For PPP PDP with L2TP contexts, this field will also display the state of the PDP context. Possible states are Pending, Forwarded, or Terminating.
SGSN Addr	IP address of the SGSN that is processing the packets.
Source	Source of IP addressing for the MS. The possible values are: <ul style="list-style-type: none"> <li>• DHCP—Dynamic address allocation using DHCP.</li> <li>• IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol.</li> <li>• Local—Dynamic address allocation using a local pool.</li> <li>• Pending—Waiting for dynamic address allocation. Dynamic address source is unknown.</li> <li>• Radius—Dynamic address allocation using RADIUS.</li> <li>• Static—IP address is not dynamically assigned.</li> </ul>
TID	Tunnel ID for the PDP context.

**Example 2**

The following is sample output from the **show gprs gtp pdp-context tid** command for a PDP context created by GTP version 1 and GPRS QoS canonical QoS is configured:

```

router#show gprs gtp pdp-context tid 1111111111111111
TID           MS Addr      Source  SGSN Addr      APN
1111111111111111 10.1.1.1    Radius  10.8.8.1      dns.com

current time :Mar 18 2002 11:24:36
user_name (IMSI):1111111111111111 MS address:10.1.1.1
MS International PSTN/ISDN Number (MSISDN):ABC
sgsn_addr_signal:10.8.8.1          sgsn_addr_data:10.8.0.1
control teid local: 0x63493E0C
control teid remove: 0x00000121
data teid local: 0x63483E10
data teid remote: 0x00000121
primary pdp: Y      nsapi: 0
signal_sequence: 0          seq_tpdu_up: 0
seq_tpdu_down: 0
upstream_signal_flow: 1    upstream_data_flow: 2
downstream_signal_flow:14  downstream_data_flow:12
    
```

```

RAupdate_flow:          0
pdp_create_time: Mar 18 2002 09:58:39
last_access_time: Mar 18 2002 09:58:39
mnrngflag:             0          tos mask map:00
session timeout: 0
idle timeout: 0
gprs qos_req:091101          canonical Qos class(req.):01
gprs qos_neg:25131F          canonical Qos class(neg.):01
effective bandwidth:0.0
rcv_pkt_count:          0          rcv_byte_count: 0
send_pkt_count:         0          send_byte_count: 0
cef_up_pkt:             0          cef_up_byte: 0
cef_down_pkt:           0          cef_down_byte: 0
cef_drop:               0          out-sequence pkt: 0
Src addr violation:          2 paks,    1024 bytes
Dest addr violation:        2 paks,    1024 bytes
Redirected mobile-to-mobile traffic: 2 paks,    1024 bytes
charging_id:             29160231
visitor: No            roamer: No
charging characteristics: 0
charging characteristics received: 0
pdp reference count:2
primary dns:             2.2.2.2
secondary dns:           4.4.4.4
primary nbns:            3.3.3.3
secondary nbns:          5.5.5.5
ntwk_init_pdp:          0
Framed_route 5.5.5.0 mask 255.255.255.0
single pdp-session: Enabled
absolute session start time: NOT SET
virtual apn: pre-auth-virtual

** Network Init Information **
MNRG Flag: 0          PDU Discard Flag: 0
SGSN Addr: 172.16.44.1    NIP State:          NIP_STATE_WAIT_PDP_ACTIVATION
Buf.Bytes: 500

```

Table 19 describes the fields shown in the display.



**Note** The Network Init Information section of the output appears only while network-initiated PDP contexts are being processed by the GGSN.



**Note** The same output fields shown in Example 2 also appear when you use the **imsi** keyword option of the **show gprs gtp pdp-context** command.



**Note** If the PDP context is created via a virtual APN, the “virtual-apn: *virtual-apn name*” field displays.

Table 19 describes the fields shown in the display.

**Table 24** *show gprs gtp pdp-context tid Field Descriptions*

Field	Description
APN	Access point name where the PDP context is active.
canonical Qos class (neg.)	Negotiated canonical quality of service class for the PDP context, with the following values: <ul style="list-style-type: none"> <li>• 01—Best effort</li> <li>• 02—Normal</li> <li>• 03—Premium</li> </ul> This field displays when GPRS QoS canonical QoS is enabled on the GGSN.
canonical Qos class (req.)	Requested GPRS canonical QoS class by the PDP context, with the following values: <ul style="list-style-type: none"> <li>• 01—Best effort</li> <li>• 02—Normal</li> <li>• 03—Premium</li> </ul> This field displays when GPRS QoS canonical QoS is enabled on the GGSN.
cef_down_byte	Total number of G-PDU bytes CEF switched on the downlink, from the GGSN to the SGSN.
cef_down_pkt	Total number of G-PDU packets CEF switched on the downlink, from the GGSN to the SGSN. The plus (+) sign is an overflow indicator.
cef_drop	Total number of G-PDU packets dropped during CEF switching.
cef_up_byte	Total number of G-PDU bytes CEF switched on the uplink, from the SGSN to the GGSN.
cef_up_pkt	Total number of G-PDU packets CEF switched on the uplink, from the SGSN to the GGSN. The plus (+) sign is an overflow indicator.
charging characteristics	Number of the charging profile selected for the PDP context.
charging characteristics received	Charging characteristics IE received from the SGSN. <p>The value of the charging characteristics received field is the decimal value of the two octets, with the first octet being the more significant byte than the second.</p> <p>The profile index, which is used to select the charging profile, is the integer obtained by dividing the charging characteristics received value by 256.</p>
charging_id	Unique 4-octet value generated by the GGSN for the PDP context. The value 0 is reserved.
control teid local	Uplink tunnel endpoint identifier (TEID) chosen by the GGSN for control plane messages. <p>This field displays for PDP contexts created with GTP version 1.</p>



**Table 24** *show gprs gtp pdp-context tid Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
control teid remote	Downlink TEID chosen by the SGSN for control plane messages. This field displays for PDP contexts created with GTP version 1.
current time	Date and time of the show command output.
data teid local	Uplink TEID chosen by the GGSN for G-PDUs. This field displays for PDP contexts created with GTP version 1.
data teid remote	Downlink TEID chosen by the SGSN for PDUs. This field displays for PDP contexts created with GTP version 1.
Dest addr violation	Number of packets (and bytes) dropped by the GGSN because of a source address violation.  This field displays only when the <b>security verify destination</b> command is configured.  <b>Note</b> This field does not apply to APNs using VRF. In addition, verification of destination addresses does not apply to GTP-PPP regeneration or GTP-PPP with L2TP.
downstream_data_flow	Flow label of downlink G-PDUs.
downstream_signal_flow	Flow label of downlink signaling messages.
effective bandwidth	Estimated number of bits per second allocated by the GGSN for this PDP context. The effective bandwidth is determined according to the QoS class (premium, normal, or best effort) for the PDP context. The potential number of supported PDP contexts for that class of QoS can be calculated according to the total amount of bandwidth (GSN resource) available to the GGSN.  This field displays when canonical QoS is enabled on the GGSN.  <b>Note</b> The effective bandwidth does not represent actual bandwidth usage.
Framed_route	Framed-Route, attribute 22, for the PDP context, downloaded from the RADIUS server during authentication and authorization.

**Table 24** show gprs gtp pdp-context tid Field Descriptions (continued)

Field	Description
gprs qos_neg	<p>Negotiated quality of service for the PDP context. The field is in the format vwxyz, which represents the following QoS classes (as defined in the GSM specifications for quality of service profiles):</p> <ul style="list-style-type: none"> <li>v—Delay class</li> <li>w—Reliability class</li> <li>x—Peak throughput class</li> <li>y—Precedence class</li> <li>zz—Mean throughput class</li> </ul> <p><b>Note</b> To determine the GPRS QoS attributes shown in this output, you must convert the value to binary and interpret the values to find the corresponding class attributes. Some of the bits represent “don’t care” bits and are not interpreted as part of the final value. For more information about how to interpret this value, see the “Interpreting the Requested and Negotiated GPRS QoS” section of the “Configuring QoS” chapter in the <i>Cisco IOS Mobile Wireless Configuration Guide</i>.</p>
gprs qos_req	<p>Requested quality of service by the PDP context. The field is in the format vwxyz, which represents the following QoS classes (as defined in the GSM specifications for GPRS QoS profiles):</p> <ul style="list-style-type: none"> <li>v—Delay class</li> <li>w—Reliability class</li> <li>x—Peak throughput class</li> <li>y—Precedence class</li> <li>zz—Mean throughput class</li> </ul> <p><b>Note</b> See the Note in the description of the gprs qos_neg output field above.</p>
idle timeout	<p>Number of seconds the GGSN waits before purging idle PDP contexts.</p>
last_access_time	<p>Time when the PDP context for this TID was last accessed. The date format is MMM DD YYYY. The time format is hours:minutes:seconds.</p> <p>When a signaling packet or data packet for a PDP context arrives on the GGSN, the last_access_time is reset to the current date and time. If the last_access_time exceeds the purge timer for idle PDP contexts, then the PDP context is purged by the GGSN.</p>
mask	<p>Framed-Route subnet.</p>
mnrflag	<p>Mobile not reachable flag, with the following values:</p> <ul style="list-style-type: none"> <li>0—flag is off.</li> <li>1—flag is on, indicating that the MS is not reachable</li> </ul>

**Table 24** *show gprs gtp pdp-context tid Field Descriptions (continued)*

Field	Description
MS_ADDR and MS Address	IP address of the mobile station.  <b>Note</b> For PPP PDP and PPP Regen contexts, this field will also display the virtual interface identifier. For PPP PDP with L2TP contexts, this field will also display the state of the PDP context. Possible states are Pending, Forwarded, or Terminating.
MS International PSTN/ISDN Number (MSISDN)	Integrated Services Digital Network (ISDN) number of the mobile station.
nsapi	Network Service Access Point Identifier (NSAPI).  This field displays for PDP contexts created with GTP version 1.
ntwk_init_pdp	Network initiated PDP context indicator, with the following values: <ul style="list-style-type: none"> <li>• 0—Not a network initiated PDP context. This indicates a mobile initiated PDP context.</li> <li>• 1—Network initiated PDP context</li> </ul>
out-sequence pkt	
pdp_create_time	Time when the PDP context for this TID was created. The date format is MMM DD YYYY. The time format is hours:minutes:seconds.
pdp reference count	Number of subsystems on the GGSN that are aware of the PDP context. For example, if both the charging and GTP subsystems are aware of the PDP context, then the pdp reference counter shows a value of 2.
primary dns	IP address of the primary DNS server.
primary nbns	IP address of the primary NetBIOS Name Service (NBNS).
primary pdp	Whether the PDP is primary or secondary. Possible values are Y (PDP is primary) or N (PDP is secondary).  This field displays for PDP contexts created with GTP version 1.
RAupdate_flow	Flow Label Data II information element in GTP header. This IE contains the flow label for data transmission between old and new SGSNs for a particular PDP context. This IE is requested by the new SGSN.
rcv_byte_count	Total number of G-PDU bytes received. For the GGSN, this is the total byte count on the uplink.
rcv_pkt_count	Total packet count of received G-PDUs. For the GGSN, this is the total byte count on the uplink. The plus (+) sign is an overflow indicator.
Redirected mobile-to-mobile traffic	Number of packets (and bytes) dropped at the APN from which they exit because mobile-to-mobile traffic has been redirected. This field displays only when the <b>redirect intermobile ip</b> command is configured.

**Table 24** show gprs gtp pdp-context tid Field Descriptions (continued)

Field	Description
roamer	Whether the PDP context is that of a roaming mobile subscriber (subscriber whose SGSN PLMN ID differs from the GGSN's). The possible values are yes or no.
secondary dns	IP address of the secondary DNS server.
secondary nbns	IP address of the secondary NBNS.
send_byte_count	Total number of G-PDU bytes sent by the GSN (GGSN or SGSN D-node).
send_pkt_count	Total number of G-PDU packets sent by the GSN (GGSN or SGSN D-node). The plus (+) sign is an overflow indicator.
seq_tpdu_down	Last sequence number used in the downlink T-PDU. This number wraps to 0 after 65535.
seq_tpdu_up	Last sequence number used in the uplink T-PDU. This number wraps to 0 after 65535.
session timeout	Number of seconds that the GGSN allows a session to remain active before purging all PDP contexts with the same IMSI or MS address.
sgsn_addr_signal	IP address of the SGSN that is processing the packets.
sgsn_addr_data	IP address of the SGSN that is processing tunnel packet data units (TPDUs).
signal_sequence	Last sequence number used in the GTP signaling message.
single PDP-session	Whether the GGSN has been configured to delete the primary PDP context, and any associated secondary PDP contexts, of a <i>hanging</i> PDP session upon receiving a new create request from the same MS that shares the same IP address of the hanging PDP context.
Source	Source of IP addressing for the MS. The possible values are: <ul style="list-style-type: none"> <li>• DHCP—Dynamic address allocation using DHCP.</li> <li>• IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol.</li> <li>• Local—Dynamic address allocation using a local pool.</li> <li>• Pending—Waiting for dynamic address allocation. Dynamic address source is unknown.</li> <li>• Radius—Dynamic address allocation using RADIUS.</li> <li>• Static—IP address is not dynamically assigned.</li> </ul>
Src addr violation	Number of packets (and bytes) dropped because of source address violation. This field displays only when the <b>security verify source</b> command is configured.
TID	Tunnel ID for the PDP context.
tos mask map	ToS value in IP header of this PDP context.
umts qos_req	Requested UMTS quality of service by the PDP context. This field displays when UMTS QoS is enabled on the GGSN.

**Table 24** *show gprs gtp pdp-context tid Field Descriptions (continued)*

Field	Description
umts qos_neg	Negotiated UMTS quality of service for the PDP context. This field displays when UMTS QoS is enabled on the GGSN.
upstream_data_flow	Flow label of uplink G-PDUs.
upstream_signal_flow	Flow label of uplink signaling messages.
user_name (IMSI)	International mobile subscriber identity for the PDP context.
virtual APN	Virtual access point name where the PDP context is active.
visitor	Whether the PDP context is that of a visiting mobile subscriber (subscriber whose IMSI contains a foreign PLMN ID.). The possible values are yes or no.

Table 20 describes the fields shown in the Network Init Information section of the output.

**Table 25** *show gprs gtp pdp-context tid Network Init Information Field Descriptions*

Field	Description
Buf.Bytes	Number of bytes currently buffered for this network-initiated PDP context.
last_access_time	Time when the PDP context for this TID was last accessed. The date format is MMM DD YYYY. The time format is hours:minutes:seconds.  When a signaling packet or data packet for a PDP context arrives on the GGSN, the last_access_time is reset to the current date and time. If the last_access_time exceeds the purge timer for idle PDP contexts, then the PDP context is purged by the GGSN.
MNRG Flag	Mobile not reachable flag, with the following values: <ul style="list-style-type: none"> <li>• 0—flag is off.</li> <li>• 1—flag is on, indicating that the MS is not reachable</li> </ul>
NIP State	State information for the network initiated PDP process on the GGSN.

**Table 25** *show gprs gtp pdp-context tid Network Init Information Field Descriptions*

Field	Description
PDU Discard Flag	<p>Discarded PDU indicator for a network initiated PDP context, with the following values:</p> <ul style="list-style-type: none"> <li>0—PDUs are not discarded. This indicates that PDUs for a network initiated PDP context are being sent to the SGSN.</li> <li>1—PDUs are being discarded by the GGSN. PDUs are discarded by the GGSN when a network initiated PDP context procedure is unsuccessful. This occurs when the SGSN sends a rejection of the PDP context request to the GGSN with a Cause value of either “MS Refuses” or “MS is not GPRS Responding.”</li> </ul> <p>When the flag is set to 1, the GGSN ignores PDUs destined for that MS for the specified PDU discard period. The default period is 300 seconds (5 minutes). You can configure the PDU discard time using the <b>gprs ntwk-init-pdp pdu-discard-period</b> command.</p>
SGSN Addr	IP address of the SGSN that is associated with the network-initiated procedure for this PDP context (used for paging).

