# 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. |

## 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 2 describes the fields shown in the display.

***Table 2 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 2 show data-store Field Descriptions (continued)*

| Field | Description |
|---|---|
| Current Status | Whether or not activity is occurring on the link. Possible values are:<br>• IDLE—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.<br>• WRITING—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.<br>• RETRIEVING—G-CDRs are being retrieved and forwarded to the active charging gateway. Once all records are retrieved, the PSD state moves to idle. |
| Operating Mode | Operational state of the PSD. Possible values are:<br>• UNDEFINED—PSD is configured on the GGSN but no connection established.<br>• STANDBY—PSD is configured and connection is established, but the PSD is in Standby mode (no writing or retrieving activity is occurring).<br>• ACTIVE—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. |
| Disk State | Whether or not disk space is available on the PSD. Possible values are AVAILABLE or FULL. |
| Data Present | Whether or not data currently exists on a disk. Possible values are YES or NO. |
| Auto retrieval | Whether or not the auto-retrieval feature has been configured for a PSD server group. |
| Client | PSD client. |

## Related Commands

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

## 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 3 describes the fields shown in the display.

*Table 3 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 3 show data-store statistics Field Descriptions (continued)*

| Field | Description |
|---|---|
| DRT Responses rcvd: Retrieved msgs forwarded | |
| DRT Responses rcvd:Disc full transitions | |

## Related Commands

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

| | |
|---|---|
| *name* | Name of the Diameter peer for which you want to display state information. |
| **all** | 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 19 describes the fields shown in the display.

***Table 4 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 4 show diameter peer Field Descriptions (continued)*

| Field | Description |
|---|---|
| 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** | Displays the parameters configured for a CSG group. |
| **statistics** | 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

| Command | Description |
|---|---|
| **ggsn csg-group** | Configures a CSG group on the GGSN for quota server-to-CSG communication. |
| **port** | Configures the port number on which the CSG listens for quota server traffic. |
| **real-address** | Configures the IP address of a real CSG for source checking on inbound messages from a CSG. |
| **virtual-address** | 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
  Seqnum 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 .**

| Command | Description |
|---|---|
| **clear ggsn quota-server statistics** | Clears the quota server-related statistics displayed using the **show ggsn quota-server statistics** command. |
| **csg-group** | Associates the quota server to a CSG group that is to be used for quota server-to-CSG communication. |
| **echo-interval** | Specifies the number of seconds that the quota server waits before sending an echo-request message to the CSG. |
| **ggsn quota-server** | Configures the quota server process that interfaces with the CSG for enhanced service-aware billing. |
| **interface** | Specifies the logical interface, by name, that the quota server will use to communicate with the CSG. |
| **n3-requests** | Specifies the maximum number of times that the quota server attempts to send a signaling request to the CSG. |
| **t3-response** | 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 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

| | |
|---|---|
| *access-point-index* | Integer (from 1 to 65535) that identifies a GGSN access point. Information about that access point is shown. |
| *access-point-index* **address-allocation** | TID and dynamically allocated mobile station (MS) addresses (by either a DHCP or RADIUS server) for PDP contexts on the specified access point are shown. |
| **all** | 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 | This command was integrated into Cisco IOS Release 12.2(4)MX.<br>• The following output fields were added to the display:<br>– accounting<br>– aggregate<br>– apn_accounting_server_group<br>– apn_authentication_server_group<br>– apn-type<br>– apn_username<br>– apn_password<br>– Block Roamer Mode<br>– GPRS vaccess interface<br>– VPN<br>– wait_accounting<br>• The following output fields were removed from the display:<br>– apn_charging_gw<br>– apn_backup_charging_gw<br>– apn_radius_server<br>• Several output field results were changed from binary 0 and 1 to Yes and No.<br>• The following output fields were added to the **all** version of this command:<br>– Access-type<br>– ppp-regeneration (max-session, setup time)<br>– VRF Name |
| 12.2(8)YD | 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. |
| 12.2(8)YW | This command was integrated into Cisco IOS Release 12.2(8)YW.<br>• The following output fields were added to the display:<br>– input ACL<br>– output ACL<br>– backup<br>– RADIUS attribute suppress MSISDN<br>– RADIUS attribute suppress IMSI<br>– RADIUS attribute suppress SGSN Address<br>– RADIUS attribute suppress QoS<br>• The format of the apn_username: , apn_password: display fields was changed to apn_username: apn_password:. |

| 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.<br>The following fields were added to the display:<br>• cac policy<br>• idle timeout<br>• input bandwidth pool<br>• input service-policy<br>• output bandwidth pool<br>• Service Mode<br>• session timeout |
| 12.3(8)XU2 | This command was integrated into Cisco IOS Release 12.3(2)XU2 and the **single pdp-session** 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:<br>• apn_type: Virtual pre-authenticate |
| 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:<br>• P-CSCF group name |

## 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 by 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 of 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
    wait_accounting: Disable
    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: foo
```

