

show gprs access-point

To display information about access points on the GGSN, use the **show gprs access-point** privileged EXEC command.

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

Syntax Description		
	<i>access-point-index</i>	Integer (from 1 to 65535) that identifies a GPRS access point. Information about that access point is shown.
	<i>access-point-index</i> 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 in Cisco IOS Release 12.1(5)T.

Release	Modification
12.2(4)MX	<p>This command was incorporated in Cisco IOS Release 12.2(4)MX.</p> <ul style="list-style-type: none"> • The following output fields were added to the display: <ul style="list-style-type: none"> – accounting – aggregate – apn_accounting_server_group – apn_authentication_server_group – apn-type – apn_username – apn_password – Block Roamer Mode – GPRS vaccess interface – VPN – wait_accounting • The following output fields were removed from the display: <ul style="list-style-type: none"> – apn_charging_gw – apn_backup_charging_gw – apn_radius_server • Several output field results were changed from binary 0 and 1 to Yes and No. • The following output fields were added to the all version of this command: <ul style="list-style-type: none"> – Access-type – ppp-regeneration (max-session, setup-time) – VRF Name
12.2(8)YD	<p>This command was incorporated in Cisco IOS Release 12.2(8)YD and the Block Roamer Mode output field was changed to Block Foreign-MS Mode output field.</p>
12.2(8)B	<p>This command was incorporated in Cisco IOS Release 12.2(8)B and the following fields were added to the display:</p> <ul style="list-style-type: none"> • RADIUS attribute suppress SGSN Address • RADIUS attribute suppress QOS • Security features: <ul style="list-style-type: none"> – Verify mobile source addr – Verify destination source addr • Traffic redirection: <ul style="list-style-type: none"> – Mobile-to-mobile
GGSN 3.1	<p>This command was incorporated in GGSN 3.1 and the interim accounting output field was added to the display.</p>

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:

```
router# show gprs access-point 1
  apn_index 1          apn_name = gprs.corporate.com
  apn_mode: non-transparent
  apn-type: Real
  accounting: Enabled
  interim accounting: Enable
  wait_accounting: Enable
  dynamic_address_pool: dhcp-proxy-client
  apn_dhcp_server: 10.99.100.5
  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: No
  network_activation_allowed: No
  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
  idle timer: 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
```

Table 3 describes the fields show in the display.

Table 3 *show gprs access-point Field Descriptions*

Field	Description
accounting	<p>Current status of accounting services at the APN:</p> <ul style="list-style-type: none"> • Enable—Accounting services are enabled at the APN. This is the default for non-transparent access APNs. • Disable—Accounting services are disabled at the APN. This is the default for transparent access APNs. <p>You can configure an APN for accounting services using the aaa-accounting access-point configuration command.</p>
aggregate	<p>Route aggregation configuration information on the GGSN.</p> <p>The output display includes the “In APN” field for configuration information for the access point, and the “In global” field for global configuration on the GGSN.</p> <p>The output field may contain the following information:</p> <ul style="list-style-type: none"> • 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. • 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. • 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	<p>Current setting for the access-mode command:</p> <ul style="list-style-type: none"> • Transparent—Users are allowed access without authorization or authentication. • Non-transparent—Users must be authenticated by the GGSN acting as a proxy for the authentication.
apn_name	Access point name.

Table 3 show gprs access-point Field Descriptions (continued)

Field	Description
apn-type	Current setting for the access-type command: <ul style="list-style-type: none"> • Real—APN type that corresponds to a physical interface to an external network on the GGSN. • Virtual—APN type that is not associated with any specific physical target network.
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.
Block Foreign-MS Mode	Current setting for the block-foreign-ms command: <ul style="list-style-type: none"> • Enable—Blocking for foreign MSs is configured. • Disable—Blocking for foreign MSs is not configured.
deactivate_pdp_context_on_violation	Current setting for the access-violation command: <ul style="list-style-type: none"> • No—User packets are discarded. • 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. 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_timer	Amount of time the GGSN will wait before purging idle mobile sessions for the access point configured using the session idle-time command.
interim accounting	Indicates whether interim accounting has been enabled on an access point using the aaa-accounting interim access point configuration command. Possible values are: <ul style="list-style-type: none"> • Enable—Interim accounting is enabled. • Diable—Interim accounting is 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: <ul style="list-style-type: none"> • No—Network-initiated PDP context support is disabled. • Yes—Network-initiated PDP context support is enabled.
number of ip_address_allocated	Number of IP addresses allocated to MS users.

Table 3 show gprs access-point Field Descriptions (continued)

Field	Description
RADIUS attribute suppress IMSI	Current setting for the radius attribute suppress imsi command: <ul style="list-style-type: none"> • Enabled—GGSN suppresses the 3GPP-IMSI number in its authentication and accounting requests to a RADIUS server. • 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: <ul style="list-style-type: none"> • Enabled—GGSN overrides or suppresses the MSISDN number in its RADIUS authentication. • 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: <ul style="list-style-type: none"> • Enabled—GGSN suppresses the 3GPP VSA 3GPP-SGSN-Address subattribute in its RADIUS authentication and accounting requests. • Disabled—GGSN does not suppress the 3GPP VSA 3GPP-SGSN-Address subattribute in its RADIUS authentication and accounting requests.
RADIUS attribute suppress QoS	Current setting for the radius attribute suppress qos command: <ul style="list-style-type: none"> • Enabled—GGSN suppresses the 3GPP VSA 3GPP-QoS-Profile subattribute in its RADIUS authentication and accounting requests. • Disabled—GGSN does not suppress the 3GPP VSA 3GPP-QoS-Profile subattribute in its RADIUS authentication and accounting requests.
subscribe_required	Current setting for the subscription-required command: <ul style="list-style-type: none"> • No—No subscription is required. • 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: <ul style="list-style-type: none"> • Enabled—GGSN verifies the source IP address of upstream TPDU against addresses previously assigned to MSs. • Disabled—GGSN does not verify the source IP address of upstream TPDU against addresses previously assigned to MSs.