**Example 3**

The following is sample output from the **show gprs gtp pdp-context tid service id** command:

```

ggsn1#show gprs gtp pdp tid 1111000000000050 service id 1
Diameter Credit Control:Enabled
Current Billing status:Prepaid
Reason to convert to postpaid:N/A
DCCA profile name:1, Source:charging profile
Rule base id:ABC, Source:AAA server
ServiceID State Quota(octets) Time flags
1 AUTHORIZED 80000 6000 SGSN:

Last pushed quota
-----
Tariff Time Change: 1110585600 Time Quota: 6000
Volume Quota: 80000 Validity Time: 500
Quota ConsumptionTime: 45 Quota Holding time: 35
Time Quota Threshold: 4000 Volume Quota Threshold:50000
Trigger Flags: 1

Last received quota
-----
Tariff_time_change: 1110585600 Time_quota: 6000
Volume quota: 80000 Validity_time: 500
Quota ConsumptionTime: 45 Quota Holding_Time: 35
Time Quota Threshold: 4000 Volume Quota Threshold:50000
Trigger Flags: 1

```

**Example 4**

The following is sample output from the **show gprs gtp pdp-context msisdn** command:

```
ggsn1#show gprs gtp pdp-context msisdn
```

TID	MS Addr	Source	SGSN Addr	MSISDN	APN
2123456708000010	55.10.0.2	LOCAL	10.1.1.70	408525823010	ippdpl
2123456809000010	55.10.0.3	LOCAL	10.1.1.70	408525823011	ippdpl
2123456707000010	55.10.0.4	LOCAL	10.1.1.70	408525823110	ippdpl
2123456789990010	55.10.0.5	LOCAL	10.1.1.70	408525823210	ippdpl

**Note**

All PDP contexts are displayed

The following is sample output from the **show gprs gtp pdp-context msisdn** command with an msisdn specified:

```
ggsn1#show gprs gtp pdp-context msisdn 4085258230
```

TID	MS Addr	Source	SGSN Addr	MSISDN	APN
2123456708000010	55.10.0.2	LOCAL	10.1.1.70	408525823010	ippdpl
2123456809000010	55.10.0.3	LOCAL	10.1.1.70	408525823011	ippdpl

**Note**

All PDP contexts whose MSISDN matches the prefix 4085258230 are displayed

[Table 21](#) describes the fields shown in the display.

**Table 26** *show gprs gtp pdp-context msisdn Field Descriptions*

Field	Description
TID	Tunnel ID for the PDP context request on the APN.
MS Addr	The IP address for the MS.
Source	Source of IP addressing for the MS. The possible values are: <ul style="list-style-type: none"> <li>DHCP—Dynamic address allocation using DHCP.</li> <li>IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol.</li> <li>Local—Dynamic address allocation using a local pool.</li> <li>Pending—Waiting for dynamic address allocation. Dynamic address source is unknown.</li> <li>Radius—Dynamic address allocation using RADIUS.</li> <li>Static—IP address is not dynamically assigned.</li> </ul>
SGSN Addr	IP address of the SGSN that is processing the packets.
MSISDN	Integrated Services Digital Network (ISDN) number of the mobile station.
APN	Access point name.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show gprs access-point</b>	Displays information about access points on the GGSN.
<b>show gprs gtp status</b>	Displays information about the current status of the GTP on the GGSN (such as activated PDP contexts, throughput, and QoS statistics).



# show gprs gtp statistics

To display the current GPRS tunneling protocol (GTP) statistics for the gateway GPRS support node (GGSN) (such as IE, GTP signaling, and GTP PDU statistics), use the **show gprs gtp statistics** command in privileged EXEC mode.

## show gprs gtp statistics

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.1(1)GA	This command was introduced.
	12.1(2)GB	This command was integrated into Cisco IOS Release 12.1(2)GB and the following fields were added to the output display: <ul style="list-style-type: none"> <li>total created_pdp</li> <li>total deleted_pdp</li> </ul>
	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, and the following fields were added to the output display: <ul style="list-style-type: none"> <li>ntwk_init_pdp_act_rej</li> <li>ppp_regen_pending</li> <li>ppp_regen_pending_peak</li> <li>ppp_regen_total_drop</li> <li>ppp_regen_no_resource</li> <li>total created_ppp_pdp</li> <li>total ntwkInit created pdp</li> </ul>
	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 the Cisco IOS Release 12.2(8)YW and the following fields were added to the output display: <ul style="list-style-type: none"> <li>tft_semantic_error</li> <li>tft_syntactic_error</li> <li>packet_filter_semantic_error</li> <li>packet_filter_syntactic_error</li> <li>total deleted_ppp_pdp</li> </ul>
	12.3(2)XB	This command was integrated into Cisco IOS Release 12.3(2)XB.

Release	Modification
12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU and the following fields were added to the output display: <ul style="list-style-type: none"> <li>• insert_download_route_fail</li> <li>• network_behind_ms APNs</li> <li>• pdp_wo_tft_exist</li> <li>• save_download_route_fail</li> <li>• total_download_route</li> <li>• total_insert_download_route</li> <li>• unsupported_comp_exthdr</li> </ul>
12.3(8)XU2	This command was integrated into Cisco IOS Release 12.3(8)XU2 and the single pdp-session cleared output field 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 and the following fields were added to the output display: <ul style="list-style-type: none"> <li>• create_as_update</li> <li>• create_collide_with_delete</li> <li>• no_sgsn_local_del_pdp</li> <li>• path_fail_local_del_pdp</li> <li>• rcv_retransmit_create_req</li> <li>• version_changes</li> <li>• ver_upgrade_local_del</li> <li>• ver_faillback_local_del</li> </ul>
12.4(9)XG	This command was integrated into Cisco IOS Release 12.4(9)XG and the following IPv6-related fields were added to the display: <ul style="list-style-type: none"> <li>• created ipv6 pdp</li> <li>• created ipv6 pdpmcb</li> <li>• deleted ipv6 pdp</li> <li>• deleted ipv6 pdpmcb</li> <li>• rejected ipv6 pdp</li> <li>• rcvd ipv6 data bytes</li> <li>• rcvd ipv6 pdu</li> <li>• rcvd ipv6 signal msg</li> <li>• sent ipv6 data bytes</li> <li>• sent ipv6 pdu</li> <li>• sent ipv6 signal msg</li> </ul>

Release	Modification
12.4(9)XG2	This command was integrated into Cisco IOS Release 12.4(9)XG2 and the following fields were added to the display: <ul style="list-style-type: none"> <li>no_req_sgsn_local_del_pdp</li> <li>no_wait_sgsn_local_del_pdp</li> </ul>
12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ and the following fields were added to the display: <ul style="list-style-type: none"> <li>Number of times DT enabled</li> <li>total COA msg received</li> <li>total COA msgs discarded</li> <li>total COA triggered update</li> <li>total EI rcvd on DT PDPs</li> <li>total error indication sent</li> <li>total error indication rcvd</li> <li>total error indication rcvd DT PDPs</li> <li>total update responses rcv</li> <li>total update fail DT pdps</li> </ul>

### Usage Guidelines

Use the **show gprs gtp statistics** command to display the GTP statistics for the GGSN. The counter values displayed by this command represent totals accumulated since the last time the statistical counters were cleared using the **clear gprs gtp statistics** command.

### Examples

The following is sample output of the **show gprs gtp statistics** command:

```
router# show gprs gtp statistics
GPRS GTP Statistics:
  version_not_support          0      msg_too_short          0
  unknown_msg                  0      unexpected_sig_msg     0
  unexpected_data_msg          0      unsupported_comp_exthdr 0
  mandatory_ie_missing         0      mandatory_ie_incorrect 0
  optional_ie_invalid          0      ie_unknown             0
  ie_out_of_order              0      ie_unexpected          2
  ie_duplicated                0      optional_ie_incorrect  0
  pdp_activation_rejected      1      tft_semantic_error     0
  tft_syntactic_error          0      pkt_ftr_semantic_error 0
  pkt_ftr_syntactic_error      0      pdp_wo_tft_exist       0
  non_existent 1 path_failure  0
  total_dropped                0      signalling_msg_dropped 0
  data_msg_dropped 0 no_resource 0
  get_pak_buffer_failure       0      rcv_signalling_msg     11
  snd_signalling_msg           11     rcv_pdu_msg            53
  snd_pdu_msg                  79     rcv_pdu_bytes          865
  snd_pdu_bytes                3319   total_created_pdp      4
  total_deleted_pdp            3      total_created_ppp_pdp  3
  total_deleted_ppp_pdp        3      ppp_regen_pending     0
  ppp_regen_pending_peak       0      ppp_regen_total_drop  0
  ppp_regen_no_resource        0      ntwk_init_pdp_act_rej  0
  total ntwkInit created pdp   0      single_pdp-session cleared 0
```

```

total ntwkInit update pdp      2      total update responses rcv  2
total COA msg received         2      total COA msgs discarded    0
total COA triggered update     2      total err indications rcvd  0
total err indications sent     0      Number of times DT enabled  0
total EI rcvd on DT PDPs      0      total update fail DT pdps  0
created ipv6 pdp               0      rejected ipv6 pdp          0
deleted ipv6 pdp               0      created ipv6 pdpmcb        0
deleted ipv6 pdpmcb           0
rcvd ipv6 pdu                  0      sent ipv6 pdu               10
rcvd ipv6 data bytes           0      sent ipv6 data bytes       1000

GPRS Network behind mobile Statistics:
network_behind_ms APNs         1      total_download_route        0
save_download_route_fail      0      insert_download_route_fail   0
total_insert_download_route    0

Debug info:
path_fail_local_del_pdp       0      ver_upgrade_local_del       0
no_sgsn_local_del_pdp        0      ver_fallback_local_del      0
no_wait_sgsn_local_del_pdp   0      no_req_sgsn_local_del_pdp   0
create_collide_with_delete    0      version_changes              0
rcv_retransmit_create_req     0      create_as_update             0
router#

router#show gprs gtp statistics | in DT
total err indications sent     0      Number of times DT enabled  0
total EI rcvd on DT PDPs      0      total update fail DT pdps  0

```

Table 27 describes the fields shown in the display:

**Table 27** show gprs gtp statistics Field Descriptions

Field	Description
created ipv6 pdp	Number of IPv6 PDP contexts created since system startup.
created ipv6 pdpmcb	
data_msg_dropped	Number of GTP PDUs dropped.
Debug info: create_as_update	Number of create PDP context requests treated as update.
Debug info: create_collide_with_delete	Number of create PDP context requests that collided with delete PDP context requests.
Debug info: no_sgsn_local_del_pdp	Number of PDPs deletes because an SGSN could not be found.
Debug info: path_fail_local_del_pdp	Number of PDPs deletes because a path failure occurred.
Debug info: rcv_retransmit_create_req	Number of create PDP context requests for which retransmit requests were received.
Debug info: ver_faillback_local_del	Number of PDP deletes due to version fallback.
Debug info: ver_upgrade_local_del	Number of PDP deletes due to version upgrade
Debug info: verson_changes	Number of PDPs locally deleted due to change in version.
deleted ipv6 pdp	Number of IPv6 PDP contexts deleted since system startup.

**Table 27** *show gprs gtp statistics Field Descriptions (continued)*

Field	Description
deleted ipv6 pdpmcb	
get_pak_buffer_failure	Number of times the GGSN has failed to obtain a GTP packet.
ie_duplicated	Number of GTP messages received with a duplicated information element.
ie_out_of_order	Number of GTP messages received with an information element (IE) out of order.
ie_unexpected	Number of GTP messages received with an information element that not expected in the GTP message, but is defined in GTP. GTP messages with unexpected IEs are processed as if the IE was not present.
ie_unknown	Number of GTP messages received with an information element of an unknown type.
insert_download_route_fail	Number of routes downloaded from the RADIUS server that failed to be inserted into the routing table because they conflicted with others.
mandatory_ie_incorrect	Number of GTP messages received with an incorrect mandatory information element—for example, with an information element that has an incorrect length.
mandatory_ie_missing	Number of GTP messages received with a missing mandatory information element.
msg_too_short	Number of GTP messages received that are too short to hold the GTP header for the supported GTP version.
network_behind_ms APNs	Number of APNs configured to support routing behind the MS.
no_resource	Number of times a resource was not available for transmitting GTP messages. For example, the router may be out of memory.
no_req_sgsn_local_del_pdp	Number of PDPs contexts deleted locally without the GGSN sending a delete PDP context request to the SGSN. <sup>1</sup>
no_sgsn_local_del_pdp	Number of PDPs deleted locally because of no SGSN.
no_wait_sgsn_local_del_pdp	Number of PDPs contexts without waiting for a response from the SGSN. <sup>1</sup>
non-existent	Number of create/update PDP requests received on non-existing PDP contexts.
ntwk_init_pdp_act_rej	Number of rejected PDP context requests that were initiated by the network (PDN).
Number of times DT enabled	
optional_ie_incorrect	Number of GTP messages received with an optional IE that is incorrect, which prevents the GGSN from processing the GTP message correctly.
optional_ie_invalid	Number of GTP messages received with an information element that contains a value that is not within the defined range for that IE. GTP messages with invalid optional IEs are processed as if the IE was not present.

**Table 27** *show gprs gtp statistics Field Descriptions (continued)*

Field	Description
packet_filter_semantic_error	Number of GTP messages received with an IE element with packet filter semantic errors. A semantic error is when the defined format of the information element (IE) is valid but the content of the IE is inconsistent or invalid.
packet_filter_syntactic_error	Number of GTP messages received with an IE element with packet filter syntactic errors. A syntactic error is when the coding of the IE is invalid.
path_failure	Number of path failures on the GPRS Support Node (GSN).
pdp_activation_rejected	Number of times a request to activate a PDP context was rejected.
pdp_wo_tft_exist	Number of Create PDP Context requests received without traffic flow template information element.
ppp_regen_no_resource	Total number of rejected responses to create PDP context and delete PDP context requests due to unavailable resource on the GGSN for PPP regeneration.
ppp_regen_pending	Number of pending PPP regeneration sessions.
ppp_regen_pending_peak	Maximum number of pending PPP regeneration sessions since the statistic was cleared.
ppp_regen_total_drop	Total number of create PDP context and delete PDP context requests that were dropped due to the threshold limit being reached for maximum number of PPP regeneration sessions allowed on the GGSN.
rcvd_ipv6_data_bytes	Number of bytes received in IPv6 PDUs.
rcvd_ipv6_pdu	Number of IPv6 PDU messages received.
rcvd_ipv6_signal_msg	Number of IPv6 GTP signaling messages received.
rcv_pdu_bytes	Number of bytes received in PDUs.
rcv_pdu_msg	Number of PDU messages received.
rcv_signaling_msg	Number of GTP signaling messages received.
rejected_ipv6_pdp	Number of IPv6 PDP context rejected since system startup.
save_download_route_fail	Number of times a downloaded route could not be saved because there was not enough memory.
sent_ipv6_data_bytes	Number of IPv6 PDU bytes sent.
sent_ipv6_pdu	Number of IPv6 PDU messages sent.
sent_ipv6_signal_msg	Number of IPv6 GTP signaling messages sent.
signalling_msg_dropped	Number of GTP signaling messages dropped.
single_pdp-session_cleared	Number of hanging single PDP contexts cleared on the GGSN.
snd_pdu_bytes	Number of PDU bytes sent.
snd_pdu_msg	Number of PDU messages sent.
snd_signalling_msg	Number of GTP signaling messages sent.
tft_semantic_error	Number of GTP messages received with an IE element with traffic flow template (TFT) semantic errors. A semantic error is when the defined format of the information element (IE) is valid but the content of the IE is inconsistent or invalid.