```
    apn_accounting_server_group: foo1
    apn_username:  apn_password:
    subscribe_required: No
    deactivate_pdp_context_on violation: Yes
    network_activation_allowed: 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
```

Table 5 describes the fields show in the display.

***Table 5 show gprs access-point Field Descriptions***

| Field | Description |
|---|---|
| accounting | Current status of accounting services at the APN:<br>• Enable—Accounting services are enabled at the APN. This is the default for non-transparent access APNs.<br>• Disable—Accounting services are disabled at the APN. This is the default for transparent access APNs.<br>You can configure an APN for accounting services using the **aaa-accounting** access-point configuration command. |
| aggregate | Route aggregation configuration information on the GGSN.<br>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.<br>The output field may contain the following information:<br>• 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.<br>• auto—Indicates that the GGSN uses the allocated IP mask from the DHCP or RADIUS server to perform route aggregation on the APN. This keyword appears when the APN has been configured with the **aggregate auto** access-point configuration command. This value only applies to the APN.<br>• Disable—Indicates that route aggregation is not configured at either the APN or global level. |
| apn_accounting_server_group | Name of the AAA server group providing accounting services. |
| apn_authentication_server_group | Name of the AAA server group providing authentication services. |
| apn_dhcp_gateway_addr | IP address of the DHCP gateway, if configured. |
| apn_dhcp_server | IP address of the DHCP server, if configured. |
| apn_index | Number assigned to this access point. |
| apn_mode | Current setting for the **access-mode** command:<br>• Transparent—Users are allowed access without authorization or authentication.<br>• Non-transparent—Users must be authenticated by the GGSN acting as a proxy for the authentication. |
| apn_name | Access point name. |

*Table 5 show gprs access-point Field Descriptions (continued)*

| Field | Description |
|---|---|
| apn-type | Current setting for the **access-type** command:<br>• Real—APN type that corresponds to a physical interface to an external network on the GGSN.<br>• Virtual—APN type that is not associated with any specific physical target network.<br>• 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. |
| apn_username | Username specified in the **anonymous user** command. If the **anonymous user** command is not configured, this field will be blank. |
| apn_password | Password specified in the **anonymous user** command. If the **anonymous user** command is not configured, this field will be blank. |
| backup | IP address of the backup DHCP server, if configured. |
| Block Foreign-MS Mode | Current setting for the **block-foreign-ms** command:<br>• Enable—Blocking for foreign MSs is configured.<br>• Disable—Blocking for foreign MSs is not configured. |
| cac policy | Name of the CAC maximum QoS policy applied to the APN, if any. |
| charging service mode | Indicates whether the charging functions of a GGSN are in operational or maintenance mode. |
| deactivate_pdp_context_on violation | Current setting for the **access-violation** command:<br>• No—User packets are discarded.<br>• Yes—Mobile sessions are terminated when there is an access violation. |
| dynamic_address_pool | Current setting for the **ip-address-pool** command. |
| GPRS vaccess interface | Name of the virtual access interface associated with the VPN.<br>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. |
| idle_timeout | Number of seconds the GGSN allows a PDP context to be idle before terminating the context as configured using the **gprs gtp pdp-context timeout idle** global configuration command. |
| input ACL | IP access list for inbound packets (Gi to Gn interfaces). |
| input bandwidth pool | Name of the bandwidth pool, if any, applied to the output (Gn) interface in the downlink direction. |
| input service-policy | Service policy attached to the APN using the **service-policy** access-point configuration command. |

*Table 5 show gprs access-point Field Descriptions (continued)*

| Field | Description |
|---|---|
| interim accounting | Indicates whether the ability to send interim accounting records to an accounting server when a routing area update or QoS change has occurred is configured using the aaa-accounting interim update command. The possible values are enabled or disabled. |
| Mobile-to-Mobile | Current setting for the **redirect intermobile ip** command. |
| network_activation_allowed | Indicates whether network-initiated PDP context support is configured using the **network-request-activation** command:<br>• No—Network-initiated PDP context support is disabled.<br>• Yes—Network-initiated PDP context support is enabled. |
| number of ip_address_allocated | Number of IP addresses allocated to MS users. |
| output ACL | IP access list for outbound packets (Gn to Gi interfaces). |
| output bandwidth pool | Name of the bandwidth pool, if any, applied to the output (Gi) interface in the uplink direction. |
| P-CSCF group name | Name of the P-CSCF server group(s) used by this APN for P-CSCF Discovery. |
| primary dns | IP address of the primary DNS to be sent in create PDP responses at the access point. |
| primary nbns | IP address of the primary NBNS to be sent in create PDP responses at the access point. |
| RADIUS attribute suppress IMSI | Current setting for the **radius attribute suppress imsi** command:<br>• Enabled—GGSN suppresses the 3GPP-IMSI number in its authentication and accounting requests to a RADIUS server.<br>• Disabled—GGSN does not suppress the 3GPP-IMSI number in its authentication and accounting requests to a RADIUS server. |
| RADIUS attribute suppress MSISDN | Current setting for the **msisdn suppression** command:<br>• Enabled—GGSN overrides or suppresses the MSISDN number in its RADIUS authentication.<br>• Disabled—GGSN does not override or suppress the MSISDN number in its RADIUS authentication. |
| RADIUS attribute suppress SGSN Address | Current setting for the **radius attribute suppress sgsn-address** command:<br>• Enabled—GGSN suppresses the 3GPP VSA 3GPP-SGSN-Address subattribute in its RADIUS authentication and accounting requests.<br>• Disabled—GGSN does not suppress the 3GPP VSA 3GPP-SGSN-Address subattribute in its RADIUS authentication and accounting requests. |

*Table 5 show gprs access-point Field Descriptions (continued)*

| Field | Description |
|---|---|
| RADIUS attribute suppress QoS | Current setting for the **radius attribute suppress qos** command:<br>• Enabled—GGSN suppresses the 3GPP VSA 3GPP-QoS-Profile subattribute in its RADIUS authentication and accounting requests.<br>• Disabled—GGSN does not suppress the 3GPP VSA 3GPP-QoS-Profile subattribute in its RADIUS authentication and accounting requests. |
| secondary dns | IP address of the secondary (backup) DNS to be sent in create PDP responses at the access point |
| secondary nbns | IP address of the secondary (backup) NBNS to be sent in create PDP responses at the access point. |
| Service Mode | Indicates whether a GGSN is in operational or maintenance mode. |
| session timeout | Amount of time the GGSN waits before purging mobile sessions for the access point configured using the **gtp pdp-context timeout session** command. |
| single pdp-session | Whether the GGSN has been configured to delete the primary PDP context, and any associated secondary PDP contexts, of a *hanging* PDP session upon receiving a new create request from the same MS that shares the same IP address of the hanging PDP context.<br>Possible values are:<br>• 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.<br>• Disabled—The feature is disabled on the access point and does not apply to any user regardless of their RADIUS user profile configuration.<br>• Mandatory—The feature is enabled on the APN and applies to all users on that APN regardless of their RADIUS user profile configuration. |
| subscribe_required | Current setting for the **subscription-required** command:<br>• No—No subscription is required.<br>• Yes—Subscription is required for access point users. The GGSN looks for the "subscription verified" selection mode in the PDP context request to establish the session. |
| Total number of PDP in this APN | Number of active PDP contexts for this access point. |
| Verify mobile source addr | Current setting for the **security verify source** command:<br>• Enabled—GGSN verifies the source IP address of upstream TPDUs against addresses previously assigned to MSs.<br>• Disabled—GGSN does not verify the source IP address of upstream TPDUs against addresses previously assigned to MSs. |

*Table 5 show gprs access-point Field Descriptions (continued)*

| Field | Description |
|---|---|
| Verify mobile destination addr | Current setting for the **security verify destination** command:<br>• Enabled—GGSN verifies the destination address of upstream TPDUs against the global list of PLMN addresses specified using the **gprs plmn ip address** command.<br>• Disabled—GGSN does not verify the destination address of upstream TPDUs against the global list of PLMN addresses specified using the **gprs plmn ip address** command. |
| VPN | Indicates whether a Virtual Private Network (VPN) is enabled or disabled 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. |
| wait_accounting | Current status of RADIUS accounting response message waiting at the APN:<br>• Enable—GGSN waits for an accounting response message from the RADIUS server before sending an activate PDP context request to the SGSN.<br>• 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.<br>You can configure RADIUS accounting response message waiting using the **gprs gtp response-message wait-accounting** global configuration command, or the **response-message wait-accounting** access-point configuration command. |

### Example 2

The following is sample output of 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 6 describes the fields show in the display.

*Table 6 show gprs access-point address-allocation Field Descriptions*

| Field | Description |
|---|---|
| TID | Tunnel ID for the PDP context request on the APN. |
| PDP_ADDRESS | IP address assigned to the 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 7 describes the fields show in the display.

*Table 7 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:<br>• transparent—Users who access the PDN through the access point associated with the current virtual template are allowed access without authorization or authentication.<br>• 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. |
| Access-type | Type of access point. The possible values are:<br>• Real—APN type that corresponds to an external physical network on the GGSN. This is the default value.<br>• 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. |
| AccessPointName | Access point network ID, which is commonly an Internet domain name. |

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

| Field | Description |
|---|---|
| ppp-regeneration (max-session, setup-time) | PPP regeneration session parameters configured at the access point:<br>• max-session—Maximum number of PPP regenerated sessions allowed at the access point.<br>• setup-time—Maximum amount of time (between 1 and 65535 seconds) within which a PPP regenerated session must be established. |
| VRF Name | Name of the VPN routing and forwarding instance associated with the APN. |

## Related Commands

| Command | Description |
|---|---|
| **access-point** | Specifies an access point number and enters access-point configuration mode. |

# show gprs access-point statistics

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:<br>• DHCP address requests sent by GGSN<br>• DHCP address requests successful<br>• DHCP address release sent by GGSN<br>• downstream packet count<br>• upstream packet count |
| 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 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 all

There are 3 Access-Points activated

Index   Mode            Access-type    AccessPointName     VRF Name
-------------------------------------------------------------------------
1       transparent        Real        coporate_1.com      corporate_1.com
     ppp regeneration (max-session: 10000, setup-time: 60)
     PDP activation initiated by MS:                 3
     Successful PDP activation initiated by MS:      3
     Dynamic PDP activation initiated by MS:         3
     Successful dynamic activation initiated by MS:  0
     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:             1
     Successful PDP deactivation initiated by GGSN:  1
     active PDP:                                     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 DHCP               0
     Src addr violation:        6 paks,    9136 bytes
     Dest addr violation:
     Redirected mobile-to-mobile traffic: 35 paks, 3480 bytes
-------------------------------------------------------------
4       transparent         gprs.pdn.com
     PDP activation initiated by MS:                 1
     Successful PDP activation initiated by MS:      1
     Dynamic PDP activation initiated by MS:         0
     Successful dynamic activation initiated by MS:  0
     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:             6
     Successful PDP deactivation initiated by GGSN:  6
     active PDP:                                     0
     upstream data volume in octets:                 0
     downstream data volume in octets:               0
     Src addr violation:        6 paks,    9136 bytes
     Dest addr violation:       6 paks,    9136 bytes
     Redirected mobile-to-mobile traffic: 35 paks, 3480 bytes
-------------------------------------------------------------
5       transparent         gpru.pdn.com
     PDP activation initiated by MS:                 1
     Successful PDP activation initiated by MS:      1
     Dynamic PDP activation initiated by MS:         0
     Successful dynamic activation initiated by MS:  0
     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:             0
     Successful PDP deactivation initiated by GGSN:  6
     active PDP:                                     0
```

```
upstream data volume in octets:                 0
downstream data volume in octets:               0
Src addr violation:        6 paks,    9136 bytes
Dest addr violation:       6 paks,    9136 bytes
Redirected mobile-to-mobile traffic: 35 paks, 3480 bytes
```

Table 8 describes the fields shown in the display:

***Table 8 show gprs access-point statistics Field Descriptions***

| Field | Description |
|---|---|
| active PDP | Number of 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 requests successful | Number of DHCP requests that were successful. |
| Dest addr violation | Number of packets (and bytes) dropped by the GGSN because of a source address violation. This field displays only when the **security verify destination** command is configured.<br>**Note** 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.) |
| 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.) |
| ppp-regeneration (max-session, setup-time) | PPP regeneration session parameters configured at the access point:<br>• max-session—Maximum number of PPP regenerated sessions allowed at the access point.<br>• 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 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 **redirect intermobile ip** command is configured. |

*Table 8 show gprs access-point statistics Field Descriptions (continued)*

| Field | Description |
|---|---|
| Src addr violation | Number of packets (and bytes) dropped because of source address violation. This field displays only when the **security verify source** 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". |
| 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

| Command | Description |
|---|---|
| **clear gprs access-point statistics** | Clears statistics counters for a specific access point or for all access points on the GGSN. |
| **show gprs access-point** | 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

| | |
|---|---|
| *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 |
|---|---|
| 12.3(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**

| Command | Description |
|---|---|
| **clear gprs access-point statistics** | Clears statistics counters for a specific access point or for all access points on the GGSN. |
| **gprs throughput interval** | Configures the interval at which the GGSN collects throughput data for APNs. |
| **show gprs access-point** | 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 bandwith-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 9 describes the fields shown in the display.