**Table 27** *show gprs gtp statistics Field Descriptions (continued)*

Field	Description
tft_syntactic_error	Number of GTP messages received with an IE element with TFT syntactic errors. A syntactic error is when the coding of the IE is invalid.
total COA msg received	Number of CoA messages received on the GGSN.
total COA msg discarded	Number of CoA messages discarded because of error.
total COA triggered deleted	Number of Delete PDP Context Requests initiated because of a COA trigger.
total COA triggered update	Number of Update PDP Context Requests initiated because of a COA trigger.
total created DT PDPs	Number of direct tunnel PDP contexts established.
total created_pdp	Number of PDP contexts created since system startup (supports Special Mobile Group (SMG)-28 standards level and later)
total created_ppp_pdp	Number of PDP contexts created for PPP PDP PDU types.
total deleted_pdp	Number of PDP contexts deleted since system startup (supports SMG-28 standards level and later)
total deleted_ppp_pdp	Number of PDP contexts created for PPP PDP PDU types deleted since system startup.
total_download_route	Number of routes downloaded from the RADIUS server.
total_dropped	Number of GTP messages dropped.
total EI rcvd on DT PDPs	Number of error indications sent from the RNC received on the GGSN for direct tunnel PDPs.
total error indication rcvd	Number of error indications received on the GGSN.
total error indication sent	Number of error indications sent.
total_insert_download_route	Total number of routes downloaded from the RADIUS server that have been inserted into the routing table by the GGSN.
total ntwkInit created pdp	Number of PDP context requests activated by the GGSN that were initiated by the network (PDN).
total ntwkInit update pdp	Number of Update PDP Context Requests sent by the GGSN.
total update fail DT PDPs	Number of direct tunnel PDP contexts deleted because a successful Update PDP Context Response was not received.
total update responses rcv	Number of update request responses received.
unexpected_data_msg	Number of GTP PDUs received for nonexistent PDP contexts.
unexpected_sig_msg	Number of unexpected GTP signaling messages received—for example, a message received on the wrong end of the tunnel or a response message received for a request that was not sent by the GGSN.
unknown_msg	Number of unknown GTP messages received.
unsupported_comp_exthdr	Number of Create PDP Context requests received with unsupported extension headers when GGSN comprehension is required.
version_not_support	Number of GTP messages received from devices running an unsupported version of the GTP.

1. This field displays only when an APN is in maintenance mode (the **service-mode maintenance** access-point configuration command).

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>clear gprs gtp statistics</b>	Clears the current GGSN GTP statistics.
	<b>clear gprs statistics all</b>	Clears all GGSN counters and statistics (both global and per-APN).
	<b>show gprs gtp path statistics</b>	Display information about one or more GTP paths between the GGSN and other GPRS/UMTS devices.



# show gprs gtp status

To display information about the current status of the GPRS Tunneling Protocol (GTP) on the gateway GPRS support node (GGSN) (such as activated PDP contexts, throughput, and QoS statistics), use the **show gprs gtp status** command in privileged EXEC mode.

## show gprs gtp status

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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, and the following output fields were added: <ul style="list-style-type: none"> <li>• activated_ppp_pdp</li> <li>• activated_ppp_regen_pdp</li> <li>• ntwk_init_pdp</li> <li>• qos_delay1_pdp</li> <li>• qos_delay2_pdp</li> <li>• qos_delay3_pdp</li> <li>• qos_delaybesteffort_pdp</li> </ul>
	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 the Cisco IOS Release 12.2(8)YW and the following output fields were added: <ul style="list-style-type: none"> <li>• activated gtpv0 pdp</li> <li>• activated gtpv1 pdp</li> <li>• activated ms</li> </ul>
	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 QoS information was removed.
	12.3(11)YJ	This command was integrated into Cisco IOS Release 12.3(11)YJ.

Release	Modification
12.3(14)YQ	This command was integrated into Cisco IOS Release 12.3(14)YQ and the following output fields were added to YQ1: <ul style="list-style-type: none"> <li>• Prepaid PDPs</li> <li>• Postpaid PDPs</li> </ul>
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.
12.4(9)XG	This command was integrated into Cisco IOS Release 12.4(9)XG and the following fields were added to the output display: <ul style="list-style-type: none"> <li>• activated ipv6 ms</li> <li>• activated gtpv0 ipv6 pdp</li> <li>• activated gtpv1 ipv6 pdp</li> <li>• gtp ipv6 swidbs</li> </ul>
12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ and the following field was added to the display: <ul style="list-style-type: none"> <li>• gtp direct tunnel PDPs</li> <li>• gtp's va swidbs</li> </ul>

### Usage Guidelines

Use the **show gprs gtp status** command to display information about the status of GTP running on the GGSN.

### Examples

The following example shows output from the **show gprs gtp status** command:

```
router#show gprs gtp status
GPRS GTP Status:
  activated gtpv0 pdp      2
  activated gtpv1 pdp      7
  activated ms             9
  activated ipv6 ms        2
  activated gtpv0 v6 pdp   1
  activated gtpv1 v6 pdp   1
  activated ppp regen pdp  1
  activated ppp pdp        2
  gtp's va hwidbs          2
  gtp's va swidbs          1
  gtp ipv6 swidbs          2
  gtp direct tunnel PDPs  7
Service-aware Status:
  Prepaid PDPs            0
  Postpaid PDPs           0
router#
```

Table 28 describes the fields shown in the display.

**Table 28** *show gprs gtp status Field Descriptions*

Field	Description
activated gtpv0 pdp	Number of IPv4 PDP contexts created with GTP version 0.
activated gtpv0 ipv6 pdp	Number of IPv6 PDP contexts created with GTP version 0.
activated gtpv1 pdp	Number of IPv4 PDP contexts created with GTP version 1.
activated gtpv1 ipv6 pdp	Number of IPv6 PDP contexts created with GTP version 1.
activated ipv6 ms	Number of active IPv6 mobile stations (MS).
activated ms	Number of active IPv4 MSs.
activated_ppp_pdp	Number of point-to-point protocol IPv4 PDP contexts currently active.
activated_ppp_regen_pdp	Number of IPv4 point-to-point protocol PDP contexts created on the GGSN.
gtp direct tunnel PDPs	Number of direct tunnel PDPs currently active.
gtp ipv6 swidb	Number of virtual access created for IPv6 PDP contexts.
gtp's ppp va hwidbs	Number of virtual access created for IPv4 PPP PDP contexts.
gtp's va swidbs	Number of virtual access created for
ntwk_init_pdp	Current number of active IPv4 PDP contexts that are initiated by the network to an MS.
Prepaid PDPs	Current number of active prepaid IPv4 PDP contexts.
Postpaid PDPs	Current number of active postpaid IPv4 PDP contexts.

#### Related Commands

Command	Description
<b>show gprs gtp statistics</b>	Displays the current GTP statistics for the GGSN.

# show gprs memory threshold statistics

To display information about the number of PDP contexts that have been deleted or the number of Create PDP Context requests that have been rejected because of the memory threshold has been exceeded, use the **show gprs memory threshold statistics** command in privileged EXEC mode:

```
show gprs memory threshold statistics
```

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs memory threshold statistics** command to obtain information about the number of PDP contexts that have been deleted or the number of Create PDP Context requests that have been rejected because the memory threshold has been exceeded.

**Examples** The following example shows output from the **show gprs memory threshold statistics** command:

```
GGSN# show gprs memory threshold statistics
Memory Threshold Statistics
=====
GGSN memory threshold status :NOT IN THRESHOLD

Number of times reached :      0
Number of PDPs rejected :      0
Number of PDPs dropped due to
    duration limit :           0
    volume limit :             0
    update request :           0

Time when last memory threshold was reached :NEVER
```

Table 24 describes the fields shown in the display.

**Table 29** *show gprs memory threshold statistics Field Descriptions*

Field	Description
GGSN memory threshold status	Current status of the GGSN memory threshold. Possible values are “in threshold” and “not in threshold.”
Number of times reached	Number of times the GGSN memory threshold has been reached since last startup.
Number of PDPs rejected	Number of Create PDP Contexts rejected because the GGSN exceeded its memory threshold.
Number of PDPs dropped due to: duration limit	Number of existing PDP contexts dropped while in memory threshold because of the generation of a CDR with the duration limit trigger configured using the <b>limit duration</b> charging profile configuration command.
Number of PDPs dropped due to: volume limit	Number of existing PDP contexts dropped while in memory threshold because of the generation of a CDR with the volume limit trigger configured using the <b>limit volume</b> charging profile configuration command.
Number of PDPs dropped due to: update request	Number of existing PDP contexts dropped while in memory threshold because of a PDP context update message.
Time when the last memory threshold was reached	Last time the GGSN memory threshold was exceeded.

# show gprs ms-address exclude-range

To display the IP address range(s) configured on the gateway GPRS support node (GGSN) for the GPRS/UMTS network, use the **show gprs ms-address exclude-range** command in privileged EXEC mode.

**show gprs ms-address exclude-range**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

## 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 **show gprs ms-address exclude-range** command to display the IP address range(s) configured on the GGSN for the GPRS network.

IP addresses are 32-bit values.

**Examples**

The following is sample output of the **show gprs ms-address exclude-range** command:

```
router# show gprs ms-address exclude-range
Start IP           End IP
10.0.0.1           10.10.10.10
```

[Table 25](#) describes the fields shown in the display.

**Table 30** *show gprs ms-address exclude-range Field Descriptions*

Field	Description
Start IP	IP address at the beginning of the range.
End IP	IP address at the end of the range.

**Related Commands**

Command	Description
<b>gprs ms-address exclude-range</b>	Specifies the IP address range(s) used by the GPRS network and thereby excluded from the mobile station (MS) IP address range.

# show gprs pcscf

To display a summary of the P-CSCF server group(s) configured on the GGSN for P-CSCF Discovery, use the **show gprs pcscf** command in privileged EXEC mode.

## show gprs pcscf

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.4(2)XB	This command was introduced.
	12.4(9)XG	This command was integrated into Cisco IOS Release 12.4(9)XG and the command has been modified to display IPv6 servers that are a part of a P-CSCF server group.
	12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ.

**Usage Guidelines** Use the **show gprs pcscf** command to display a summary of the P-CSCF server group(s) configured on the GGSN.

**Examples** The following example shows the output for the **show gprs pcscf** command:

```
router#show gprs pcscf
P-CSCF Group name:groupA
List of IP addresses in the group:
172.76.82.77
192.3.3.3

P-CSCF Group name:groupB
List of IP addresses in the group:
172.76.82.77
192.4.4.4

P-CSCF Group name:groupC
List of IP addresses in the group:
2001:999::9
```



**Related Commands**

<b>Command</b>	<b>Description</b>
<b>gprs pcsf</b>	Configures a P-CSCF server group on the GGSN and enters P-CSCF group configuration mode.
<b>pcsfcf</b>	Assigns a P-CSCF server group to an APN.
<b>server</b>	Specifies the IP address of a P-CSCF server you want to include in the P-CSCF server group.
<b>show gprs access-point</b>	Displays information about access points on the GGSN.

# show gprs plmn

To display the mobile country code (MCC) and mobile network code (MNC) of the home and trusted PLMNs, use the **show gprs plmn** command in privileged EXEC mode.

**show gprs plmn**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs plmn** command to display the configured MCCs and MNCs of the home and trusted PLMNs.

**Examples** The following is sample output of the **show gprs plmn ip address** command:

```
GGSN# show gprs plmn
Home PLMN
  MCC = 302  MNC = 678
Trusted PLMN
  MCC = 346  MNC = 123
  MCC = 234  MNC = 67
  MCC = 123  MNC = 45
  MCC = 100  MNC = 35
```

Related Commands	Command	Description
	<b>gprs mcc mnc</b>	Configure MCC and MNC that the GGSN uses to determine if a Create PDP Context request is from a roamer.

# show gprs plmn ip address

To display the IP address range(s) configured for a PLMN, use the **show gprs plmn ip address** command in privileged EXEC mode.

## show gprs plmn ip address

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs plmn ip address** command to display the IP address range(s) configured for a PLMN. IP addresses are 32-bit values.

**Examples** The following is sample output of the **show gprs plmn ip address** command:

```
router# show gprs plmn ip address
PLMN Start IP      End IP             Range Type
9.9.9.9            9.9.9.9
10.2.25.1          10.2.25.255
16.0.0.9           16.0.0.9
99.100.0.1         99.100.0.255
101.0.1.1          101.0.1.1         sgsn
105.0.1.1          105.0.1.1         sgsn
106.0.1.1          106.0.1.1         sgsn
110.12.0.2         110.12.0.2
110.13.0.2         110.13.0.2
```

Table 25 describes the fields shown in the display.

**Table 31** *show gprs plmn ip address* Field Descriptions

Field	Description
PLMN Start IP	IP address at the beginning of the range.
End IP	IP address at the end of the range.

**Related Commands**

Command	Description
<b>gprs plmn ip address</b>	Specifies the PLMN IP address range(s) used by the GGSN.

# show gprs qos status

To display the number of PDP contexts currently active on the gateway GPRS support node (GGSN) for a particular QoS class, use the **show gprs qos status** command in privileged EXEC mode.

## show gprs qos status

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs qos status** command to display the number of PDP contexts currently active on the GGSN for a particular QoS class.

## Examples

### Example 1

The following example shows output from the **show gprs qos status** command for UMTS QoS:

```
router# show gprs qos status
GPRS QoS Status:
  type:UMTS
  conversational_pdp      100  streaming_pdp      150
  interactive_pdp        1345  background_pdp     2000
```

Table 27 describes the fields shown in the display.

**Table 32** show gprs qos status Field Descriptions

Field	Description
type	Type of QoS. Possible QoS types are: <ul style="list-style-type: none"> <li>• Canonical—Configured using the <b>gprs qos map canonical-qos</b> command.</li> <li>• Delay—Configured using the <b>gprs qos map delay</b> command.</li> <li>• UMTS—Configured using the <b>gprs qos map umts</b> command.</li> <li>• None—No QoS is configured on the GGSN.</li> </ul>
conversational_pdp	Current number of PDP contexts that have a conversational UMTS QoS traffic class.
streaming_pdp	Current number of PDP contexts that have a streaming UMTS QoS traffic class.
interactive_pdp	Current number of PDP contexts that have a interactive UMTS QoS traffic class.
background_pdp	Current number of PDP contexts that have a background UMTS QoS traffic class.

**Example 2**

The following example displays output from the **show gprs qos status** command for canonical QoS:

```
router# show gprs qos status
GPRS QoS Status:
type:Canonical
  gsn_used_bandwidth:1110.000      total_gsn_resource:1048576
  mean_throughput_premium:0.000
  mean_throughput_normal:1110.000  mean_throughput_besteffort 0.000
  qos_high_pdp:0                  qos_normal_pdp:1
  qos_low_pdp :0                  qos_premium_mean-throughput-deviation 0.100
```

Table 28 describes the fields shown in the display.

**Table 33** show gprs qos status Field Descriptions

Field	Description
gsn_used_bandwidth	Currently used bandwidth, in bits per second. Represents the cumulative bandwidth for all active PDP context requests currently using canonical QoS. This field only appears when canonical QoS is enabled.
mean_throughput_besteffort	Total mean throughput for best effort QoS users, in bits per second. Represents the cumulative throughput for all active PDP context requests classified in the best effort canonical QoS class. This field only appears when canonical QoS is enabled.

**Table 33** *show gprs qos status Field Descriptions*

Field	Description
mean_throughput_normal	Total mean throughput for normal QoS users, in bits per second. Represents the cumulative throughput for all active PDP context requests classified in the normal canonical QoS class. This field only appears when canonical QoS is enabled.
mean_throughput_premium:	Total mean throughput for premium QoS users, in bits per second. Represents the cumulative throughput for all active PDP context requests classified in the premium canonical QoS class. This field only appears when canonical QoS is enabled.
qos_high_pdp	Current number of active PDP contexts that are classified in the premium canonical QoS class. This field only appears when canonical QoS is enabled.
qos_low_pdp	Current number of PDP contexts that are classified in the best effort canonical QoS class. This field only appears when canonical QoS is enabled.
qos_normal_pdp	Current number of PDP contexts that are classified in the normal canonical QoS class. This field only appears when canonical QoS is enabled.
qos_premium mean-throughput-deviation	Current mean throughput deviation for QoS. This field only appears when canonical QoS is enabled.
total_gsn_resource	Currently available GSN resources. This field only appears when canonical QoS is enabled.
type	Type of QoS. Possible QoS types are: <ul style="list-style-type: none"> <li>• Canonical—Configured using the <b>gprs qos map canonical-qos</b> command.</li> <li>• Delay—Configured using the <b>gprs qos map delay</b> command.</li> <li>• UMTS—Configured using the <b>gprs qos map umts</b> command.</li> <li>• None—No QoS is configured on the GGSN.</li> </ul>

**Example 3**

The following example displays output from the **show gprs qos status** command for delay QoS:

```
router# show gprs qos status
GPRS QoS Status:
type:Delay
qos_delay1_pdp:0          qos_delay2_pdp: 0
qos_delay3_pdp:0          qos_delaybesteffort_pdp 0
```

Table 29 describes the fields shown in the display.

**Table 34** *show gprs qos status Field Descriptions*

Field	Description
type	Type of QoS. Possible QoS types are: <ul style="list-style-type: none"> <li>• Canonical—Configured using the <b>gprs qos map canonical-qos</b> command.</li> <li>• Delay—Configured using the <b>gprs qos map delay</b> command.</li> <li>• UMTS—Configured using the <b>gprs qos map umts</b> command.</li> <li>• None—No QoS is configured on the GGSN.</li> </ul>
qos_delay1_pdp	Current number of active PDP contexts that are classified in the class 1 delay QoS class. This field only appears when delay QoS is enabled.
qos_delay2_pdp	Current number of active PDP contexts that are classified in the class 2 delay QoS class. This field only appears when delay QoS is enabled.
qos_delay3_pdp	Current number of active PDP contexts that are classified in the class 3 delay QoS class. This field only appears when delay QoS is enabled.
qos_delaybesteffort_pdp	Current number of active PDP contexts that are classified in the best effort delay QoS class. This field only appears when delay QoS is enabled.

**Example 4**

The following example shows output from the **show gprs qos status** command when no QoS has been configured on the GGSN:

```
router# show gprs qos status
GPRS QoS Status:
type:None
```

**Related Commands**

Command	Description
<b>gprs qos map canonical-qos</b>	Enables mapping of GPRS QoS categories to a canonical QoS method that includes best-effort, normal, and premium QoS classes.
<b>gprs qos map delay</b>	Enables Delay QoS on the GGSN.
<b>gprs qos map umts</b>	Enables UMTS QoS on the GGSN.



# show gprs redundancy

To display statistics related to GTP-SR, use the **show gprs redundancy** command in privileged EXEC mode.

**show gprs redundancy [statistics]**

<b>Syntax Description</b>	<b>statistics</b>	Displays GTP-SR statistics.
---------------------------	-------------------	-----------------------------

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.3(11)YJ	This command was introduced.
	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 **show gprs redundancy** command to display GTP-SR related event queues and/or statistics.

**Examples** The following example shows the output for the **show gprs redundancy statistics** command:

```

GGSN#show gprs redundancy statistics

tb10-7600-5-2#show gprs redundancy statistics
GPRS Redundancy Statistics
  Last cleared:never

  CheckPointed-From-Active Statistics

  Total Number of Messages:                9
    Number of Context Setup messages:      0
    Number of Context Modify messages:     0
    Number of Context Remove messages:     0
    Number of Path Setup messages:         0
    Number of Path Modify messages:        0
    Number of Path Remove messages:        0
    Number of CGF Ready messages:          1
    Number of CGF Modify messages:         0
    Number of CGF Remove messages:         0
    Number of Internal State messages:     8

```

The following example shows the output for the **show gprs redundancy** command:

```

GGSN#show gprs redundancy
GPRS redundancy is enabled and Unit-Status is Standby

Redundancy Transport Infrastructure status
  Redundancy Infrastructure state:          STANDBY HOT
  Peer Redundancy Infrastructure state:    ACTIVE

  GGSN Redundancy system up since:       00:01:16 UTC Mar 1 2002
  Time of last switchover:                never
  Total Number of Switchovers:           0

GPRS Redundancy Statistics
  Last cleared:never

CheckPointed-From-Active Statistics

  Total Number of Messages:              9
  Number of Context Setup messages:      0
  Number of Context Modify messages:     0
  Number of Context Remove messages:     0
  Number of Path Setup messages:         0
  Number of Path Modify messages:        0
  Number of Path Remove messages:        0
  Number of CGF Ready messages:          1
  Number of CGF Modify messages:         0
  Number of CGF Remove messages:         0
  Number of Internal State messages:     8
    
```

Table 30 describes the fields shown in the display.

**Table 35** *show gprs redundancy Field Descriptions*

Field	Description
Redundancy Transport Infrastructure state	Current state of the local redundancy infrastructure.
Peer Redundancy Infrastructure state	Current state of the redundancy infrastructure on the peer GGSN. Possible values are ACTIVE or STANDBY.
GGSN Redundancy system up since	Time at which the GTP-SR system was established.
Time of last switchover	Time the last switchover occurred.
Total Number of Switchovers	Total number of times a switchover has occurred since GTP-SR system has been up.
Last cleared	Time GTP-SR statistics were last cleared.
Total number of Messages	Total number of GTP-SR related messages received.
Number of Context Setup messages	Number of Create PDP Context messages received.
Number of Context Modify messages	Number of modify PDP context messages received.
Number of Context Remove messages	Number of delete PDP context messages received.
Number of Path Setup messages	Number of SGSN-to-GGSN path setup messages received.
Number of Path Modify messages	Number of SGSN-to-GGSN path modify messages received.
Number of Path Remove messages	Number of SGSN-to-GGSN path deletion messages received.

**Table 35** *show gprs redundancy Field Descriptions (continued)*

Field	Description
Number of CGF Ready messages	Number of GGSN-to-CG functionality ready messages received.
Number of CGF Modify messages	Number of GGSN-to-CG path change messages received.
Number of CGF Remove messages	Number of GGSN-to-CG path deletion messages received.
Number of Internal State messages	Number of internal state messages.

**Related Commands**

Command	Description
<b>clear gprs redundancy statistics</b>	Clears statistics related to GTP-SR.
<b>gprs redundancy</b>	Enables GTP-SR on a GGSN.
<b>gprs redundancy charging sync-window cdr rec-seqnum</b>	Configures the window size used to determine when the CDR record sequence number needs to be synchronized to the Standby GGSN.
<b>gprs redundancy charging sync-window gtp seqnum</b>	Configures the window size used to determine when the GTP' sequence number needs to be synchronized to the Standby GGSN.

# show gprs service-aware statistics

To view statistics related to the service-aware features of the gateway GPRS support node (GGSN), such as packets sent to, and received from, the Diameter server or CSG, use the **show gprs service-aware statistics** command in privileged EXEC mode:

```
show gprs service-aware statistics
```

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privilege EXEC

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 **show gprs service-aware statistics** command to display the statistics related to service-aware features for the GGSN.

The counter values displayed by this command represent totals accumulated since the last time the statistical counters were cleared using the **clear gprs service-aware statistics** command.

**Examples**

The following is sample output of the **show gprs service-aware statistics** command:

```

router#show gprs service-aware statistics
GGSN service-aware statistics:
  num service aware apn 1
  total_ggsn_event      4          total_ggsn_failure      0
  total_csg_event      23999       total_csg_failure      0
  total_dcca_event     23996       total_dcca_failure     5
  total_category_created 23996       total_category_deleted 4
  total_sync_object_created 6000       total_sync_object_deleted 6000
  category_fsm_return_error 0          total_quota_push_ack  23995
  total_service_auth   0          total_service_reauth   0
  total_service_stop   4          total_quota_return     0
  total_quota_granted  23995       total_terminate_category 0
  total_blacklisted_category 1          total_unknown_category 0
  total_RAR_event      0          total_rating_change    0
  total_delete_pdp     0          total_convert_to_postpaid 0
  report_final_convert_to_postpaid 0          total_send_dummy_quota 0
  category_wait_csg_timeout 0          sync_timeout_ser_stop  1
  sync_timeout_qr      0          sync_timeout_other     0

GGSN service-aware pdp session statistics:
  total_prepaid_users   5994          total_postpaid_users   10
  reject_due_to_dcca_failure 0          reject_due_to_csg_failure 0
  reject_due_to_other_reason 0

```

Table 31 describes the fields shown in the display.

**Table 36** *show gprs service-aware statistics Field Descriptions*

Field	Description
num service aware apn	Number of APNS that are service-aware (i.e., for which credit-control will be performed using a Diameter server).
total_ggsn_event	Number of PDP-level events received, such as GTP update event or sending an accounting-stop message.
total_ggsn_failure	Number of internal failures associated with creating, accessing, or manipulating various category-related dtat structures.
total_csg_event	Number of CSG-related events received by various categories, such as Quota Push Ack, Service-Auth, or Service-Reauth.
total_csg_failure	Number of CSG-related errors received, such as GTP' NACK.
total_dcca_event	Number of DCCA-server related events received by various categories, such as Quota Grants, Blacklists, or Authorization Denied.
total_dcca_failure	Number of times the DCCA server has not responded during a specified time period.
total_category_created	Number of categories created across all PDP contexts.
total_category_deleted	Number of categories deleted across all PDP contexts.
total_sync_object_created	Number of sync objects created, to which to send multiple messages associated with an event.
total_sync_object_deleted	Number of sync objects deleted. A sync object is required when a DCCA procedure such as Quota-Push needs to be performed for multiple categories in a single CCR/CCA.

**Table 36** *show gprs service-aware statistics Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
category_fsm_return_error	Number of internal errors while executing the category state machine.
total_quota_push_ack	Number of Quota Push acknowledgements received from the CSG.
total_service_auth	Number of Service-Auth requests received from the CSG.
total_service_reauth	Number of Service-Reauth requests received from the CSG.
total_service_stop	Number of Service-Stop responses received from the CSG.
total_quota_return	Number of Quota-Return messages received from the CSG.
total_quota_granted	Number of times quota has been granted by the DCCA server for various categories.
total_terminate_category	Number of times the DCCA server has terminated the service because authorization was denied or the user's credit was exhausted.
total_blacklisted_category	Number of times the DCCA server blacklisted a category.
total_unknown_category	Number of times the DCCA server has responded with a DIAMETER_RATING_FAILED message.
total_RAR_event	Number of times an update PDP context request has been received by category.
total_rating_change	Number of times an update PDP context event has been received by category.
total_delete_pdp	Not currently used.
total_convert_to_postpaid	Number of times a CC session has been converted to postpaid session because of an unresponsive DCCA server.
report_final_convert_to_postpaid	Number of times a session was converted to a postpaid session because of an invalid answer from the DCCA server.
total_send_dummy_quota	Number of times dummy quota has been granted because of a slow DCCA server (for example, a server that didn't respond in the required Tx time interval).
category_wait_csg_timeout	Number of times a category timeout occurred on service stop.
sync_timeout_ser_stop	Sync_object timeout on service stop.
sync_timeout_qr	Sync_object timeout on quota return.
sync_timeout_other	Sync_object timeout on other reasons.
total_prepaid_users	Number of service-aware users treated as pre-paid users.
total_postpaid_users	Number of service-aware users treated as post-paid users.
reject_due_to_dcca_failure	Number of times a PDP context has been rejected because of a failure to communicate with a DCCA server.
reject_due_to_csg_failure	Number of times a PDP context has been rejected because of a failure to communicate with a CSG server.
reject_due_to_other_reason	Number of times a PDP context has been rejected for other reasons.

**Related Commands**

<b>Command</b>	<b>Description</b>
<code>clear gprs service-aware statistics</code>	Displays information about access points on the GGSN.

# show gprs slb detail

To display all Cisco IOS SLB-related information, such as operation mode, virtual server addresses, SLB notifications, and statistics, use the **show gprs slb detail** command in privileged EXEC mode.

## show gprs slb detail

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 and the Subscriber exit field was added to the output.
	12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB and the following fields were removed from the display: <ul style="list-style-type: none"> <li>• SLB Notifications sent               <ul style="list-style-type: none"> <li>– CAC failure</li> <li>– Subscriber ext</li> </ul> </li> </ul> The following fields were added to the SLB Statistics section of the display: <ul style="list-style-type: none"> <li>• CAC-failure notifications sent</li> <li>• Session-deletion notifications sent</li> <li>• PDP status notifications sent</li> <li>• PDP status negative response sent</li> <li>• PDP status requests received</li> </ul>

**Usage Guidelines** Use the **show gprs slb detail** command to display to all Cisco IOS SLB-related information, including statistics associated with GTP SLB sticky database support.



**Examples**

The following example shows the output for the **show gprs slb detail** command:

```
GGSN#show gprs slb detail
SLB Operation Mode:dispatched
SLB vservers:
  10.10.195.1
SLB Statistics:
  CAC-failure notifications sent:          0
  Session-deletion notifications sent:     0
  PDP status notifications sent:          0
  PDP status negative response sent:      0
  PDP status requests received:          0
GGSN#
```

[Table 32](#) describes the fields shown in the display.

**Table 37** *show gprs slb detail Field Descriptions*

Field	Description
CAC-failure notifications sent	Number of times the GGSN has notified the Cisco IOS SLB that a Call Admission Control (CAC) or canonical QoS failure has occurred.
PPP status negative response sent	Number of responses sent to the IOS SLB after the sticky object idle timer has expired that indicate that the PDP context associated with the sticky object has ended.
PPP status notifications sent	Number of status notifications sent to the IOS SLB after the idle timer on associated sticky object has expired that indicate whether a PDP context is active or has ended.
PPP status requests received	Number of IOS SLB requests received by the GGSN.
Session-deletion notifications sent	Number of times the GGSN has notified the Cisco IOS SLB that the last PDP context associated with an IMSI has been deleted.
SLB Operation Mode:	Mode of operation in which the Cisco IOS SLB is functioning. Possible values are dispatched and directed.
SLB vservers	IP addresses of the virtual servers to be notified by the GGSN when the specific type of condition defined using the <b>gprs slb notify</b> command occurs.

**Related Commands**

Command	Description
<b>clear gprs slb statistics</b>	Clears Cisco IOS SLB statistics.
<b>gprs slb mode</b>	Defines the Cisco IOS SLB operation mode.
<b>gprs slb notify</b>	Enables the GGSN to notify the Cisco IOS SLB when a specific type of condition occurs.
<b>gprs slb vserver</b>	Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined using the <b>gprs slb notify</b> command occurs.
<b>show gprs slb mode</b>	Displays the Cisco IOS SLB mode of operation.
<b>show gprs slb statistics</b>	Displays Cisco IOS SLB statistics.
<b>show gprs slb vservers</b>	Displays the list of defined Cisco IOS SLB virtual servers.

# show gprs slb mode

To display the Cisco IOS SLB mode of operation defined on the gateway GPRS support node (GGSN), use the **show gprs slb mode** command in privileged EXEC mode.

**show gprs slb mode**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs slb mode** command to display the Cisco IOS SLB operation mode defined on the GGSN.

**Examples** The following example shows that the Cisco IOS SLB operation mode is defined as dispatch mode:

```
GGSN#show gprs slb mode
SLB Operation Mode:dispatched
```

Related Commands	Command	Description
	<a href="#">clear gprs slb statistics</a>	Clears Cisco IOS SLB statistics.
	<a href="#">gprs slb mode</a>	Defines the Cisco IOS SLB operation mode.
	<a href="#">gprs slb notify</a>	Enables the GGSN to provide feedback to the Cisco IOS SLB when a specific condition occurs.
	<a href="#">gprs slb vserver</a>	Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined by the <b>gprs slb notify</b> command occurs.
	<a href="#">show gprs slb detail</a>	Displays Cisco IOS SLB related information, such as the operation mode, virtual servers addresses, and statistics.

Command	Description
<a href="#">show gprs slb statistics</a>	Displays Cisco IOS SLB statistics.
<a href="#">show gprs slb vservers</a>	Displays the list of defined Cisco IOS SLB virtual servers.

# show gprs slb statistics

To display Cisco IOS SLB statistics, use the **show gprs slb mode** command in privileged EXEC mode.

**show gprs slb statistics**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 the Cisco IOS Release 12.3(14)YU and the Subscriber exit field was added to the output.
	12.4(2)XB	This command was integrated into Cisco IOS Release 12.4(2)XB and the following fields were removed from the display: <ul style="list-style-type: none"> <li>• SLB Notifications sent               <ul style="list-style-type: none"> <li>– CAC failure</li> <li>– Subscriber exit</li> </ul> </li> </ul> The following fields were added to the SLB Statistics section of the display: <ul style="list-style-type: none"> <li>• CAC-failure notifications sent</li> <li>• Session-deletion notifications sent</li> <li>• PDP status notifications sent</li> <li>• PDP status negative response sent</li> <li>• PDP status requests received</li> </ul>

**Usage Guidelines**

Use the **show gprs slb statistics** command to display IOS SLB statistics, including statistics associated with GTP SLB sticky database support.