*Table 9 show gprs bandwidth-pool status Field Descriptions*

| Field | Description |
|---|---|
| BW Name | Name of the bandwidth pool as defined using the **gprs bandwidth-pool** global configuration command and each sub traffic class -based pools defined using the **traffic-class** bandwidth pool configuration command. |
| Total BW | Total amount of bandwidth, in kilobits per second, allocated to a bandwidth pool using the **bandwidth** 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 **traffic-class** 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 |
|---|---|
| **bandwidth** | Defines the total bandwidth, in kilobits per second, for a bandwidth pool. |
| **bandwidth-pool** | Applies a bandwidth pool to an APN. |
| **gprs qos bandwidth-pool** | Creates or modifies a bandwidth pool. |
| **traffic-class** | 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.<br>The following output fields were added to the display:<br>• Charging CDR Option Local Record Sequence Number<br>• Charging CDR Option No Partial CDR Generation<br>• Charging CDR Option Node ID<br>• Charging CDR Option Packet Count<br>• Charging Change Condition Limit<br>• Charging Send Buffer Size<br>• Charging GTP' Port Number<br>• Charging MCC Code<br>• Charging MNC Code<br>• Charging Roamers CDR Only<br>• Charging HPLMN Matching Criteria<br>• Charging SGSN Limit<br>The following output fields were removed from the display:<br>• Charging MCC Code<br>• Charging MNC Code<br>• Charging HPLMN Matching Criteria |
| 12.2(8)YD | This command was integrated into Cisco IOS Release 12.2(8)YD. |

| Release | Modification |
|---|---|
| 12.2(8)YW | This command was integrated into the Cisco IOS Release 12.2(8)YW.<br>• The Charging Path Protocol field was changed from binary 0 and 1 to udp and tcp.<br>• The Charging qos-info output field was changed to Charging release.<br>• The following output fields were added to the display:<br>– Charging Time Limit<br>– Charging qos-info<br>– Charging Transfer Format.<br>– GTP' use short header |
| 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 fields were added to the display:<br>• Access Point Name<br>• ChCh Selection Mode<br>• Default Tertiary Charging Gateway Address<br>• Dynamic Address<br>• External Charging ID<br>• PDP Type<br>• Served PDP Address<br>• Service Mode<br>• SGSN PLMN ID |
| 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 following fields were added to the display:<br>• Access Point Name Virtual<br>• Camel Charging Info<br>• IMEISV<br>• MS Time Zone<br>• Radio Access Technology<br>• User Location Information |
| 12.4(2)XB | This command was integrated into Cisco IOS Release 12.4(2)XB. |