**Examples**

The following example displays IOS SLB-related statistics on the GGSN:

```
GGSN#show gprs slb statistics
SLB Statistics:
  CAC-failure notifications sent:          0
  Session-deletion notifications sent:    0
  PDP status notifications sent:         0
  PDP status negative response sent:     0
  PDP status requests received:         0
```

[Table 33](#) describes the fields shown in the display.

**Table 38** *show gprs slb statistics Field Descriptions*

Field	Description
CAC-failure notifications sent	Number of times the GGSN has notified the Cisco IOS SLB that a Call Admission Control (CAC) or canonical QoS failure has occurred.
PPP status negative response sent	Number of responses sent to the IOS SLB after the sticky object idle timer has expired that indicate that the PDP context associated with the sticky object has ended.
PPP status notifications sent	Number of status notifications sent to the IOS SLB after the idle timer on associated sticky object has expired that indicate whether a PDP context is active or has ended.
PPP status requests received	Number of IOS SLB requests received by the GGSN.
Session-deletion notifications sent	Number of times the GGSN has notified the IOS SLB that the last PDP context associated with an IMSI has been deleted.

**Related Commands**

Command	Description
<b>clear gprs slb statistics</b>	Clears Cisco IOS SLB statistics.
<b>gprs slb mode</b>	Defines the Cisco IOS SLB operation mode.
<b>gprs slb notify</b>	Enables the GGSN to notify the Cisco IOS SLB when a specific type of condition occurs.
<b>gprs slb vserver</b>	Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined using the <b>gprs slb notify</b> command occurs.
<b>show gprs slb detail</b>	Displays Cisco IOS SLB related information, such as the operation mode, virtual servers addresses, and statistics.
<b>show gprs slb mode</b>	Displays the Cisco IOS SLB mode of operation defined on the GGSN.
<b>show gprs slb vservers</b>	Displays the list of defined Cisco IOS SLB virtual servers.

# show gprs slb vservers

To display a list of Cisco IOS SLB virtual servers to be notified by the gateway GPRS support node (GGSN) when the specific type of condition defined using the **gprs slb notify** command occurs, use the **show gprs slb vservers** command in privileged EXEC mode.

**show gprs slb vservers**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs slb vservers** command to display a list of Cisco IOS SLB virtual servers to be used for GGSN-SLB messaging.

**Examples** The following example shows a list of virtual servers that were defined using the **gprs slb vservers global** configuration command:

```
GGSN#show gprs slb vservers
SLB vservers:
10.10.10.10
11.11.11.11
```

Related Commands	Command	Description
	<a href="#">clear gprs slb statistics</a>	Clears Cisco IOS SLB statistics.
	<a href="#">gprs slb mode</a>	Defines the Cisco IOS SLB operation mode.
	<a href="#">gprs slb notify</a>	Enables the GGSN to notify the Cisco IOS SLB when a specific type of condition occurs.
	<a href="#">gprs slb vserver</a>	Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined by the <b>gprs slb notify</b> command occurs.

Command	Description
<a href="#">show gprs slb detail</a>	Displays Cisco IOS SLB related information, such as the operation mode, virtual servers addresses, and statistics.
<a href="#">show gprs slb mode</a>	Displays the Cisco IOS SLB mode of operation defined on the GGSN.
<a href="#">show gprs slb statistics</a>	Displays Cisco IOS SLB statistics.

# show gprs service-mode

To display the current service mode of the gateway GPRS support node (GGSN) and the last time the service mode was changed, issue the **show gprs service-mode** command in privileged EXEC mode.

**show gprs service-mode**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs service-mode** command to display the current service mode of a GGSN and the last time the service mode was changed.

## Examples

### Example 1

The following example shows output from the **show gprs service-mode** command when no service-mode change has occurred:

```
GGSN# show gprs service-mode
Service mode:operational
GGSN#
```

### Example 2

The following example shows output from the **show gprs service-mode** command when a service-mode change has occurred:

```
GGSN# show gprs service-mode
Service mode:maintenance last change at: 23:49:21 UTC Mon January 20, 2004
GGSN#
```



**Related Commands**

<b>Command</b>	<b>Description</b>
<b>gprs charging service-mode</b>	Configures the service-mode state of a GGSN's charging functions.
<b>gprs service-mode</b>	Configures the service-mode state of a GGSN.
<b>service-mode</b>	Configures the service-mode state of an APN.

# show gprs umts-qos map traffic-class

To display UMTS QoS mapping information, use the **show gprs umts-qos map traffic-class** command in privileged EXEC mode.

```
show gprs umts-qos map traffic-class { all | signalling | conversational | streaming | interactive | background }
```

## Syntax Description

<b>all</b>	Displays information for all UMTS QoS traffic classes.
<b>signalling</b>	Displays information for the UMTS QoS traffic class signalling.
<b>conversational</b>	Displays information for the UMTS QoS traffic class conversational.
<b>streaming</b>	Displays information for the UMTS QoS traffic class streaming.
<b>interactive</b>	Displays information for the UMTS QoS traffic class interactive.
<b>background</b>	Displays information for the UMTS QoS traffic class background.

## Defaults

No default behavior or values.

## Command Modes

Privileged EXEC

## 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 **show gprs umts-qos map traffic-class** command to display information about UMTS QoS mapping.

## Examples

The following example shows output from the **show gprs umts-qos map traffic-class** command for all UMTS QoS traffic classes:

```
router# show gprs umts-qos map traffic-class all
Traffic Class      Diffserv PHB Group      Diffserv Code Point
-----
signaling          Signaling Class         40
conversational     EF Class                 46
streaming          AF2 Class                18,20,22
```

interactive	AF3 Class	26,28,30
background	Best Effort	0

Table 34 describes the fields shown in the display.

**Table 39** *show gprs umts-qos map traffic-class Field Descriptions*

Field	Description
Traffic Class	Type of UMTS QoS traffic class as specified in the <b>gprs umts-qos map traffic-class</b> command. The UMTS QoS traffic classes are: <ul style="list-style-type: none"> <li>• signaling</li> <li>• conversational</li> <li>• streaming</li> <li>• interactive</li> <li>• background</li> </ul>
Diffserv PHB Group	Type of DiffServ PHB group as specified in the <b>gprs umts-qos map diffserv-phb</b> command. Possible DiffServ PHB groups are: <ul style="list-style-type: none"> <li>• signalling-class</li> <li>• ef-class</li> <li>• af1-class</li> <li>• af2-class</li> <li>• af3-class</li> <li>• af4-class</li> <li>• best-effort</li> </ul>
Diffserv Code Point	Number of DSCPs as specified in the <b>gprs umts-qos map diffserv-phb</b> command.

#### Related Commands

Command	Description
<b>gprs umts-qos map traffic-class</b>	Specifies a QoS mapping from the UMTS traffic classes to a differentiated services (DiffServ) per-hop behavior (PHB) group
<b>gprs umts-qos map diffserv-phb</b>	Assigns a differentiated services code point (DSCP) to a DiffServ PHB group.

# show gprs umts-qos police pdp-context tid

To display policing statistics for a PDP context, use the **show gprs umts-qos police pdp tid** command in privileged EXEC mode.

**show gprs umts-qos police pdp-context tid** *tid*

<b>Syntax Description</b>	<i>tid</i>	Specifies the tunnel ID for which you want to display policing statistics.
---------------------------	------------	--

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show gprs umts-qos police pdp-context tid** command to display policing information for a PDP context.

**Examples** The following example shows output from the **show gprs umts-qos police pdp-context tid** command for a PDP context:

```

GGSN#sh gprs umts-qos police pdp-context tid 120300000000010
DOWNLINK POLICING STATISTICS
Flow id:1
  police:
    rate 5184000 , bc 1500 bytes
    peak-rate 7424000, be 1800 bytes
    conformed 2 packets, 200 bytes; actions:
      set-dscp-transmit 15
    exceeded 0 packets, 0 bytes; actions:
      set-dscp-transmit 15
    violated 0 packets, 0 bytes; actions:
      drop

```

Flow id:Identifier used in communication with IOS QoS regarding a particular flow.

rate :Average rate in bits per second.

bc :Normal burst size in bytes

peak-rate :peak rate in bits per second

be :Excess burst size in bytes.

---

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>police rate</b>	Configures traffic policing using the police rate.
<b>service-policy</b>	Attaches a service policy to an APN, to be used as the service policy for PDP flows of that APN.

---

# show gprs umts-qos profile pdp tid

To display requested and negotiated QoS information for a PDP context, use the **show gprs umts-qos profile pdp tid** command in privileged EXEC mode.

**show gprs umts-qos profile pdp tid** *tid*

<b>Syntax Description</b>	<i>tid</i>	Specifies the tunnel ID for which you want to display policing statistics.
---------------------------	------------	--

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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 **show gprs umts-qos profile pdp tid** command to display requested and negotiated QoS information for a PDP context.

**Examples** The following example shows output from the **show gprs umts-qos profile pdp tid** command for R97/R98 QoS:

```

show gprs umts-qos profile pdp tid 120300000000010
Requested QoS Profile           Negotiated QoS Profile
=====                       =====
Delay Class:2                  Delay Class:2
Reliability:1                  Reliability:1
Peak Throughput:1             Peak Throughput:1
Precedence:1                   Precedence:1
Mean Throughput:1             Mean Throughput:1
    
```

The following example shows output from the **show gprs umts-qos profile pdp tid** command for R99 QoS:

```

Requested QoS Profile           Negotiated QoS Profile
=====                       =====
Allocation/Retention:1        Allocaion/Retention:1
Delay Class:2                  Delay Class:2
Reliability:1                  Reliability:1
Peak Throughput:1             Peak Throughput:1
Precedence:1                   Precedence:1
Mean Throughput:1             Mean Throughput:1
    
```

Traffic Class:conversational  
Delivery Order:2  
Delivery of Err:2  
Max SDU Size(bytes):1520  
MBR for Uplink(kbps):20  
MBR for Downlink(kbps):20  
Residual BER:1  
SDU Error Ratio:1\*10^-2  
Transfer Delay(ms):10  
Handling Priority:1  
GBR for Uplink(kbps):10  
GBR for Downlink(kbps):5  
Source Statistics Des:Speech

Traffic Class:conversational  
Delivery Order:2  
Delivery of Err:2  
Max SDU Size(bytes):1520  
MBR for Uplink(kbps):20  
MBR for Downlink(kbps):20  
Residual BER:1  
SDU Error Ratio:1\*10^-2  
Transfer Delay(ms):10  
Handling Priority:1  
GBR for Uplink(kbps):10  
GBR for Downlink(kbps):5  
Source Statistics Des:Speech

# show ip iscsi name

To display the name of an iSCSI initiator, use the **show ip iscsi name** command in privileged EXEC mode.

**show ip iscsi name**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show ip iscsi name** command to display the name of an iSCSI initiator.

**Examples** The following example shows output from the **show ip iscsi session** command:

```
Router#show ip iscsi name
iSCSI initiator name: iqn.1987-07.com.cisco:wtbg-sup-09-3
Router#
```

Related Commands	Command	Description
	<b>show ip iscsi session</b>	Displays information about the iSCSI sessions on the GGSN.
	<b>show ip iscsi target</b>	Displays information about iSCSI targets.



# show ip iscsi session

To display the status of iSCSI sessions on the GGSN, use the **show ip iscsi session** command in privileged EXEC mode.

```
show ip iscsi session [session_id] [detail]
```

Syntax Description	
<i>session_id</i>	(Optional) Identification number of the session.
<b>detail</b>	(Optional) Displays detailed information about the iSCSI session.

**Syntax Description** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show ip iscsi session** command to display iSCSI sessions.

**Examples** The following example shows output from the **show ip iscsi session** command:

```
Router#show ip iscsi session 12
ID TARGET STATE CONNECTIONS
-----
12 LINUX Logged In 1

Router#show ip iscsi session
ID TARGET STATE CONNECTIONS
-----
12 LINUX Logged In 1

Router#show ip iscsi session detail
ID: 12
Profile: LINUX
State: Logged In
Connections: 1
First Burst Length: 16384
Max Burst Length: 16384
Max Recv Data Segment: 32768
Max Xmit Data Segment: 8192
Initial R2T: Yes
Immediate data: Yes
Data PDU in order: Yes
Data PDU in order: Yes

Router#show ip iscsi session 12 detail
ID: 12
```

```
Profile: LINUX
State: Logged In
Connections: 1
First Burst Length: 16384
Max Burst Length: 16384
Max Recv Data Segment: 32768
Max Xmit Data Segment: 8192
Initial R2T: Yes
Immediate data: Yes
Data PDU in order: Yes
Data PDU in order: Yes

Router#
```

# show ip iscsi stats

To display iSCSI statistics, use the **show ip iscsi stats** command in privileged EXEC mode.

**show ip iscsi stats [detail]**

<b>Syntax Description</b>	<b>detail</b> (Optional) Displays detailed information about the iSCSI statistics.
---------------------------	--

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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 **show ip iscsi stats** command to display iSCSI statistics.

**Examples** The following example shows output from the **show ip iscsi stats** command:

```
Router#show ip iscsi stats
iSCSI Stats:
  Login Requests - 2, Login Responses - 2
  Logout Requests - 0, Logout Responses - 0
  Login Timeouts - 0, Logout Timeouts - 0
  SCSI Commands - 27, SCSI Responses - 27
  Data In PDUs - 25, Data Out PDUs - 0
  Immed Data - 1, Unsolicited Data - 0
  NOP Ins - 35, NOP Outs - 35
  Async Requests - 0, Async Req Logout - 0
  Async Drop Conn - 0, Async Drop Conns - 0
  R2t Requests - 0, Rejects - 0

System Stats:
  TX Queue Overflow - 0, RX Queue Overflow - 0
  Connection Resets - 0, Tasks aborted - 0

SCSI Stats:
  Total Requests - 27
  Test Unit Ready Requests - 1, Test Unit Ready Failures - 0
  Report Luns Requests - 1, Report Luns Failures - 0
  Lun Inquiry Requests - 5, Lun Inquiry Failures - 0
  Read Capacity Requests - 5, Read Capacity Failures - 0
  Read Requests - 14, Read Failures - 0
  Write Requests - 1, Write Failures - 0
  Blocks Read- 49, Blocks Written - 8
```

```

Router#show ip iscsi stats detail
iSCSI Stats:
  Login Requests - 2, Login Responses - 2
  Logout Requests - 0, Logout Responses - 0
  Login Timeouts - 0, Logout Timeouts - 0
  SCSI Commands - 27, SCSI Responses - 27
  Data In PDUs - 25, Data Out PDUs - 0
  Immed Data - 1, Unsolicited Data - 0
  NOP Ins - 36, NOP Outs - 36
  Async Requests - 0, Async Req Logout - 0
  Async Drop Conn - 0, Async Drop Conns - 0
  R2t Requests - 0, Rejects - 0

System Stats:
  TX Queue Overflow - 0, RX Queue Overflow - 0
  Connection Resets - 0, Tasks aborted - 0

SCSI Stats:
  Total Requests - 27
  Test Unit Ready Requests - 1, Test Unit Ready Failures - 0
  Report Luns Requests - 1, Report Luns Failures - 0
  Lun Inquiry Requests - 5, Lun Inquiry Failures - 0
  Read Capacity Requests - 5, Read Capacity Failures - 0
  Read Requests - 14, Read Failures - 0
  Write Requests - 1, Write Failures - 0
  Blocks Read- 49, Blocks Written - 8
  
```

**Related Commands**

Command	Description
clear ip iscsi stats	Clears iSCSI statistics.

# show ip iscsi target

To display details about an iSCSI target, use the **show ip iscsi target** command in privileged EXEC mode.

**show ip iscsi target**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show ip iscsi target** command to display information about an iSCSI target.

**Examples** The following example shows output from the **show ip iscsi target** command:

```
Router#show ip iscsi target
Target Profile= TARGET_LINUX IN_USE
Target: name= iqn.2002-10.edu.unh.iol.iscsi.draft20-target:1
Target: ip= 10.76.43.233, port= 3260, portal group= 0
vrf= , sync read offset= 100, batch write= 100
write interval= 5 sec, file size= 100 MB #
```

Related Commands	Command	Description
	<b>show ip iscsi session</b>	Displays iSCSI sessions.
	<b>show ip iscsi stats</b>	Display iSCSI statistics.

# show policy-map apn

To display statistical and configuration information for all input and output policies attached to an APN, use the **show policy-map apn** command in privileged EXEC mode.

**show policy-map apn** *access-point-index*

## Syntax Description

<i>access-point-index</i>	Integer (from 1 to 65535) that identifies an access point. Information about that access point is shown.
---------------------------	--

## Defaults

No default behavior or values.

## Command Modes

Privileged EXEC

## 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 **show policy-map apn** command to display statistical and configuration information for all input and output policies attached to an APN.

## Examples

This section provides sample outputs of the **show policy-map apn** command. The output you see might vary slightly from the ones shown below.

### Example 1: Non Flow-Based Policing

The example provides sample output of the **show policy-map apn** command for non flow-based policing for access point 1, to which a service policy called "policy-non-flow" is attached (configured as shown below).

```
! Configures a class map with dscp based classification

class-map match-all class-dscp
  match ip dscp default

! Configures a policy with this class map

policy-map policy-nonflow
  class class-dscp
  police rate pdp
    conform-action transmit
    exceed-action set-dscp-transmit 15
```

```

        violate-action drop

! Attaches the policy to an APN

gprs access-point-list gprs
  access-point 1
    access-point-name static
    service-policy input policy-nonflow
  !

GGSN#show policy-map apn 1
APN 1

Service-policy input:policy-nonflow

Class-map:class-dscp (match-all)
  3 packets, 300 bytes
  30 second offered rate 0 bps, drop rate 0 bps
  Match:ip dscp default
  police:
    rate 8000 bps, burst 1000 bytes
    peak-rate 10000 bps, peak-burst 1400 bytes
    conformed 3 packets, 300 bytes; actions:
      transmit
    exceeded 0 packets, 0 bytes; actions:
      set-dscp-transmit 15
    violated 0 packets, 0 bytes; actions:
      drop
    conformed 0 bps, exceed 0 bps, violate 0 bps
Class-map:class-default (match-any)
  0 packets, 0 bytes
  30 second offered rate 0 bps, drop rate 0 bps
  Match:any

```

With the above configuration, the **show gprs umts-qos police pdp-context tid** command does not display any information for the configuration is not per-PDP based.

```

GGSN#show gprs umts-qos police pdp-context tid 1203000000000010
No Policing Statistics Available

```

### Example 2: Flow-Based Policing

The example provides sample output of the **show policy-map apn** command for flow-based policing for access point 1, to which a service policy called "policy-non-flow" is attached (configured as shown below).

```

! Configures a class map with flow based classification.

class-map match-all class-pdp
  match flow pdp
!
! Configures a policy-map and attach this class map into it.

policy-map policy-gprs
  class class-pdp
    police rate pdp
      conform-action set-dscp-transmit 15
      exceed-action set-dscp-transmit 15
      violate-action drop
!

```

**Note**

With non flow-based policing, the police rate is not provided using the police rate command but is taken dynamically from the configure maximum and guaranteed bit rates.

```
! Attaches the policy-map to the apn.

gprs access-point-list gprs
  access-point 1
    access-point-name static
    service-policy input policy-gprs
  !

GGSN#show policy-map apn 1
APN 1

Service-policy input:policy-gprs

Class-map:class-pdp (match-all)
  3 packets, 300 bytes
  30 second offered rate 0 bps, drop rate 0 bps
  Match:flow pdp
  police:
    rate pdp, bc 1500 bytes
    peak-rate pdp, be 1800 bytes
    conformed 0 packets, 0 bytes; actions:
      set-dscp-transmit 15
    exceeded 0 packets, 0 bytes; actions:
      set-dscp-transmit 15
    violated 0 packets, 0 bytes; actions:
      drop

Class-map:class-default (match-any)
  0 packets, 0 bytes
  30 second offered rate 0 bps, drop rate 0 bps
  Match:any
```

The **show policy-map** command displays the aggregated traffic count. To display the policing counters, issues the **show gprs umts-qos police pdp-context tid** command:

```
GGSN#show gprs umts-qos police pdp-context tid 1203000000000010
DOWNLINK POLICING STATISTICS
Flow id:1
  police:
    rate 5184000 , bc 1500 bytes
    peak-rate 7424000, be 1800 bytes
    conformed 2 packets, 200 bytes; actions:
      set-dscp-transmit 15
    exceeded 0 packets, 0 bytes; actions:
      set-dscp-transmit 15
    violated 0 packets, 0 bytes; actions:
      drop
```



**Example 3: Flow and DSCP-Based Policing**

In the following example, a policy map is created with both flow-based and DSCP-based classification. In this configuration, per-PDP policing occurs when both conditions are met. For example, if a packet is received by the GGSN for a PDP with a different DSCP value than the one configured in the class-map, policing does not occur.

```
! Configures a class map with match flow + DSCP based classification.
!
class-map match-all class-flow-dscp
  match ip dscp default
  match flow pdp
!
! Configure a policy-map with this class map
!
policy-map policy-flow-dscp
  class class-flow-dscp
    police rate pdp
      conform-action transmit
      exceed-action set-dscp-transmit 15
      violate-action drop

! Attaches the policy to an apn.

gprs access-point-list gprs
  access-point 1
  access-point-name static
  service-policy input policy-flow-dscp
!
```

**Note**


---

Data with DSCP value 0 has been processed.

---

```
GGSN#show policy-map apn 1
APN 1

Service-policy input:policy-flow-dscp

Class-map:class-flow-dscp (match-all)
  4 packets, 456 bytes
  30 second offered rate 0 bps, drop rate 0 bps
  Match:ip dscp default
  Match:flow pdp
  police:
    rate pdp, bc 1500 bytes
    peak-rate pdp, be 1800 bytes
    conformed 0 packets, 0 bytes; actions:
      transmit
    exceeded 0 packets, 0 bytes; actions:
      set-dscp-transmit 15
    violated 0 packets, 0 bytes; actions:
      drop

Class-map:class-default (match-any)
  0 packets, 0 bytes
  30 second offered rate 0 bps, drop rate 0 bps
  Match:any
```

```
GGSN#show gprs umts-qos police pdp-context tid 120300000000010
DOWNLINK POLICING STATISTICS
Flow id:1
  police:
    rate 5184000 , bc 1500 bytes
    peak-rate 7424000, be 1800 bytes
    conformed 3 packets, 342 bytes; actions:
      transmit
    exceeded 0 packets, 0 bytes; actions:
      set-dscp-transmit 15
    violated 0 packets, 0 bytes; actions:
      drop
```

A packet with a different DSCP value does not get policed.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>match flow</b>	Specifies PDP flows as the match criterion in a class map.
<b>police rate</b>	Configures traffic policing using the police rate.
<b>service-policy</b>	Attaches a service policy to an APN, to be used as the service policy for PDP flows of that APN.
<b>show gprs umts-qos police pdp-context tid</b>	Displays policing statistics for a PDP context.

# show record-storage-module stats

To display current record storage module (RSM) statistics, use the **show record-storage-module stats** command in privileged EXEC mode.

## show record-storage-module stats

**Syntax Description** This command has no arguments or keywords.

**Defaults** No default behavior or values.

**Command Modes** Privileged EXEC

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 **show record-storage-module stats** command to display RSM statistics.

**Examples** The following example shows output from the **show record-storage-module stats** command:

```
Router#show record-storage-module stats
RSM Appl Stats:
requests:
  open= 1, read= 0, write= 0
  ping= 0, close= 0
request fail:
  open= 0, read= 0, write= 0
  ping= 0, close= 0 | ta
alloc fail:
  appl info= 0, appl msg= 0, appl req= 0,
  data buffer= 0, drive= 0
RSM Clear:
  Statistics = 1

Router#
```

Related Commands	Command	Description
	<b>clear record-storage-module stats</b>	Clears current RSM-related statistics.

# show record-storage-module target-info

To display the number of record storage module (RSM) disks available their current status, use the **show record-storage-module target-info** command in privileged EXEC mode.

**show record-storage-module target-info** [**all** | **target-profile** *profile\_name*] [**detail**]

## Syntax Description

<b>all</b>	Displays statistics for all targets for which there are profiles.
<b>target-profile</b> <i>profile_name</i>	Displays statistics for a specific profile.
<b>detail</b>	Displays detailed information about the RSM drives.

## Defaults

No default behavior or values.

## Command Modes

Privileged EXEC

## 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 **show record-storage-module target-info** command to display RSM statistics by profile.

## Examples

The following example shows output from the **show record-storage-module target-info** command:

```
Router#show record-storage-module target-info all detail
Target profile = TARGET_LINUX
Application name = GGSN, Target State = Active, Disk = Usable
Application id = 2, iSCSI handle = 2
Number of drives = 5, Read drive = sda3, Write drive = sda3
Active drives:
  Drive = sda3
  File system id = 19
  Descriptors: read = -1, write = -1, master = -1
  Current File: bytes written = 0, bytes read = 0
  Master file in memory:
  Drive full = No
  Write: dir = 1, file = 1
  Read: dir = 1, file = 1, offset = 62675
  Salvage file = 0, CRC = 0x91C816C0
Failed drives:
  Drive = sda0
  Reason = Unexpected IFS error (Invalid DOS media or no media in slot)
  Drive = sda1
  Reason = Unexpected IFS error (Invalid DOS media or no media in slot)
  Drive = sda2
  Reason = Unexpected IFS error (Invalid DOS media or no media in slot)
  Drive = sda4
  Reason = Unexpected IFS error (Invalid DOS media or no media in slot)
```

# show tech-support

To display GPRS/UMTS protocol-specific information about the router when reporting a problem, use the **show tech-support** command in privileged EXEC mode and specify the **ggsn** keyword option.

**show tech-support [ ggsn ]**

<b>Syntax Description</b>	<b>ggsn</b> (Optional) Displays show command output specific to GPRS/UMTS.
---------------------------	--

<b>Defaults</b>	No default behavior or values.
-----------------	--------------------------------

<b>Command Modes</b>	Privileged EXEC
----------------------	-----------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	11.2	This command was introduced.
	12.3(8)XU	This command was integrated into Cisco IOS Release 12.3(8)XU and the <b>ggsn</b> keyword option 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.

<b>Usage Guidelines</b>	The output of <b>show tech-support ggsn</b> includes the ggsn-specific output displayed by the following commands:
-------------------------	--

- **show gprs charging parameters**
- **show gprs charging statistics**
- **show gprs charging status all**
- **show gprs gtp parameters**
- **show gprs gtp statistics**
- **show gprs gtp status**
- **show gprs memory threshold statistics**
- **show gprs qos status**
- **show running-config**
- **show version**

**Examples**

The following example shows the output of the **show tech-support ggsn** command:

```

GGSN# show tech-support ggsn

----- show version -----

Cisco IOS Software, 7200 Software (C7200-G8IS-M), Experimental Version
12.3(20040128:223808) [r50 104]
Copyright (c) 1986-2004 by Cisco Systems, Inc.
Compiled Sun 01-Feb-04 05:22 by user

ROM: System Bootstrap, Version 12.2(4r)B2, RELEASE SOFTWARE (fc2)
BOOTLDR: 7200 Software (C7200-KBOOT-M), Version 12.1(8a)E, EARLY DEPLOYMENT RELEASE
SOFTWARE (fc1)

ggsn uptime is 1 day, 21 hours, 4 minutes
System returned to ROM by reload at 19:48:49 EST Fri Jan 30 2004
System image file is "tftp://9.1.0.1/gota/c7200-g8is-mz"
Last reload reason: Reload command

Cisco 7206VXR (NPE400) processor (revision A) with 491520K/32768K bytes of memory.
Processor board ID 29550562
R7000 CPU at 350MHz, Implementation 39, Rev 3.3, 256KB L2, 4096KB L3 Cache
6 slot VXR midplane, Version 2.7

Last reset from s/w nmi

PCI bus mb0_mb1 has 600 bandwidth points
PCI bus mb2 has 40 bandwidth points

4 Ethernet interfaces
3 FastEthernet interfaces
125K bytes of NVRAM.

46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
8192K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

----- show running-config -----

Building configuration...

Current configuration : 6770 bytes
!
version 12.3
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service udp-small-servers
service tcp-small-servers
service gprs ggsn
!
hostname ggsn
!
boot-start-marker
boot-end-marker
!
logging queue-limit 100
no logging buffered
enable secret 5 <removed>
enable password <removed>
!
clock timezone EST -4

```

```
aaa new-model
!
aaa group server radius mwg
!
aaa group server radius list1
  server 10.76.82.75 auth-port 1645 acct-port 1646
!
aaa authentication ppp default local
aaa authentication ppp list1 local
aaa authorization network default local
aaa authorization network list1 local
aaa authorization configuration list1 group radius
aaa accounting update periodic 10
aaa accounting network default start-stop group radius
aaa accounting network list1 start-stop group radius
aaa session-id common
ip subnet-zero
!
ip cef
no ip domain lookup
ip host PAGENT-SECURITY-V3 39.26.7.9 17.99.0.0
!
ip dhcp pool TEST
  network 100.0.0.0 255.0.0.0
!
ip vrf vpn1
  rd 100:1
!
ip address-pool dhcp-proxy-client
vpdn enable
!
ipv6 unicast-routing
!
interface Tunnel0
  description to handle vrf traffic from APN1 on GGSN MWAM 1
  ip unnumbered Loopback3
  tunnel source Loopback3
  tunnel destination 20.20.120.20
!
interface Tunnel1
  no ip address
  shutdown
  tunnel source 17.1.101.1
  tunnel destination 13.1.101.1
!
interface Tunnel2
  no ip address
  shutdown
  tunnel source 17.1.102.1
  tunnel destination 13.1.102.1
!
interface Loopback0
  ip address 100.0.0.1 255.255.255.255
  no ip route-cache
  no ip mroute-cache
  shutdown
!
interface Loopback1
  ip address 33.44.55.66 255.255.0.0
  no ip route-cache
  no ip mroute-cache
  shutdown
!
interface Loopback2
```

```
ip address 35.0.0.1 255.0.0.0
no ip route-cache
no ip mroute-cache
shutdown
!
interface Loopback3
description interface for ggsn mwam 1
ip address 20.20.120.21 255.255.255.255
no ip route-cache
no ip mroute-cache
shutdown
!
interface FastEthernet0/0
ip address 9.3.66.3 255.255.0.0
no ip route-cache
no ip mroute-cache
duplex auto
speed auto
no cdp enable
!
interface FastEthernet0/1
ip address 20.20.51.31 255.255.255.0
shutdown
duplex auto
speed auto
!
interface FastEthernet1/0
ip address 1.1.1.1 255.255.255.0
shutdown
duplex half
!
interface Ethernet2/0
ip address 10.3.12.1 255.255.0.0
no ip route-cache
no ip mroute-cache
shutdown
duplex half
no cdp enable
!
interface Ethernet2/1
ip address 11.3.12.1 255.255.0.0
no ip route-cache
no ip mroute-cache
shutdown
duplex half
no cdp enable
!
interface Ethernet2/2
ip address 12.3.12.1 255.255.0.0
no ip route-cache
no ip mroute-cache
shutdown
duplex half
no cdp enable
!
interface Ethernet2/3
ip address 10.10.10.2 255.255.255.0
no ip route-cache
no ip mroute-cache
shutdown
duplex half
no cdp enable
!
interface Virtual-Template1
```



```

ip address 72.72.72.1 255.255.0.0
encapsulation gtp
gprs access-point-list 1
!
interface Virtual-Template2
ip unnumbered Loopback0
no peer default ip address
!
interface Virtual-Template3
description VT for PPP and PPP L2TP
ip unnumbered Loopback1
peer default ip address pool mypool
no keepalive
!
ip local pool pdsn-pool 6.6.10.1 6.6.10.255
ip local pool pdsn-pool 6.6.11.1 6.6.26.255
ip local pool pdsn-pool 6.6.27.1 6.6.42.255
ip local pool pdsn-pool 6.6.43.1 6.6.58.255
ip local pool pdsn-pool 6.6.59.1 6.6.64.255
ip local pool pdsn-pool 6.6.65.1 6.6.80.255
ip local pool pdsn-pool 55.55.10.1 55.55.25.253
ip local pool ha-pool 24.24.1.1 24.24.16.255
ip local pool mypool 85.0.0.0 85.0.0.255
ip local pool mypool 85.1.0.0 85.1.255.255
ip local pool mypool 85.2.0.0 85.2.255.255
ip local pool mypool 85.3.0.0 85.3.255.255
ip local pool pooltest 180.180.1.1 180.180.1.10
ip default-gateway 9.15.0.1
ip classless
ip route 7.7.7.1 255.255.255.255 Ethernet2/3
ip route 9.1.0.1 255.255.255.255 9.3.0.1
ip route 9.100.0.1 255.255.255.255 9.15.0.1
ip route 20.20.120.20 255.255.255.255 FastEthernet0/1
no ip http server
!
access-list 112 deny tcp any any
access-list 120 permit ip any host 10.1.102.1
access-list 150 permit icmp any 60.0.0.0 0.0.0.255
access-list 150 permit icmp 60.0.0.0 0.0.0.255 any
dialer-list 1 protocol ip permit
ipv6 router rip TEST2
poison-reverse
!
gprs maximum-pdp-context-allowed 45000
gprs qos map umts
gprs access-point-list 1
access-point 1
access-point-name gprs.cisco.com
aaa-group authentication list1
aggregate 1.1.0.0 255.255.0.0
access-violation deactivate-pdp-context
!
access-point 2
access-point-name ppp.com
ppp-regeneration
!
!
!
gprs gtp path-echo-interval 0
gprs gtp ip udp ignore checksum
gprs gtp ppp vtemplate 3
gprs gtp ppp-regeneration vtemplate 2
gprs default ip-address-pool radius-client
gprs default charging-gateway 12.3.11.1 13.3.11.1