## 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.
* 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
* Backup data store (PSD) Address:          172.28.28.28
* Retrieve only data store (PSD) Address    192.13.13.13
```

Table 10 describes the fields shown in the display.

***Table 10 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.<br>You can configure this limit using the **gprs charging cdr-aggregation-limit** command. |
| Charging CDR Option: Access Point Name<br><br>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.<br>You can enable the GGSN to provide the APN or virtual PAN parameter in G-CDRs using the **gprs charging cdr-option apn** and **gprs charging cdr-option apn virtual** 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.<br>You can enable the GGSN to provide the APN selection mode in G-CDRs using the **gprs charging cdr-option apn-selection-mode** 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.<br>You can enable the GGSN to include a copy of the tag and length of the CAMEL in G-CDRs using the **gprs charging cdr-option camel-charge-info** 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.<br>You can enable the GGSN to provide the APN parameter in G-CDRs using the **gprs charging cdr-option dynamic-address** command. |
| Charging CDR Option: IMEISV | Status indicating if the GGSN includes the International Mobile Equipment Identity IMEI software version (IMEISIV) in G-CDRs.<br>You can enable the GGSN to include the IMEISIV IE in G-CDRs using the **gprs charging cdr-option imeisv** command. |

*Table 10 show gprs charging parameters Field Descriptions (continued)*

| Field | Description |
|---|---|
| Charging CDR Option: Local Record Sequence Number | Status indicating if the GGSN uses the local record sequence field in G-CDRs. The possible values are enabled or disabled.<br>You can enable the GGSN to use the local record sequence field in G-CDRs using the **gprs charging cdr-option local-record-sequence-number** command. |
| Charging CDR Option: MS Time Zone | Status indicating if the GGSN includes the MS time zone (MSTZ) in G-CDRs.<br>You can enable the GGSN to provide MSTZ in G-CDRs using the **gprs charging cdr-option ms-time-zone** command. |
| Charging CDR Option: Network Initiated PDP | Status indicating if the GGSN includes the NIP parameter in G-CDRs. The possible values are enabled or disabled.<br>You can enable the GGSN to use the local record sequence field in G-CDRs using the **gprs charging cdr-option nip** command. |
| Charging CDR Option: No Partial CDR Generation | Status indicating if the GGSN can create partial CDRs. The possible values are enabled or disabled.<br>You can disable partial CDR generation by the GGSN using the **gprs charging cdr-option no-partial-cdr-generation** command. |
| Charging CDR Option: Node ID | 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.<br>You can enable the GGSN to use the node ID field in G-CDRs using the **gprs charging cdr-option node-id** command. |
| Charging CDR Option: Packet Count | 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.<br>You can enable the GGSN to provide packet counts using the **gprs charging cdr-option packet-count** command. |
| Charging CDR Option: PDP Type | Status indicating if the GGSN includes the PDP type parameter in G-CDRs. The possible values are enabled or disabled.<br>You can enable the GGSN to provide packet counts using the **gprs charging cdr-option pdp-type** command. |
| Charging CDR Option: Private Echo | Status indicating if the GGSN uses private echo signaling for flow control. The possible values are enabled or disabled.<br>You can enable private echo signaling using the **gprs charging flow-control private-echo** command. |

*Table 10 show gprs charging parameters Field Descriptions (continued)*

| Field | Description |
|---|---|
| Charging CDR Option: Radio Access Type-RAT | Status indicating if the GGSN includes the radio access technology (RAT) IE in G-CDRs.<br>You can enable the GGSN to provide the RAT IE in G-CDRs using the **gprs charging cdr-option rat-type** command. |
| Charging CDR Option: Served MSISDN | 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.<br>You can enable the GGSN to provide the MSISDN number using the **gprs charging cdr-option served-msisdn** command. |
| Charging CDR Option: Served PDP Address | 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.<br>You can enable this feature using the **gprs charging cdr-option pdp-address** command. |
| Charging CDR Option: SGSN PLMN ID | Status indicating if the GGSN includes the SGSN PLMN identifier in G-CDRs. The possible values are enabled or disabled.<br>You can enable the GGSN to include the SGSN PLMN identifier using the **gprs charging cdr-option sgsn-plmn** command. |
| Charging CDR Option: User Location Information | Status indicating if the GGSN includes the user location information (ULI) IE in G-CDRs.<br>You can configure the GGSN to include the ULI IE in G-CDRs using the **gprs charging cdr-option user-loc-info** command. |
| Charging Change Condition Limit | Maximum number of charging containers in each G-CDR.<br>You can configure the change condition limit using the **gprs charging container change-limit** command. |
| Charging Gateway Path Request Timer | 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.<br>You can configure the path request timer using the **gprs charging cg-path-requests** command. |

*Table 10 show gprs charging parameters Field Descriptions (continued)*

| Field | Description |
|---|---|
| Charging Gateway Priority Switchover | Whether or not the GGSN switches over to a charging gateway of higher priority when that gateway becomes active.<br><br>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).<br><br>You can enable the GGSN to switch over to a higher priority charging gateway using the **gprs charging switchover priority** command. |
| Charging MAP DATA TOS | 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.<br><br>You can configure the ToS mapping using the **gprs charging map data tos** command. |
| Charging Message Options: Number Responded | 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.<br><br>You can enable the GGSN to use the Number of Requests Responded field using the **gprs charging message transfer-response number-responded** command. |
| Charging Message Options: Packet Transfer Command IE | 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.<br><br>You can enable the GGSN to include the Packet Transfer Command IE in the Data Record Transfer Request messages using the **gprs charging message transfer-request command-ie** command. |
| Charging Message Options: Send Possibly Duplicated CDR | 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.<br><br>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 **gprs charging message transfer-request possibly-duplicate** command. |

*Table 10 show gprs charging parameters Field Descriptions (continued)*

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

*Table 10 show gprs charging parameters Field Descriptions (continued)*

| Field | Description |
|---|---|
| Charging SGSN Limit | Maximum number of SGSN changes that can occur before the GGSN closes a G-CDR for a particular PDP context. |
| Charging Tariff Time Changes | Time of day when GGSN charging tariffs change.<br>You can configure this time using the **gprs charging tariff-time** command. |
| Charging Transfer Interval | Amount of time (in seconds) that the GGSN waits before checking and sending any closed CDRs to the charging gateway.<br>You can configure this period of time using the **gprs charging transfer interval** command. |
| Charging Transfer Threshold | Maximum size (in bytes) that the GGSN maintains in a charging container before closing it and updating the CDR.<br>You can configure the container volume using the **gprs charging container volume-threshold** command. |
| Current Active Charging Gateway Address | IP address of the charging gateway to which the GGSN is currently sending charging data.<br>You can configure the primary charging gateway using the **gprs default charging-gateway** 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.<br>You can configure the backup charging gateway using the **gprs default charging-gateway** command. |
| Default Backup Charging Gateway Address | IP address of the default secondary (backup) charging gateway.<br>You can configure the default backup charging gateway using the **gprs default charging-gateway** command. |
| Default Tertiary Charging Gateway Address | IP address of the default tertiary (backup) charging gateway.<br>You can configure the default backup charging gateway using the **gprs default charging-gateway** command. |
| Default Charging Gateway Address | IP address of the default primary charging gateway.<br>You can configure the default primary charging gateway using the **gprs default charging-gateway** command. |

*Table 10 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).<br>You can configure the GGSN to use the GTP short header using the **gprs charging header short** 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 |
|---|---|
| **show gprs charging statistics** | 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 11 describes the fields shown in the display.

*Table 11 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 |
|---|---|
| **show gprs charging parameters** | Displays information about the current GGSN charging configuration. |
| **show gprs charging status** | 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

| | |
|---|---|
| **tid** *tunnel_id* | Specifies a tunnel ID for which you want to display charging statistics. |
| **access-point** *access-point-index* | Specifies the index of the access point for which you want to display charging statistics. |
| **all** | 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 12 describes the fields shown in the display.

***Table 12 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 13 describes the fields shown in the display.

***Table 13 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 13 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 14 describes the fields shown in the display.

*Table 14 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 **all** 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 **tid** and **access-point** 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 **tid** and **access-point** 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**

| Command | Description |
|---|---|
| **show gprs charging parameters** | Displays information about the current GGSN charging configuration. |
| **show gprs charging statistics** | 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

| | |
|---|---|
| **imsi** *imsi* | 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 **show gprs gtp ms all** command or the **show gprs gtp pdp-context tid** command. |
| **access-point** *access-point-index* | Displays MSs by access point. |
| **all** | 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.<br>• 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.<br>• The SGSN MCC/MNC field was added |
| 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 15 describes the fields shown in the display.

*Table 15 show gprs gtp ms Field Descriptions*

| Field | Description |
|---|---|
| IMSI | International mobile subscriber identity for the MSs. |
| MS ADDRESS | The IP address for the MSs.<br>**Note** 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 |
|---|---|
| **show gprs gtp pdp-context** | Displays a list of the currently active PDP contexts (mobile sessions). |
| **show gprs gtp status** | 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.<br>The following output fields were added to the display:<br>• Charging MCC Code<br>• Charging MNC Code<br>• Charging HPLMN Matching Criteria<br>• GTP dynamic echo-timer minimum<br>• GTP dynamic echo-timer smooth factor<br>The following output field was removed:<br>• GTP max hold time for old sgsn PDUs T3_tunnel |
| 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:<br>• GPRS HPLMN Matching Criteria |
| 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:<br>• GPRS MCC Code<br>• GPRS MNC Code |
| 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 16 describes the fields shown in the display.

*Table 16 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.<br>You can configure the N3 buffer using the **gprs gtp n3-buffer-size** command. |
| GTP dynamic echo-timer minimum | Current minimum time period (in seconds) used by the dynamic echo timer.<br>You can configure the minimum value using the **gprs gtp echo-timer dynamic minimum** command. |
| GTP dynamic echo-timer smooth factor | Current multiplier used by the GGSN to calculate the T-dynamic for the dynamic echo timer.<br>You can configure the smooth factor using the **gprs gtp echo-timer dynamic smooth-factor** command. |
| GTP max pdp context | Current maximum number of PDP contexts (mobile sessions) that can be activated on the GGSN.<br>You can configure the maximum number of PDP context requests using the **gprs maximum-pdp-context-allowed** command. |
| GTP max retry N3_request | Maximum number of times that the GGSN attempts to send a signaling request to an SGSN.<br>You can configure the maximum number of signaling requests made by the GGSN using the **gprs gtp n3-requests** command. |

*Table 16 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.<br>You can configure the path echo interval using the **gprs gtp path-echo-interval** command. |
| GTP signal max wait time T3_response | Interval, in seconds, that the GGSN waits before responding to a signaling request message.<br>You can configure the maximum interval using the **gprs gtp t3-response** command. |

## Related Commands

| Command | Description |
|---|---|
| **show gprs gtp statistics** | Displays the current GTP statistics for the GGSN (such as IE, GTP signaling, and GTP PDU statistics). |
| **show gprs gtp status** | 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** {**remote-address** *ip-address* [**remote-port** *remote-port-num*] | **version** *gtp-version* | **all**}

## Syntax Description

| | |
|---|---|
| **remote-address** *ip-address* | Displays GTP path information for a specified remote IP address. Optionally, displays GTP path information for a specified remote IP address and port number. |
| **remote-port** *remote_port_num* | (Optional) Displays GTP path information for a specified remote IP address and port number. |
| **version** *gtp-version* | Displays the GTP paths by the GTP version (0 or 1). |
| **all** | Displays information for all GTP paths. |

## 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 field was added to the display:<br>• Dynamic echo timer |
| 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.<br>• The **version** keyword option and the option to display GTP path information for a remote IP address and remote port number were added.<br>• The GTP version output field was added to the display. |
| 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 gtp path** command to display information about one or more GTP paths from the GGSN.

## Examples

### Example 1

The following example shows the output for the GTP path to the remote device with an IP address of 10.49.85.100:

```
router# show gprs gtp path 10.49.85.100
Local address       Remote address          GTP version         Dynamic echo timer
10.10.10.1(2123)    10.49.85.100(2123)      1                        5
10.10.10.1(2152)    10.49.85.100(2152)      1                        5
```

### Example 2

The following example shows the output for the GTP path to the remote device with an IP address of 10.49.85.100 and remote port number 2123:

```
router# show gprs gtp path 10.49.85.100 2123
Local address       Remote address          GTP version         Dynamic echo timer
10.10.10.1(2123)    10.49.85.100(2123)      1                        5
```

### Example 3

The following example shows the output for all paths on the GGSN that are using GTP version 1:

```
router# show gprs gtp path version 1
Local address       Remote address          GTP version         Dynamic echo timer
10.10.10.1(3386)    10.49.85.100(3386)      1                        5
10.10.10.1(3386)    10.7.7.7(3386)          1                        2
```

### Example 4

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