```

```

gprs default map-converting-gsn 10.3.11.1
!
gprs charging server-switch-timer 0
gprs charging cdr-aggregation-limit 1
!
radius-server host 10.76.82.75 auth-port 1645 acct-port 1646
radius-server key <removed>
!
control-plane
!
mgcp modem passthrough voip mode ca
no mgcp timer receive-rtcp
!
dial-peer cor custom
!
!
gatekeeper
shutdown
!
alias exec pdp sh gprs gtp pdp all
alias exec pdptid show gprs gtp pdp tid
alias exec pdptid1 show gprs gtp pdp tid 1111111111111111
alias exec pdptid2 show gprs gtp pdp tid 2222222222222222
alias exec pdpclear clear gprs gtp pdp all
!
line con 0
exec-timeout 0 0
password <removed>
logging synchronous
login authentication console
transport preferred all
transport output all
stopbits 1
line aux 0
transport preferred all
transport output all
stopbits 1
line vty 0 4
exec-timeout 0 0
password <removed>
transport preferred all
transport input all
transport output all
line vty 5 15
transport preferred all
transport input all
transport output all
!
no scheduler max-task-time
!
end

```

```
----- show gprs gtp status -----
```

```

GPRS GTP Status:
  activated gtpv0 pdp      0
  activated gtpv1 pdp      0
  activated ms             0
  network init pdp        0
  activated ppp regen pdp  0
  activated ppp pdp        0
  gtp's ppp va hwidbs     0

```

```
----- show gprs gtp parameters -----
```

```

GTP path echo interval                = 0
GTP signal max wait time T3_response  = 1
GTP max retry N3_request              = 5
GTP dynamic echo-timer minimum        = 5
GTP dynamic echo-timer smooth factor  = 2
GTP buffer size for receiving N3_buffer = 8192
GTP max pdp context                   = 45000

```

----- show gprs gtp statistics -----

GGSN# **show gprs gtp statistics**

GPRS GTP Statistics:

version_not_support	0	msg_too_short	0
unknown_msg	0	unexpected_sig_msg	0
unexpected_data_msg	0	unsupported_comp_exthdr	0
mandatory_ie_missing	0	mandatory_ie_incorrect	0
optional_ie_invalid	0	ie_unknown	0
ie_out_of_order	0	ie_unexpected	0
ie_duplicated	0	optional_ie_incorrect	0
pdp_activation_rejected	2	tft_semantic_error	0
tft_syntactic_error	0	pkt_ftr_semantic_error	0
pkt_ftr_syntactic_error	0	non_existent	0
path_failure	0	total_dropped	0
signalling_msg_dropped	0	data_msg_dropped	0
no_resource	0	get_pak_buffer_failure	0
rcv_signalling_msg	7	snd_signalling_msg	7
rcv_pdu_msg	0	snd_pdu_msg	0
rcv_pdu_bytes	0	snd_pdu_bytes	0
total_created_pdp	3	total_deleted_pdp	2
total_created_ppp_pdp	0	total_deleted_ppp_pdp	0
ppp_regen_pending	0	ppp_regen_pending_peak	0
ppp_regen_total_drop	0	ppp_regen_no_resource	0
ntwk_init_pdp_act_rej	0	total_ntwkInit_created_pdp	0

GPRS Network behind mobile Statistics:

network_behind_ms APNs	1	total_download_route	5
save_download_route_fail	0	insert_download_route_fail	2
total_insert_download_route	3		

----- show gprs charging status all -----

GPRS Charging Protocol Status

=====

```

* Number of APNs : <0>
* Number of CDRs : <0>
* Number of closed CDRs buffered: <0>
* Number of Containers buffered: <0>
* Number of pending unack. CDR_Output_Msgs: <0>

```

----- show gprs charging parameters -----

GPRS Charging Protocol Parameters

=====

```

* Default Charging Gateway Address: <12.3.11.1>
* Default Backup Charging Gateway Address: <13.3.11.1>
* Default Tertiary Charging Gateway Address: UNDEFINED.
* Current Active Charging Gateway Address: <12.3.11.1>
* Current Backup Charging Gateway Address: <13.3.11.1>
* Charging Server Switch-Over Timer: <0> seconds.
* Charging Path Protocol: udp
* GTP' use short header: DISABLED

```

```

* Charging Message Options:
  Transfer Request:
- Packet Transfer Command IE:          DISABLED.
  Transfer Response:
- Number Responded:                    DISABLED.
* Charging MAP DATA TOS:               <3>
* Charging Transfer Interval:           <105> seconds.
* Charging Transfer Threshold:          <1048576> bytes.
* Charging CDR Aggregation Limit:       <1> CDRs per msg.
* Charging Packet Queue Size:           <128> messages.
* Charging Gateway Path Request Timer:  <0> Minutes.
* Charging Change Condition Limit:      <5>
* Charging SGSN Limit:                  DISABLED.
* Charging Time Limit:                  <0>
* Charging Send Buffer Size:             <1460>
* Charging Port Number:                 <3386>
* Charging Roamers CDR Only:            DISABLED.
* Charging CDR Option:
- Local Record Sequence Number:         DISABLED.
- APN Selection Mode:                   DISABLED.
- ChCh Selection Mode:                   DISABLED.
- IMS Signaling Context:                 DISABLED.
- External Charging ID:                  DISABLED.
- SGSN PLMN ID:                          DISABLED.
- Dynamic Address:                       ENABLED.
- Served PDP Address:                    ENABLED.
- PDP Type:                              ENABLED.
- Access Point Name:                     ENABLED.
- Network Initiated PDP:                 ENABLED.
- No Partial CDR Generation:             DISABLED.
- Node ID:                                DISABLED.
- Packet Count:                           DISABLED.
- Served MSISDN:                          DISABLED.
- Private Echo:                           DISABLED.
* Charging release:                       99
* Charging Tariff Time Changes:
- NO Tariff Time Changes
* Charging Service Mode:                  OPERATIONAL

```

----- show gprs charging statistics -----

GPRS Charging Protocol Statistics  
 =====

```

* Total Number of CDRs for Charging:      <0>
* Total Number of Containers for Charging: <0>
* Total Number of CDR_Output_Msgs sent:   <0>

-- Charging Gateway Statistics --
* Charging Gateway Down Count:            <0>

```

```
----- show gprs qos status -----
```

```
GPRS QoS Status:
```

```
type: UMTS
conversational_pdp      0  streaming_pdp      0
interactive_pdp        0  background_pdp      0
```

```
----- show gprs memory threshold statistics --
```

```
Memory Threshold Statistics
```

```
=====
```

```
GGSN memory threshold status :NOT IN THRESHOLD
```

```
Number of times reached :      0
Number of PDPs rejected :      0
Number of PDPs dropped due to
    duration limit :           0
    volume limit :             0
    update request :           0
```

```
Time when last memory threshold was reached :NEVER
```

# source interface

To configure the interface to use to connect to a Diameter peer, use the **source interface** command in Diameter peer configuration mode. To remove the interface configuration, use the **no** form of this command

**source interface** *interface\_name*

**no source interface**

<b>Syntax Description</b>	<i>interface_name</i> Name of the interface that the GGSN will use to communicate a Diameter peer.
---------------------------	--

<b>Defaults</b>	No default behavior or values.
-----------------	--------------------------------

<b>Command Modes</b>	Diameter peer configuration
----------------------	-----------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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.

<b>Usage Guidelines</b>	Use the <b>source interface</b> command to specify the interface to use for a Diameter peer-to-peer connection. The DCCA client process on the GGSN will use this source address and port to initiate the TCP connection to the peer.
-------------------------	---

<b>Examples</b>	The following configuration example fastEthernet0 as the source interface to use for the peer-to-peer connection:
-----------------	---

```
Diameter peer dcca1
  address ipv4 10.10.10.1
  transport tcp port 4000
  security ipsec
  source interface fastEthernet0
```

<b>Related Commands .</b>	<b>Command</b>	<b>Description</b>
	<b>address ipv4</b>	Configures the IP address of the Diameter peer host.
	<b>destination host</b>	Configures the Fully Qualified Domain Name (FQDN) of the Diameter peer
	<b>destination realm</b>	Configures the destination realm (domain name) in which the Diameter host is located.
	<b>diameter peer</b>	Defines the Diameter peer (server) and enters diameter peer configuration mode.

<b>Command</b>	<b>Description</b>
<b>ip vrf forwarding</b>	Defines the VRF associated with the Diameter peer.
<b>security</b>	Configures the security protocol to use for the Diameter peer-to-peer connection.
<b>timer</b>	Configures Diameter base protocol timers for peer-to-peer communication.
<b>transport</b>	Configures the transport protocol to use to connect with the Diameter peer.

# subscription-required

To specify that the gateway GPRS support node (GGSN) checks the value of the selection mode in a PDP context request to determine if a subscription is required to access a PDN through a particular access point, use the **subscription-required** command in access-point configuration mode. To specify that no subscription is required, use the **no** form of this command.

**subscription-required**

**no subscription-required**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No subscription is required

**Command Modes** Access-point 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 **subscription-required** command to specify that the GGSN checks the value of the selection mode in a PDP context request to determine if a subscription is required for user access to PDNs through the current access point. When you configure the **subscription-required** command at the APN, the GGSN looks for the “subscription verified” selection mode in the PDP context request to establish the session. If the GGSN finds that the selection mode is designated as subscription not verified in the PDP context request, then the GGSN rejects the PDP context request.

The subscription must be set up by the service provider, and subscription information must be passed with the mobile user’s PDP context requests.



**Examples**

The following example specifies that the GGSN checks for subscription verification in the selection mode before establishing a session at the access-point:

```
access-point 1
access-point-name gprs.somewhere.com
dhcp-server 10.100.0.3
dhcp-gateway-address 10.88.0.1
subscription-required
exit
```

# t3-response

To specify the initial time that the quota server waits before resending a signaling request message when a response to a request has not been received, use the **t3-response** command in quota server configuration mode. To return to the default value, use the **no** form of this command

**t3-response** *response-interval*

**no t3-response**

<b>Syntax Description</b>	<i>response-interval</i>	Value between 1 and 65535 that specifies the length of the T3 response interval, in seconds.
---------------------------	--------------------------	--

<b>Defaults</b>	1 second.
-----------------	-----------

<b>Command Modes</b>	Quota server configuration
----------------------	----------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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** The **t3-response** command is used by the GGSN to process delete PDP context requests and to perform the default method of echo timing.

For delete PDP context requests, the **t3-response** command is used to specify how long the quota server waits before sending a retry of the delete PDP context request when a response is not received from the CSG, until the n3-requests limit is reached.

**Examples** The following example configures a T3 interval response interval of 524 seconds:

```
ggsn quota-server qsl
 interface loopback1
  echo-interval 90
  n3-requests 3
  t3-response 524
```

<b>Related Commands .</b>	<b>Command</b>	<b>Description</b>
	<b>clear ggsn quota-server statistics</b>	Clears the quota server-related statistics displayed using the <b>show ggsn quota-server statistics</b> command.
	<b>csg-group</b>	Associates the quota server to a CSG group that is to be used for quota server-to-CSG communication.

<b>Command</b>	<b>Description</b>
<b>echo-interval</b>	Specifies the number of seconds that the quota server waits before sending an echo-request message to the CSG.
<b>ggsn quota-server</b>	Configures the quota server process that interfaces with the CSG for enhanced service-aware billing.
<b>interface</b>	Specifies the logical interface, by name, that the quota server will use to communicate with the CSG.
<b>n3-requests</b>	Specifies the maximum number of times that the quota server attempts to send a signaling request to the CSG.
<b>show ggsn quota-server</b>	Displays quota server parameters or statistics about the message and error counts.

# tariff-time

To specify that a charging profile use the tariff changes configured using the **gprs charging tariff-time** global configuration command, use the **tariff-time** command in charging profile configuration mode. To return to the default value, use the **no** form of this command.

**tariff-time**

**no tariff-time**

**Syntax Description** This command has no arguments or keywords.

**Defaults** No tariff-time changes

**Command Modes** Charging profile 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 **tariff-time** charging profile configuration command to specify that the time configured for tariff changes on the GGSN (using the **gprs charging tariff-time** global configuration command) apply to a charging profile created using the **gprs charging profile** global configuration or **charging profile** access-point configuration commands.

## Examples

The following example specifies that tariff-changes apply to a charging profile:

```
charging profile 10
  tariff-time
exit
```

## Related Commands..

Command	Description
<a href="#">category</a>	Identifies the subscriber category to which a charging profile applies.
<a href="#">cdr suppression</a>	Specifies that CDRs be suppressed as a charging characteristic in a charging profile.
<a href="#">charging profile</a>	Associates a default charging profile to an access point.
<a href="#">content dcca profile</a>	Defines a DCCA client profile in a GGSN charging profile.

<b>Command</b>	<b>Description</b>
<b>content postpaid time</b>	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.
<b>content postpaid validity</b>	Specifies as a trigger condition in a charging profile, the amount of time quota granted to a postpaid user is valid.
<b>content postpaid volume</b>	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.
<b>content rulebase</b>	Associates a default rule-base ID with a charging profile.
<b>description</b>	Specifies the name or a brief description of a charging profile.
<b>gprs charging characteristics reject</b>	Specifies that Create PDP Context requests for which no charging profile can be selected be rejected by the GGSN.
<b>gprs charging container time-trigger</b>	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.
<b>gprs charging profile</b>	Creates a new charging profile (or modifies an existing one), and enters charging profile configuration mode.
<b>limit duration</b>	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.
<b>limit sgsn-change</b>	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.
<b>limit volume</b>	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.

# timer

To configure Diameter base protocol timers for peer-to-peer communication, use the **timer** command in Diameter peer configuration mode. To remove the timer configurations, use the **no** form of this command

**timer** {**connection** | **transaction** | **watchdog**} *seconds*

**no timer** {**connection** | **transaction** | **watchdog**}

## Syntax Description

<b>connection</b>	Sets the maximum amount of time the GGSN attempts to reconnect to a Diameter peer after a connection to the peer has been brought down due to a transport failure. A value of 0 configures the GGSN to not try to reconnect.
<b>transaction</b>	Sets the maximum amount of time the GGSN waits for a Diameter peer to respond before trying another peer.
<b>watchdog</b>	Sets the maximum amount of time the GGSN waits for a Diameter peer to respond to a watchdog packet.  When the watchdog timer expires, a DWR is sent to the Diameter peer and the watchdog timer is reset. If a DWA is not received before the next expiration of the watchdog timer, a transport failure to the Diameter peer has occurred.
<i>seconds</i>	Maximum amount of time, in seconds, of the timer. Valid range, in seconds, is 1 to 1000.

## Defaults

30 seconds.

## Command Modes

Diameter peer 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 **timer** Diameter peer configuration command to configure Diameter base timers for a Diameter node.

When configuring timers, note that the value for the transaction timer, should be larger than the TX-timeout value, and, on the SGSN, the values configured for the number GTP N3 requests and T3 retransmissions must be larger than the sum of all possible server timers (RADIUS, DCCA, and CSG). Specifically, the SGSN N3\*T3 must be greater than 2 x RADIUS timeout + N x DCCA timeout + CSG timeout where:

- 2 is for both authentication and accounting.
- N is for the number of diameter servers configured in the server group.

**Examples**

The following example configures the frequency of connection attempts with a Diameter peer to 120 seconds.

```
Diameter peer dca1
address ipv4 10.10.10.1
transport tcp port 4000
security ipsec
source interface fastEthernet0
timer connection 120
```

**Related Commands .**

<b>Command</b>	<b>Description</b>
<b>address ipv4</b>	Configures the IP address of the Diameter peer host.
<b>destination host</b>	Configures the Fully Qualified Domain Name (FQDN) of the Diameter peer
<b>destination realm</b>	Configures the destination realm (domain name) in which the Diameter host is located.
<b>diameter peer</b>	Defines the Diameter peer (server) and enters diameter peer configuration mode.
<b>ip vrf forwarding</b>	Defines the VRF associated with the Diameter peer.
<b>security</b>	Configures the security protocol to use for the Diameter peer-to-peer connection.
<b>source interface</b>	Configures the interface to use to connect to the Diameter peer.
<b>transport</b>	Configures the transport protocol to use to connect with the Diameter peer.

# traffic-class

To allocate bandwidth from a bandwidth pool to a specific traffic class, use the **traffic-class** command in bandwidth pool configuration mode. To return to the default value, use the **no** form of this command.

**traffic-class** *traffic-class-name* [**percent**] *value*

**no traffic-class** *traffic-class-name* [**percent**] *value*

## Syntax Description

<i>traffic-class-name</i>	Specifies the traffic class for which you are allocating bandwidth. Valid values are conversational, streaming, interactive, or background.
<b>percent</b>	(Optional) Specifies that the bandwidth be allocated as a percentage rather than absolute value.
<i>value</i>	Specifies the bandwidth in either a percentage (1 to 100% when used with the optional <b>percent</b> keyword), or absolute value in kilobits per second (0 to 4292967295). Note that the same unit (percentage or absolute value) must be used for all traffic classes.

## Defaults

No bandwidth reservation is configured for any of the traffic classes, therefore, all PDPs are accepted.

## Command Modes

Bandwidth pool 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 **traffic-class** bandwidth pool configuration command to allocate bandwidth to a specific traffic class.



### Note

Before allocating the bandwidth in a bandwidth pool to a specific traffic class, the pool must be created using the **gprs qos bandwidth-pool** global configuration command.

The bandwidth can be allocated as a percentage or absolute value, however, the bandwidth unit must be consistent for all traffic classes (percentage and absolute value cannot be mixed within the same bandwidth pool).



If a traffic class is configured with 0 (absolute value) as the allocated bandwidth, the total bandwidth available for that traffic class is 0 kbps. Therefore, if a Create PDP Context request with that traffic class is received, it is rejected by the GGSN.

**Note**

Bandwidth reservation can be configured for real-time (conversational and streaming) and non real-time (interactive and background) class PDPs, however, bandwidth checking is performed only for real-time PDP contexts. All Create PDP Context requests for non real-time PDPs are allowed.

**Examples**

The following example reserves 15% of the total available bandwidth to the Background class of PDPs:

```
traffic-class background percent 15%
```

**Related Commands**

Command	Description
<b>bandwidth</b>	Defines the total bandwidth, in kilobits per second, for a bandwidth pool. Valid values are 1 to 4292967295.
<b>bandwidth-pool</b>	Applies a bandwidth pool to an APN.
<b>gprs qos bandwidth-pool</b>	Creates or modifies a bandwidth pool.
<b>traffic-class</b>	Allocates bandwidth pool bandwidth to a specific traffic class.

# transport

To configure the transport protocol to use to connect with a Diameter peer, use the **transport** command in Diameter peer configuration mode. To remove the configuration, use the **no** form of this command

```
transport {tcp | sctp} port port-number
```

```
no transport
```

## Syntax Description

<b>tcp</b>	Defines TCP as the transport protocol to use to connect to the Diameter peer.
<b>sctp</b>	Defines SCTP as the transport protocol to use to connect to the Diameter peer.
	<b>Note</b> SCTP is not supported as the transport protocol in GGSN Release 5.2.
<b>port port-number</b>	Port on the Diameter peer to use for peer-to-peer connection. The default is 3868.

## Defaults

No default behavior or values.

## Command Modes

Diameter peer 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 **transport** command to define the protocol to use to connect to a Diameter peer.

When the **no** form of this command is issued, all session that are bound to the peer cannot use the connection any longer. If there are any pending messages in the connection queue, the applications that sent the messages will be notified so that they can try alternate peers.

## Examples

The following configuration example configures TCP as the transport protocol between Diameter peers and port 4000 as the port to use for peer-to-peer communication:

```
Diameter peer dca1
address ipv4 10.10.10.1
transport tcp port 4000
```

## Related Commands

Command	Description
<b>address ipv4</b>	Configures the IP address of the Diameter peer host.
<b>destination host</b>	Configures the Fully Qualified Domain Name (FQDN) of the Diameter peer

<b>Command</b>	<b>Description</b>
<b>destination realm</b>	Configures the destination realm (domain name) in which the Diameter host is located.
<b>diameter peer</b>	Defines the Diameter peer (server) and enters diameter peer configuration mode.
<b>ip vrf forwarding</b>	Defines the VRF associated with the Diameter peer.
<b>security</b>	Configures the security protocol to use for the Diameter peer-to-peer connection.
<b>source interface</b>	Configures the interface to use to connect to the Diameter peer.
<b>timer</b>	Configures Diameter base protocol timers for peer-to-peer communication.

# trigger

To configure a condition that, when it occurs, triggers a DCCA client to request quota-reauthorization for a service-aware prepaid PDP context, use the **trigger** command in DCCA profile configuration mode. To remove the configuration, use the **no** form of this command.

**trigger** {sgsn-change | qos-change | rat | plmn-id}

**no trigger** {sgsn-change | qos-change | rat | plmn-id}

## Syntax Description

<b>sgsn-change</b>	Configures the DCCA client to request quota-reauthorization if SGSN changes occur.
<b>qos-change</b>	Configures the DCCA client to request quota-reauthorization if a QoS changes should occur.
<b>rat</b>	Configures a radio access technology (RAT) change change to trigger a quota-reauthorization request. The RAT indicates whether the SGSN serves the user equipment (UE) UMTS or GSM/EDGE RAN (GERAN).
<b>plmn-id</b>	Configures a public land mobile network (PLMN) ID change change to trigger a quota-reauthorization request.

## Defaults

No default behavior or values.

## Command Modes

DCCA profile 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.
12.4(9)XG	This command was integrated into Cisco IOS Release 12.4(9)XG and the <b>rat</b> and <b>plmn-id</b> keyword options were added.
12.4(15)XQ	This command was integrated into Cisco IOS Release 12.4(15)XQ.

## Usage Guidelines

Use the **trigger** command to configure changes that trigger the GGSN to request quota reauthorization for service-aware prepaid PDP contexts.

Modifying this command will not affect existing PDP contexts using a DCCA client.



### Note

This command is not supported by a vendor-specific DCCA client.

**Examples**

The following configuration example configures several conditions in a DCCA profile, “dcca-profile1” for prepaid PDP contexts, that when the condition occurs, triggers quota reauthorization:

```
gprs dcca profile dcca-profile1
  tx-timeout 100
  ccfh continue
  authorization dcca-net
  destination-realm cisco.com
  trigger sgsn-change
  trigger qos-change
  trigger rat-change
  trigger plmn-change
```

**Related Commands .**

Command	Description
<b>authorization</b>	Defines a method of authorization (AAA method list), in the DCCA client profile, that specifies the Diameter server groups.
<b>ccfh</b>	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.
<b>content dcca profile</b>	Defines the DCCA client profile in a GGSN charging profile.
<b>destination-realm</b>	Configures the destination realm to be sent in CCR initial requests to a DCCA server.
<b>gprs dcca profile</b>	Defines a DCCA client profile on the GGSN and enters DCCA client profile configuration mode.
<b>session-failover</b>	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.
<b>tx-timeout</b>	Configures a TX timeout value used by the DCCA client to monitor the communication of Credit Control Requests (CCRs) with a Diameter server.

# tx-timeout

To configure a TX timeout value used by the DCCA client to monitor the communication of Credit Control Requests (CCRs) with a Diameter server, use the **tx-timeout** command in DCCA client profile configuration mode. To return to the default values, use the **no** form of this command

**tx-timeout** *value*

**no tx-timeout**

<b>Syntax Description</b>	<i>value</i>	Amount of time, in seconds, a CRR can wait for a response from the Diameter sever before the DCCA client takes action. Valid range is 0 to 1000 seconds.
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<b>Defaults</b>	10 seconds.
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<b>Command Modes</b>	DCCA client profile configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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**

Typically, the Diameter base detects transport failures that occur with a Diameter server. For prepaid services, the time it takes for a response from the network is crucial, therefore the DCCA client can be configured to react faster than the Diameter base if necessary.

The Tx timer is used by the DCCA client to supervise the communication with the Diameter server. The timer is started with each initial and updated CCR. If the time configured for the timer elapses, the DCCA client takes an action on the PDP context depending on the current value of the Credit Control Fault Handling (CCFH) AVP for the credit control (CC) session.

When a response to all pending CCRs is received, the Tx timer is stopped.

**Examples**

The following configuration example sets the Tx time for a DCCA client to 25 seconds:

```
gprs dcca profile dcca-profile1
  authorization dcca-method
  tx-timeout 25
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>authorization</b>	Defines a method of authorization (AAA method list), in the DCCA client profile, that specifies the Diameter server groups.
<b>ccfh</b>	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.
<b>content dcca profile</b>	Defines the DCCA client profile in a GGSN charging profile.
<b>gprs dcca profile</b>	Defines a DCCA client profile on the GGSN and enters DCCA client profile configuration mode.
<b>session-failover</b>	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

# virtual-address

To configure a virtual IP address to which a quota server sends all CSG requests, use the **virtual-address** command in CSG group configuration mode. To deconfigure the virtual IP address, use the **no** form of this command

**virtual-address** *ip-address*

**no virtual-address** *ip-address*

<b>Syntax Description</b>	<i>ip-address</i>	Virtual IP address of the CSG group.
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<b>Defaults</b>	No default behavior or values.
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<b>Command Modes</b>	CSG group configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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.

<b>Usage Guidelines</b>	Use the <b>virtual-address</b> to configure the virtual IP address of a CSG group.
-------------------------	--

The virtual IP address is the address to which the quota server will send all requests, and is required before a path between the quota server and the CSG can come up.



**Caution**

Issuing the **no** form of this command will bring down a quota server-to-CSG path if is up.

<b>Examples</b>	The following configuration example configures CSG group csg1 to use the virtual IP address 5.5.5.14:
-----------------	---

```
ggsn csg-group csg1
  virtual-address 5.5.5.14
  port 4444
  real-address 5.1.1.1
  real-address 5.1.1.2
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<b>ggsn csg-group</b>	Configures a CSG group on the GGSN for quota server-to-CSG communication.
<b>port</b>	Configures the port number on which the CSG listens for quota server traffic.	



<b>Command</b>	<b>Description</b>
<b>real-address</b>	Configures the IP address of a real CSG for source checking on inbound messages from a CSG.
<b>show ggsn csg</b>	Displays the parameters used by the CSG group or the number of path and quota management messages sent and received by the quota server.

# vrf

To configure VPN routing and forwarding (VRF) at a gateway GPRS support node (GGSN) access point and associate an access point with a particular VRF instance, use the **vrf** command in access-point configuration mode.

**vrf** *vrf-name*

## Syntax Description

<i>vrf-name</i>	Name of the corresponding VRF instance with which the access point is associated.
-----------------	---

## Defaults

No default behavior or values.

## Command Modes

Access-point 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 **vrf** command to configure VRF at a GGSN access point and associate an access point with a particular VRF instance.



### Note

With GGSN Release 5.0 and later, you can assign multiple APNs to the same VRF.



### Note

Multiple VRFs can be associated with the same VRF instance.

The *vrf-name* should match the name configured in an **ip vrf** global configuration command, and also the **ip vrf forwarding** command at the Gi interface.

To support VRF, you must also enable Cisco Express Forwarding (CEF) switching on the router using the **ip cef** global configuration command.

If you are also configuring DHCP services at the APN, then you must also configure the **dhcp-server ip-address vrf** command.

**Note**

Memory constraints might occur if you define a large number of access points to support VRF.

**Note**

VRF is not supported on the Catalyst 6500/Cisco 7600 Supervisor / MSFC2. Therefore, to support VRF on the Catalyst 6500/Cisco 7600 platform, you must tunnel VRF encapsulated traffic through the Supervisor / MSFC2 via a GRE tunnel. For more information, see the *Cisco GGSN Release 5.1 Configuration Guide*.

**Examples**

The following example shows a VRF configuration for vpn3 (without tunneling) using the **ip vrf** global configuration command. Because the **ip vrf** command establishes both VRF and CEF routing tables, notice that **ip cef** also is configured at the global configuration level to enable CEF switching at all of the interfaces.

The following other configuration elements must also associate the same VRF named vpn3:

- FastEthernet0/0 is configured as the Gi interface using the **ip vrf forwarding** interface configuration command.
- Access-point 2 implements VRF using the **vrf** command access-point configuration command.

The DHCP server at access-point 2 also is configured to support VRF. Notice that access-point 1 uses the same DHCP server, but is not supporting the VRF address space. The IP addresses for access-point 1 will apply to the global routing table:

```

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
!
ip cef
!
ip vrf vpn3
  rd 300:3
!
interface Loopback1
  ip address 10.30.30.30 255.255.255.255
!
interface Loopback2
  ip vrf forwarding vpn3
  ip address 10.27.27.27 255.255.255.255
!
interface FastEthernet0/0
  ip vrf forwarding vpn3
  ip address 10.50.0.1 255.255.0.0
  duplex half
!
interface FastEthernet1/0
  ip address 10.70.0.1 255.255.0.0
  duplex half
!
interface loopback 1
  ip address 10.8.0.1 255.255.255.0
!

```

```

interface Virtual-Template1
 ip unnumber loopback 1
 encapsulation gtp
 gprs access-point-list gprs
 !
 ip route 10.10.0.1 255.255.255.255 Virtual-Template1
 ip route vrf vpn3 10.100.0.5 255.255.255.0 fa0/0 10.50.0.2
 ip route 10.200.0.5 255.255.255.0 fa1/0 10.70.0.2
 !
 no ip http server
 !
 gprs access-point-list gprs
 access-point 1
 access-point-name gprs.pdn.com
 ip-address-pool dhcp-proxy-client
 dhcp-server 10.200.0.5
 dhcp-gateway-address 10.30.30.30
 network-request-activation
 exit
 !
 access-point 2
 access-point-name gprs.pdn2.com
 access-mode non-transparent
 ip-address-pool dhcp-proxy-client
 dhcp-server 10.100.0.5 10.100.0.6 vrf
 dhcp-gateway-address 10.27.27.27
 aaa-group authentication foo
 vrf vpn3
 exit
 !
 gprs default ip-address-pool dhcp-proxy-client
 gprs gtp ip udp ignore checksum
 !
 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
<b>dhcp-server</b>	Specifies a primary (and backup) DHCP server to allocate IP addresses to MS users entering a particular PDN access point.
<b>ip cef</b>	Enables CEF on the RP card.
<b>ip vrf</b>	Configures a VRF routing table.
<b>ip vrf forwarding</b>	Associates a VRF with an interface or subinterface.
<b>rd</b>	Creates routing and forwarding tables for a VRF and and specifies the default route distinguisher for a VPN.