```
router# show gprs gtp path all
Total number of path : 3
Local address       Remote address          GTP version         Dynamic echo timer
10.10.10.1(3386)    10.49.85.100(3386)      1                        Disabled
10.10.10.1(3386)    10.1.1.1(3386)          0                        2
10.10.10.1(3386)    10.7.7.7(3386)          1                        5
```

Table 17 describes the fields shown in the display.

*Table 17 show gprs gtp path Field Descriptions*

| Field | Description |
|---|---|
| Total number of path | Total number of GTP paths currently established. |
| Dynamic echo timer | Current setting (in seconds) for the dynamic echo timer. “Disabled” appears when the dynamic echo timer is not in use. |
| 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. |

# 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

| | |
|---|---|
| **all** | Displays information for all GTP paths. |
| **remote-address** *ip-address* | 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. |
| **remote-port** *remote_port_num* | (Optional) Displays GTP path throughput information for a specified remote IP address and port number. |
| **version** *gtp-version* | 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 18 describes the fields shown in the display.

*Table 18 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

| | |
|---|---|
| **tid** *tunnel_id* **[service [all \| id** *id_string*]] | 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. |
| **ms-address** *ip_address* | Displays PDP contexts for the specified mobile station IP address (in dotted-decimal format). |
| **apn-index** *access-point-index* | (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. |
| **imsi** *imsi* | Displays PDP contexts by International Mobile Subscriber Identity (IMSI). The IMSI value can be up to 15 numeric digits. |
| **nsapi** *nsapi* [**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. |
| **path** *ip-address* [*remote_port_num*] | Displays PDP contexts by path. Optionally, displays PDP contexts by remote IP address and port number. |
| **access-point** *access-point-index* | Displays PDP contexts by access point. Possible values are 1 to 65535. |
| **pdp-type** {**ip** \| **ppp**} | Displays PDP contexts that are transmitted using either IP or PPP. |
| **qos-umts-class** | Displays PDPs by UMTS QoS traffic class. You can specify the following traffic classes: **background**, **conversational**, **interactive**, and **streaming**. This option is available when UMTS QoS is enabled. |
| **qos-precedence** | Displays PDP contexts for a specified GPRS QoS precedence type. You can specify the following precedence types: **low**, **normal**, and **high**. This option is available when GPRS QoS canonical QoS is enabled. |
| **qos-delay** | Displays PDP contexts for a specified GPRS quality of service delay class type. You can specify the following delay class types: **class1**, **class2**, **class3**, and **classbesteffort**. This option is available when GPRS QoS delayed-based QoS is enabled. |
| **version** *gtp-version* | Displays PDP contexts by GTP version. The possible values are 0 or 1. |
| **msisdn** [*msisdn*] | Displays all PDP contexts with MSISDN information. Optionally, displays particular PDPs filtered by the longest prefix match of the specified MSISDN. |
| **all** | 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 | This command was integrated into Cisco IOS Release 12.2(4)MX.<br>• The **pdp-type ppp** and **qos-delay** options were added to the command.<br>• The following fields were added to the output display of the **tid** version of this command:<br>– cef_down_byte<br>– cef_down_pkt<br>– cef_drop<br>– cef_up_byte<br>– cef_up_pkt<br>– gtp pdp idle time<br>• The Network Init Information section was added to the output display of the **tid** version of this command with the following new fields:<br>– Buf.Bytes<br>– MNRG Flag<br>– NIP State<br>– PDU Discard Flag<br>– SGSN Addr<br>• The following fields were removed from the output display of the **tid** version of this command:<br>– fast_up_pkt<br>– fast_up_byte<br>– fast_down_pkt<br>– fast_down_byte<br>– fast_drop<br>• The “dynamic?” and “Dynamic” fields were removed from the output display of the **all** and **tid** versions of this command, and were replaced by the Source field. |

| Release | Modification |
|---|---|
| 12.2(8)YD | This command was integrated into Cisco IOS Release 12.2(8)YD and the following fields were added to the output display of the **tid** version of this command:<br>• primary dns<br>• secondary dns<br>• primary nbns<br>• secondary nbns |
| 12.2(8)YW | This command was integrated into the 12.2(8)YW.<br>• The the option of displaying PDP contexts by remote IP address and port number was added.<br>• The delay Qos class(req.) output field was added to the display of the **tid** version of this command when the mapping of GPRS QoS categories to delay QoS classes is enabled.<br>• The **ms-address**, **imsi**, **qos-umts-class** and **version** options were added to the command.<br>• The ggsn_addr_signal field was changed to the sgsn_addr_data in the output display of the **tid** version of this command.<br>• The following fields were added to the output display of the **tid** version of this command:<br>– control teid local<br>– control teid remote<br>– data teid local<br>– data teid remote<br>– primary pdp<br>– nsapi |
| 12.3(2)XB | 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. |

| Release | Modification |
|---|---|
| 12.3(8)XU | This command was integrated into Cisco IOS Release 12.3(8)XU.<br>• The following fields were added to the output display of the **tid** version of this command:<br>– charging characteristics<br>– charging characteristics received<br>– Framed_route<br>– idle timeout<br>– mask<br>– roamer<br>– session timeout<br>– visitor<br>• The gtp pdp idle time field were removed from the output display of the **tid** version of this command.<br>• An overflow indicator (+) was added to the following fields of the output display of the **tid** version of this command:<br>– cef_down_pkt<br>– cef_up_pkt<br>– rcv_pkt_count<br>– send_pkt_count |
| 12.3(8)XU2 | 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 **tid** version of this command. |
| 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 the Cisco IOS Release 12.3(14)YQ.<br>• The option of display the service category in a PDP context was added was added.<br>• The following fields were added to the **tid** version of this command when the **service** keyword option is specified:<br>– Diameter Credit Control<br>– Current Billing Status<br>– Reason to convert to postpaid<br>– DCCA profile name and Source<br>– Rule base id and Source<br>– ServiceID<br>– State<br>– Quota(octets)<br>– Time<br>– flags<br>– Last pushed quota<br>- Tariff Time Change<br>- Time Quota<br>- Volume Quota<br>- Validity Time<br>- Quota ConsumptionTime<br>- Quota Holding time<br>- Time Quota Threshold<br>- Volume Quota Threshold<br>- Trigger Flags<br>– Last received quota<br>- Tariff_time_change<br>- Time_quota<br>- Volume_quota<br>- Validity_time<br>- Quota ConsumptionTime<br>- Quota Holding_Time<br>- Time Quota Threshold<br>- Volume Quota Threshold<br>- Trigger Flags |

| Release | Modification |
|---|---|
| 12.3(14)YU | This command was integrated into the Cisco IOS Release 12.3(14)YU and the **msisdn** [*msisdn*] keyword option was added.<br><br>Additionally, the QoS for charging field was removed from the **show gprs gtp pdp-context tid** command display and when a PDP is created via a virtual APN, the following field has been added to the **show gprs gtp pdp-context tid** command display:<br><br>• virtual-apn: *virtual-apn-name* |
| 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 19 describes the fields shown in the display.

*Table 19 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.<br>**Note** 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:<br>• DHCP—Dynamic address allocation using DHCP.<br>• IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol.<br>• Local—Dynamic address allocation using a local pool.<br>• Pending—Waiting for dynamic address allocation. Dynamic address source is unknown.<br>• Radius—Dynamic address allocation using RADIUS.<br>• Static—IP address is not dynamically assigned. |
| 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
mnrgflag:         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 20 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 20 describes the fields shown in the display.

***Table 20 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:<br>• 01—Best effort<br>• 02—Normal<br>• 03—Premium<br>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:<br>• 01—Best effort<br>• 02—Normal<br>• 03—Premium<br>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.<br>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.<br>The profile index, which is used to select the charging profile, is the integer obtained by dividing the charging characteristics received value by 256. |
| 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.<br>This field displays for PDP contexts created with GTP version 1. |

*Table 20 show gprs gtp pdp-context tid Field Descriptions (continued)*

| Field | Description |
|---|---|
| control teid remote | Downlink TEID chosen by the SGSN for control plane messages.<br>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.<br>This field displays for PDP contexts created with GTP version 1. |
| data teid remote | Downlink TEID chosen by the SGSN for PDUs.<br>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.<br>This field displays only when the **security verify destination** command is configured.<br>**Note** 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.<br>This field displays when canonical QoS is enabled on the GGSN.<br>**Note** 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 20 show gprs gtp pdp-context tid Field Descriptions (continued)*

| Field | Description |
|---|---|
| gprs qos_neg | Negotiated quality of service for the PDP context. The field is in the format *vwxyzz*, which represents the following QoS classes (as defined in the GSM specifications for quality of service profiles):<br>• *v*—Delay class<br>• *w*—Reliability class<br>• *x*—Peak throughput class<br>• *y*—Precedence class<br>• *zz*—Mean throughput class<br>**Note** 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 *Cisco IOS Mobile Wireless Configuration Guide*. |
| gprs qos_req | Requested quality of service by the PDP context. The field is in the format *vwxyzz*, which represents the following QoS classes (as defined in the GSM specifications for GPRS QoS profiles):<br>• *v*—Delay class<br>• *w*—Reliability class<br>• *x*—Peak throughput class<br>• *y*—Precedence class<br>• *zz*—Mean throughput class<br>**Note** See the Note in the description of the gprs qos_neg output field above. |
| idle timeout | Number of seconds the GGSN waits before purging idle PDP contexts. |
| 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.<br>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. |
| mask | Framed-Route subnet. |
| mnrgflag | Mobile not reachable flag, with the following values:<br>• 0—flag is off.<br>• 1—flag is on, indicating that the MS is not reachable |

*Table 20 show gprs gtp pdp-context tid Field Descriptions (continued)*

| Field | Description |
|---|---|
| MS_ADDR and MS Address | IP address of the mobile station.<br>**Note** 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).<br>This field displays for PDP contexts created with GTP version 1. |
| ntwk_init_pdp | Network initiated PDP context indicator, with the following values:<br>• 0—Not a network initiated PDP context. This indicates a mobile initiated PDP context.<br>• 1—Network initiated PDP context |
| 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).<br>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 **redirect intermobile ip** command is configured. |

*Table 20 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 *hanging* 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:<br>• DHCP—Dynamic address allocation using DHCP.<br>• IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol.<br>• Local—Dynamic address allocation using a local pool.<br>• Pending—Waiting for dynamic address allocation. Dynamic address source is unknown.<br>• Radius—Dynamic address allocation using RADIUS.<br>• Static—IP address is not dynamically assigned. |
| Src addr violation | Number of packets (and bytes) dropped because of source address violation. This field displays only when the **security verify source** 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 20 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 21 describes the fields shown in the Network Init Information section of the output.

*Table 21 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.<br>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:<br>• 0—flag is off.<br>• 1—flag is on, indicating that the MS is not reachable |
| NIP State | State information for the network initiated PDP process on the GGSN. |

*Table 21 show gprs gtp pdp-context tid Network Init Information Field Descriptions*

| Field | Description |
|---|---|
| PDU Discard Flag | Discarded PDU indicator for a network initiated PDP context, with the following values:<br>• 0—PDUs are not discarded. This indicates that PDUs for a network initiated PDP context are being sent to the SGSN.<br>• 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.”<br><br>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 **gprs ntwk-init-pdp pdu-discard-period** command. |
| 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 22 describes the fields shown in the display.

*Table 22 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:<br>• DHCP—Dynamic address allocation using DHCP.<br>• IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol.<br>• Local—Dynamic address allocation using a local pool.<br>• Pending—Waiting for dynamic address allocation. Dynamic address source is unknown.<br>• Radius—Dynamic address allocation using RADIUS.<br>• Static—IP address is not dynamically assigned. |
| 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

| Command | Description |
|---|---|
| **show gprs access-point** | Displays information about access points on the GGSN. |
| **show gprs gtp status** | 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:<br>• total created_pdp<br>• total deleted_pdp |
| 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:<br>• ntwk_init_pdp_act_rej<br>• ppp_regen_pending<br>• ppp_regen_pending_peak<br>• ppp_regen_total_drop<br>• ppp_regen_no_resource<br>• total created_ppp_pdp<br>• total ntwkInit created pdp |
| 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:<br>• tft_semantic_error<br>• tft_syntactic_error<br>• packet_filter_semantic_error<br>• packet_filter_syntactic_error<br>• total deleted_ppp_pdp |
| 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:<br>• insert_download_route_fail<br>• network_behind_ms APNs<br>• pdp_wo_tft_exist<br>• save_download_route_fail<br>• total_download_route<br>• total_insert_download_route<br>• unsupported_comp_exthdr |
| 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:<br>• create_as_update<br>• create_collide_with_delete<br>• no_sgsn_local_del_pdp<br>• path_fail_local_del_pdp<br>• rcv_retransmit_create_req<br>• version_changes<br>• ver_upgrade_local_del<br>• ver_faillback_local_del |

## 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:

```
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            pdp_wo_tft_exist
```

```
 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            single pdp-session cleared  0

Debug info:
 path_fail_local_del_pdp     0          ver_upgrade_local_del     0
 no_sgsn_local_del_pdp       0          ver_faillback_local_del   0
 create_collide_with_delete  0          version_changes           0
 rcv_retransmit_create_req   0          create_as_update          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
```

Table 23 describes the fields shown in the display:

***Table 23 show gprs gtp statistics Field Descriptions***

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

*Table 23 show gprs gtp statistics Field Descriptions (continued)*

| Field | Description |
|---|---|
| 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. |
| 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). |
| 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. |
| 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. |

*Table 23 show gprs gtp statistics Field Descriptions (continued)*

| Field | Description |
|---|---|
| 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. |
| rcv_pdu_bytes | Number of bytes received in protocol data units (PDUs). |
| rcv_pdu_msg | Number of PDU messages received. |
| rcv_signaling_msg | Number of GTP signaling messages received. |
| save_download_route_fail | Number of times a downloaded route could not be saved because there was not enough memory. |
| 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. |
| 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 created_pdp | Total number of PDP contexts created since system startup (supports Special Mobile Group (SMG)-28 standards level and later) |
| total created_ppp_pdp | Total number of PDP contexts created for PPP PDP PDU types. |
| total deleted_pdp | Total number of PDP contexts deleted since system startup (supports SMG-28 standards level and later) |
| total deleted_ppp_pdp | Total number of PDP contexts created for PPP PDP PDU types deleted since system startup. |
| total_download_route | Total number of routes downloaded from the RADIUS server. |
| total_dropped | Number of GTP messages dropped. |
| 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). |
| unexpected_data_msg | Number of GTP PDUs received for nonexistent PDP contexts. |

*Table 23 show gprs gtp statistics Field Descriptions (continued)*

| Field | Description |
|---|---|
| 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. |

## Related Commands

| Command | Description |
|---|---|
| **show gprs gtp parameters** | Displays the current GTP parameters configured on the GGSN. |
| **show gprs gtp path** | Displays information about one or more GTP paths between the GGSN and other GPRS devices. |
| **show gprs gtp pdp-context** | Displays a list of the currently active PDP contexts (mobile sessions). |
| **show gprs gtp status** | Displays information about the current status of GTP on the GGSN. |
| **show gprs charging statistics** | Displays current statistics for the transfer of charging packets between the GGSN and charging gateways. |

# 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:<br>• activated_ppp_pdp<br>• activated_ppp_regen_pdp<br>• ntwk_init_pdp<br>• qos_delay1_pdp<br>• qos_delay2_pdp<br>• qos_delay3_pdp<br>• qos_delaybesteffort_pdp |
| 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:<br>• activated gtpv0 pdp<br>• activated gtpv1 pdp<br>• activated ms |
| 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:<br>• Prepaid PDPs<br>• Postpaid PDPs |
| 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 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:

```
GGSN# show gprs gtp status

GPRS GTP Status:
  activated gtpv0 pdp     0
  activated gtpv1 pdp     5
  activated ms            5
  network init pdp        0
  activated ppp regen pdp 0
  activated ppp pdp       0
  gtp's ppp va hwidbs     0
Service-aware Status:
  Prepaid PDPs            3
  Postpaid PDPs           2
```

Table 24 describes the fields shown in the display.

*Table 24 show gprs gtp status Field Descriptions*

| Field | Description |
|---|---|
| activated gtpv0 pdp | Number of PDP contexts created with GTP version 0. |
| activated gtpv1 pdp | Number of PDP contexts created with GTP version 1. |
| activated ms | Number of active mobile stations (MS). |
| activated_pdp | Number of PDP contexts currently activated. This number includes PDP contexts initiated by both the MS and the network (PDN). |
| activated_ppp_pdp | Number of point-to-point protocol PDP contexts currently activated. |
| activated_ppp_regen_pdp | Number of point-to-point protocol PDP contexts created on the GGSN. |
| gtp’s ppp va hwidbs | |
| ntwk_init_pdp | Current number of active PDP contexts that are initiated by the network to an MS. |
| Prepaid PDPs | Current number of active prepaid PDP contexts. |
| Postpaid PDPs | Current number of active postpaid PDP contexts. |

## Related Commands

| Command | Description |
|---|---|
| **encapsulation gtp** | Sets the encapsulation type for all connections established using the virtual template to GTP. This is mandatory for all GTP interfaces. |
| **show gprs gtp statistics** | 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 25 describes the fields shown in the display.

*Table 25 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 limt trigger configured using the **limit duration** 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 **limit volume** 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 26 describes the fields shown in the display.

*Table 26 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 |
|---|---|
| **gprs ms-address exclude-range** | 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. |

## 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:

```
GGSN#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
```

## Related Commands

| Command | Description |
|---|---|
| **gprs pcscf** | Configures a P-CSCF server group on the GGSN and enters P-CSCF group configuration mode. |
| **pcscf** | Assigns a P-CSCF server group to an APN. |
| **server** | Specifies the IP address of a P-CSCF server you want to include in the P-CSCF server group. |
| **show gprs access-point** | 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 |
|---|---|
| **gprs mcc mnc** | 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 26 describes the fields shown in the display.

*Table 27 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 |
|---|---|
| **gprs plmn ip address** | 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 28 describes the fields shown in the display.

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

| Field | Description |
|---|---|
| type | Type of QoS. Possible QoS types are:<br>• Canonical—Configured using the **gprs qos map canonical-qos** command.<br>• Delay—Configured using the **gprs qos map delay** command.<br>• UMTS—Configured using the **gprs qos map umts** command.<br>• None—No QoS is configured on the GGSN. |
| 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 29 describes the fields shown in the display.

***Table 29 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. |
| 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. |

*Table 29 show gprs qos status Field Descriptions*

| Field | Description |
|---|---|
| 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:<br>• Canonical—Configured using the **gprs qos map canonical-qos** command.<br>• Delay—Configured using the **gprs qos map delay** command.<br>• UMTS—Configured using the **gprs qos map umts** command.<br>• None—No QoS is configured on the GGSN. |

### 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 30 describes the fields shown in the display.

*Table 30 show gprs qos status Field Descriptions*

| Field | Description |
|---|---|
| type | Type of QoS. Possible QoS types are:<br>• Canonical—Configured using the **gprs qos map canonical-qos** command.<br>• Delay—Configured using the **gprs qos map delay** command.<br>• UMTS—Configured using the **gprs qos map umts** command.<br>• None—No QoS is configured on the GGSN. |
| 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 classifed 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 |
|---|---|
| **gprs qos map canonical-qos** | Enables mapping of GPRS QoS categories to a canonical QoS method that includes best-effort, normal, and premium QoS classes. |
| **gprs qos map delay** | Enables Delay QoS on the GGSN. |
| **gprs qos map umts** | 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**]

## Syntax Description

| | |
|---|---|
| **statistics** | Displays GTP-SR statistics. |

## Defaults

No default behavior or values.

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 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 31 describes the fields shown in the display.

***Table 31 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 31 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 |
|---|---|
| **clear gprs redundancy statistics** | Clears statistics related to GTP-SR. |
| **gprs redundancy** | Enables GTP-SR on a GGSN. |
| **gprs redundancy charging sync-window cdr rec-seqnum** | Configures the window size used to determine when the CDR record sequence number needs to be synchronized to the Standby GGSN. |
| **gprs redundancy charging sync-window gtpp seqnum** | 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 32 describes the fields shown in the display.

*Table 32 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 procdure such as Quota-Push needs to be performed for multiple categories in a single CCR/CCA. |

*Table 32 show gprs service-aware statistics Field Descriptions (continued)*

| Field | Description |
|---|---|
| category_fsm_return_error | Number of internal erros 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 contect has been rejected for other reasons. |

**Related Commands**

| Command | Description |
|---|---|
| **clear gprs service-aware statistics** | 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:<br>• SLB Notifications sent<br>– CAC failure<br>– Subscriber ext<br>The following fields were added to the SLB Statistics section of the display:<br>• CAC-failure notifications sent<br>• Session-deletion notifications sent<br>• PDP status notifications sent<br>• PDP status negative response sent<br>• PDP status requests received |

## 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 33 describes the fields shown in the display.

***Table 33 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 **gprs slb notify** command occurs. |

## Related Commands

| Command | Description |
|---|---|
| **clear gprs slb statistics** | Clears Cisco IOS SLB statistics. |
| **gprs slb mode** | Defines the Cisco IOS SLB operation mode. |
| **gprs slb notify** | Enables the GGSN to notify the Cisco IOS SLB when a specific type of condition occurs. |
| **gprs slb vserver** | Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined using the **gprs slb notify** command occurs. |
| **show gprs slb mode** | Displays the Cisco IOS SLB mode of operation. |
| **show gprs slb statistics** | Displays Cisco IOS SLB statistics. |
| **show gprs slb vservers** | 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 defi ned as dispatch mode:

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

## Related Commands

| Command | Description |
|---|---|
| clear gprs slb statistics | Clears Cisco IOS SLB statistics. |
| gprs slb mode | Defines the Cisco IOS SLB operation mode. |
| gprs slb notify | Enables the GGSN to provide feedback to the Cisco IOS SLB when a specific condition occurs. |
| gprs slb vserver | Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined by the **gprs slb notify** command occurs. |
| show gprs slb detail | Displays Cisco IOS SLB related information, such as the operation mode, virtual servers addresses, and statistics. |

| Command | Description |
|---|---|
| **show gprs slb statistics** | Displays Cisco IOS SLB statistics. |
| **show gprs slb vservers** | 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:<br>• SLB Notifications sent<br>– CAC failure<br>– Subscriber exit<br>The following fields were added to the SLB Statistics section of the display:<br>• CAC-failure notifications sent<br>• Session-deletion notifications sent<br>• PDP status notifications sent<br>• PDP status negative response sent<br>• PDP status requests received |

## 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 34 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 |
|---|---|
| **clear gprs slb statistics** | Clears Cisco IOS SLB statistics. |
| **gprs slb mode** | Defines the Cisco IOS SLB operation mode. |
| **gprs slb notify** | Enables the GGSN to notify the Cisco IOS SLB when a specific type of condition occurs. |
| **gprs slb vserver** | Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined using the **gprs slb notify** command occurs. |
| **show gprs slb detail** | Displays Cisco IOS SLB related information, such as the operation mode, virtual servers addresses, and statistics. |
| **show gprs slb mode** | Displays the Cisco IOS SLB mode of operation defined on the GGSN. |
| **show gprs slb vservers** | 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 |
|---|---|
| clear gprs slb statistics | Clears Cisco IOS SLB statistics. |
| gprs slb mode | Defines the Cisco IOS SLB operation mode. |
| gprs slb notify | Enables the GGSN to notify the Cisco IOS SLB when a specific type of condition occurs. |
| gprs slb vserver | Configures the Cisco IOS SLB virtual servers to be notified by the GGSN when the specific type of condition defined by the **gprs slb notify** command occurs. |

| Command | Description |
|---|---|
| **show gprs slb detail** | Displays Cisco IOS SLB related information, such as the operation mode, virtual servers addresses, and statistics. |
| **show gprs slb mode** | Displays the Cisco IOS SLB mode of operation defined on the GGSN. |
| **show gprs slb statistics** | 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**

| Command | Description |
|---|---|
| **gprs charging service-mode** | Configures the service-mode state of a GGSN's charging functions. |
| **gprs service-mode** | Configures the service-mode state of a GGSN. |
| **service-mode** | 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

| | |
|---|---|
| **all** | Displays information for all UMTS QoS traffic classes. |
| **signalling** | Displays information for the UMTS QoS traffic class signalling. |
| **conversational** | Displays information for the UMTS QoS traffic class conversational. |
| **streaming** | Displays information for the UMTS QoS traffic class streaming. |
| **interactive** | Displays information for the UMTS QoS traffic class interactive. |
| **background** | 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 35 describes the fields shown in the display.

***Table 35 show gprs umts-qos map traffic-class Field Descriptions***

| Field | Description |
|---|---|
| Traffic Class | Type of UMTS QoS traffic class as specified in the **gprs umts-qos map traffic-class** command. The UMTS QoS traffic classes are:<br>• signaling<br>• conversational<br>• streaming<br>• interactive<br>• background |
| Diffserv PHB Group | Type of DiffServ PHB group as specified in the **gprs umts-qos map diffserv-phb** command. Possible DiffServ PHB groups are:<br>• signalling-class<br>• ef-class<br>• af1-class<br>• af2-class<br>• af3-class<br>• af4-class<br>• best-effort |
| Diffserv Code Point | Number of DSCPs as specified in the **gprs umts-qos map diffserv-phb** command. |

## Related Commands

| Command | Description |
|---|---|
| **gprs umts-qos map traffic-class** | Specifies a QoS mapping from the UMTS traffic classes to a differentiated services (DiffServ) per-hop behavior (PHB) group |
| **gprs umts-qos map diffserv-phb** | 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*

## Syntax Description

| | |
|---|---|
| *tid* | 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 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

   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

| Command | Description |
|---|---|
| **police rate** | Configures traffic policing using the police rate. |
| **service-policy** | 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*

## Syntax Description

| | |
|---|---|
| *tid* | 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 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 1203000000000010
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 Throughtput: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 Throughtput:1
Traffic Class:conversational         Traffic Class:conversational
Delivery Order:2                     Delivery Order:2
Delivery of Err:2                    Delivery of Err:2
Max SDU Size(bytes):1520             Max SDU Size(bytes):1520
MBR for Uplink(kbps):20              MBR for Uplink(kbps):20
MBR for Downlink(kbps):20            MBR for Downlink(kbps):20
Residual BER:1                       Residual BER:1
SDU Error Ratio:1*10^-2              SDU Error Ratio:1*10^-2
Transfer Delay(ms):10                Transfer Delay(ms):10
Handling Priority:1                  Handling Priority:1
GBR for Uplink(kbps):10              GBR for Uplink(kbps):10
GBR for Downlink(kbps):5             GBR for Downlink(kbps):5
Source Statistics Des:Speech         Source Statistics Des:Speech
```

# 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

| | |
|---|---|
| *access-point-index* | 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 attch 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 classication. 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 1203000000000010
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

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

# 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**]

## Syntax Description

| | |
|---|---|
| **ggsn** | (Optional) Displays show command output specific to GPRS/UMTS. |

## Defaults

No default behavior or values.

## Command Modes

Privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 11.2 | This command was introduced. |
| 12.3(8)XU | This command was integrated into Cisco IOS Release 12.3(8)XU and the **ggsn** 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. |

## Usage Guidelines

The output of **show tech-support ggsn** 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 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**

## Syntax Description

| | |
|---|---|
| *interface_name* | Name of the interface that the GGSN will use to communicate a Diameter peer. |

## 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 **source interface** 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.

## Examples

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
```

## Related Commands .

| Command | Description |
|---|---|
| **address ipv4** | Configures the IP address of the Diameter peer host. |
| **destination host** | Configures the Fully Qualified Domain Name (FQDN) of the Diameter peer |
| **destination realm** | Configures the destination realm (domain name) in which the Diameter host is located. |
| **diameter peer** | Defines the Diameter peer (server) and enters diameter peer configuration mode. |

| Command | Description |
|---|---|
| **ip vrf forwarding** | Defines the VRF associated with the Diameter peer. |
| **security** | Configures the security protocol to use for the Diameter peer-to-peer connection. |
| **timer** | Configures Diameter base protocol timers for peer-to-peer communication. |
| **transport** | 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**

## Syntax Description

| | |
|---|---|
| *response-interval* | Value between 1 and 65535 that specifies the length of the T3 response interval, in seconds. |

## Defaults

1 second.

## Command Modes

Quota server 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

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 qs1
 interface loopback1
 echo-interval 90
 n3-requests 3
 t3-response 524
```

## Related Commands .

| Command | Description |
|---|---|
| **clear ggsn quota-server statistics** | Clears the quota server-related statistics displayed using the **show ggsn quota-server statistics** command. |
| **csg-group** | Associates the quota server to a CSG group that is to be used for quota server-to-CSG communication. |

| Command | Description |
|---|---|
| **echo-interval** | Specifies the number of seconds that the quota server waits before sending an echo-request message to the CSG. |
| **ggsn quota-server** | Configures the quota server process that interfaces with the CSG for enhanced service-aware billing. |
| **interface** | Specifies the logical interface, by name, that the quota server will use to communicate with the CSG. |
| **n3-requests** | Specifies the maximum number of times that the quota server attempts to send a signaling request to the CSG. |
| **show ggsn quota-server** | 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
 tarrif-time
 exit
```

## Related Commands..

| Command | Description |
|---|---|
| **category** | Identifies the subscriber category to which a charging profile applies.s |
| **cdr suppression** | Specifies that CDRs be suppressed as a charging characteristic in a charging profile. |
| **charging profile** | Associates a default charging profile to an access point. |
| **content dcca profile** | Defines a DCCA client profile in a GGSN charging profile. |

| Command | Description |
|---|---|
| **content postpaid time** | Specifies as a trigger condition for postpaid users in a charging profile, the time duration limit that when exceeded causes the GGSN to collect upstream and downstream traffic byte counts and close and update the G-CDR for a particular PDP context. |
| **content postpaid validity** | Specifies as a trigger condition in a charging profile, the amount of time quota granted to a postpaid user is valid. |
| **content postpaid volume** | Specifies as a trigger condition for postpaid users in a charging profile, the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR. |
| **content rulebase** | Associates a default rule-base ID with a charging profile. |
| **description** | Specifies the name or a brief description of a charging profile. |
| **gprs charging characteristics reject** | Specifies that Create PDP Context requests for which no charging profile can be selected be rejected by the GGSN. |
| **gprs charging container time-trigger** | Specifies a global time limit, that when exceeded by a PDP context causes the GGSN to close and update the G-CDR for that particular PDP context. |
| **gprs charging profile** | Creates a new charging profile (or modifies an existing one), and enters charging profile configuration mode. |
| **limit duration** | Specifies as a trigger condition in a charging profile, the time duration limit that when exceeded causes the GGSN to collect upstream and downstream traffic byte counts and close and update the G-CDR for a particular PDP context. |
| **limit sgsn-change** | Specifies as a trigger condition in a charging profile, the maximum number of SGSN changes that can occur before closing and updating the G-CDR for a particular PDP context. |
| **limit volume** | Specifies as a trigger condition in a charging profile, the maximum number of bytes that the GGSN maintains across all containers for a particular PDP context before closing and updating the G-CDR. |

# 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

| | |
|---|---|
| **connection** | 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. |
| **transaction** | Sets the maximum amount of time the GGSN waits for a Diameter peer to respond before trying another peer. |
| **watchdog** | Sets the maximum amount of time the GGSN waits for a Diameter peer to respond to a watchdog packet.<br>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. |
| *seconds* | 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 dcca1
 address ipv4 10.10.10.1
 transport tcp port 4000
 security ipsec
 source interface fastEthernet0
 timer connection 120
```

## Related Commands .

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

| | |
|---|---|
| *traffic-class-name* | Specifies the traffic class for which you are allocating bandwidth. Valid values are conversational, streaming, interactive, or background. |
| **percent** | (Optional) Specifies that the bandwidth be allocated as a percentage rather than absolute value. |
| *value* | Specifies the bandwith in either a percentage (1 to 100% when used with the optional **percent** 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 |
|---|---|
| **bandwidth** | Defines the total bandwidth, in kilobits per second, for a bandwidth pool. Valid values are 1 to 4292967295. |
| **bandwidth-pool** | Applies a bandwidth pool to an APN. |
| **gprs qos bandwidth-pool** | Creates or modifies a bandwidth pool. |
| **traffic-class** | 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

| | |
|---|---|
| **tcp** | Defines TCP as the transport protocol to use to connect to the Diameter peer. |
| **sctp** | Defines SCTP as the transport protocol to use to connect to the Diameter peer.<br>**Note** SCTP is not supported as the transport protocol in GGSN Release 5.2. |
| **port** *port-number* | 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 dcca1
 address ipv4 10.10.10.1
 transport tcp port 4000
```

## Related Commands .

| Command | Description |
|---|---|
| **address ipv4** | Configures the IP address of the Diameter peer host. |
| **destination host** | Configures the Fully Qualified Domain Name (FQDN) of the Diameter peer |

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

# trigger

To specify that SGSN and QoS changes will trigger a DCCA client to request quota-reauthorization, 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}**

**no trigger {sgsn-change | qos-change}**

## Syntax Description

| | |
|---|---|
| **sgsn-change** | Configures the DCCA client to request quota-reauthorization if SGSN changes occur. |
| **qos-change** | Configures the DCCA client to request quota-reauthorization if a QoS changes should occur. |
| **port** *port-number* | Port on the Diameter peer to use for peer-to-peer connection. The default is 3868. |

## 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. |

## Usage Guidelines

Use the **trigger** command to configure SGSN and QoS changes as a trigger for quota reauthorization.

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 SGSN changes as a trigger condition for quota reauthorization in DCCA client “dcca-profile1”:

```
gprs dcca profile dcca-profile1
  authorization dcca-method
  trigger sgsn-change
```

**Related Commands .**

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

# 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**

## Syntax Description

| | |
|---|---|
| *value* | 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. |

## Defaults

10 seconds.

## Command Modes

DCCA client 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. |

## 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**

| Command | Description |
|---|---|
| **authorization** | Defines a method of authorization (AAA method list), in the DCCA client profile, that specifies the Diameter server groups. |
| **ccfh** | Configures the Credit Control Failure Handling (CCFH) AVP locally to use for a credit-control session when the Credit Control Answer (CCA) sent by the DCCA server does not contain CCFH value. |
| **content dcca profile** | Defines the DCCA client profile in a GGSN charging profile. |
| **gprs dcca profile** | Defines a DCCA client profile on the GGSN and enters DCCA client profile configuration mode. |
| **session-failover** | Configures Credit Control Session Failover (CCSF) AVP support when a credit control answer (CCA) message from the DCCA server does not contain a value for the CCSF AVP |

# 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*

## Syntax Description

| | |
|---|---|
| *ip-address* | Virtual IP address of the CSG group. |

## Defaults

No default behavior or values.

## Command Modes

CSG group 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 **virtual-address** 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.

## Examples

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
```

## Related Commands

| Command | Description |
|---|---|
| **ggsn csg-group** | Configures a CSG group on the GGSN for quota server-to-CSG communication. |
| **port** | Configures the port number on which the CSG listens for quota server traffic. |

| Command | Description |
|---|---|
| **real-address** | Configures the IP address of a real CSG for source checking on inbound messages from a CSG. |
| **show ggsn csg** | 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

| | |
|---|---|
| *vrf-name* | 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 mutliple 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 |
|---|---|
| **dhcp-server** | Specifies a primary (and backup) DHCP server to allocate IP addresses to MS users entering a particular PDN access point. |
| **ip cef** | Enables CEF on the RP card. |
| **ip vrf** | Configures a VRF routing table. |
| **ip vrf forwarding** | Associates a VRF with an interface or subinterface. |
| **rd** | Creates routing and forwarding tables for a VRF and and specifies the default route distinguisher for a VPN. |