Table 3 show gprs access-point Field Descriptions (continued)

Field	Description
Verify mobile destination addr	Current setting for the security verify destination command: <ul style="list-style-type: none"> • Enabled—GGSN verifies the destination address of upstream TPDU's against the global list of PLMN addresses specified using the gprs plmn ip address command. • Disabled—GGSN does not verify the destination address of upstream TPDU's 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: <ul style="list-style-type: none"> • Enable—GGSN waits for an accounting response message from the RADIUS server before sending an activate PDP context request to the SGSN. • 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. <p>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.</p>

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 4 describes the fields show in the display.

Table 4 *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          gprs.pdn1.com     vpn1
      ppp-regeneration (max-session: 10000, setup-time: 60)
-----
2       non-transparent    Real          gprs.pdn2.com
-----
3       transparent         Virtual       corporate
-----
```

Table 5 describes the fields show in the display.

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

Field	Description
Index	Integer assigned to the access point in the GGSN configuration. The index number is used to reference an APN in GGSN commands.
Mode	Authorization configured on the access point. The possible values are: <ul style="list-style-type: none"> transparent—Users who access the PDN through the access point associated with the current virtual template are allowed access without authorization or authentication. 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: <ul style="list-style-type: none"> Real—APN type that corresponds to an external physical network on the GGSN. This is the default value. 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 5 *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: <ul style="list-style-type: none"> max-session—Maximum number of PPP regenerated sessions allowed at the access point. setup-time—Maximum amount of time (between 1 and 65535 seconds) within which a PPP regenerated session must be established.
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 GGSN, use the **show gprs access-point statistics** privileged EXEC command.

show gprs access-point statistics {*access-point-index* / **all**}

Syntax Description	<i>access-point-index</i>	Index number of an access point. Statistics for that access point are shown.
	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 incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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         gpvt.pdn.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
-----
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
-----
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

```

Table 6 describes the fields shown in the display:

Table 6 *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.
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.)

Table 6 *show gprs access-point statistics Field Descriptions (continued)*

Field	Description
ppp-regeneration (max-session, setup-time)	PPP regeneration session parameters configured at the access point: <ul style="list-style-type: none"> max-session—Maximum number of PPP regenerated sessions allowed at the access point. setup-time—Maximum amount of time (between 1 and 65535 seconds) within which a PPP regenerated session must be established.
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.

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 charging parameters

To display information about the current GPRS charging configuration, use the **show gprs charging parameters** privileged EXEC command.

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 in Cisco IOS Release 12.1(5)T.
	12.2(4)MX	This command was incorporated in Cisco IOS Release 12.2(4)MX. The following output fields were added to the display: <ul style="list-style-type: none"> • Charging CDR Option Local Record Sequence Number • Charging CDR Option No Partial CDR Generation • Charging CDR Option Node ID • Charging CDR Option Packet Count • Charging Change Condition Limit • Charging Send Buffer Size • Charging GTP' Port Number • Charging MCC Code • Charging MNC Code • Charging Roamers CDR Only • Charging HPLMN Matching Criteria • Charging SGSN Limit The following output fields were removed from the display: <ul style="list-style-type: none"> • Charging MCC Code • Charging MNC Code • Charging HPLMN Matching Criteria
	12.2(8)YD	This command was incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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:      <10.9.9.9>
* Default Backup Charging Gateway Address: <10.5.5.5>
* Current Active Charging Gateway Address: <10.9.9.9>
* Current Backup Charging Gateway Address: <10.5.5.5>
* Charging Server Switch-Over Timer:     <15> seconds.
* Charging Path Protocol (0:UDP, 1:TCP):  <0>
* Charging MAP DATA TOS:                <3>
* Charging Transfer Interval:            <105> seconds.
* Charging Transfer Threshold:           <400> bytes.
* Charging CDR Aggregation Limit:        <1> CDRs per msg.
* Charging Packet Queue Size:           <128> messages.
* Charging Gateway Path Request Timer:   <1> Minutes.
* Charging Change Condition Limit:      <7>
* Charging SGSN Limit:                  <0>
* Charging Send Buffer Size:              <1460>
* Charging Port Number:                  <3386>
* Charging Roamers CDR Only:            DISABLED.
* Charging CDR Option:
- Local Record Sequence Number:         ENABLED.
- APN Selection Mode:                   DISABLED.
- No Partial CDR Generation:            ENABLED.
- Node ID:                              ENABLED.
- Packet Count:                         ENABLED.
- Served MSISDN:                       ENABLED.
- Private Echo:                         ENABLED.
* Charging Tariff Time Changes:
- Tariff Time Change (#0):              17:00:00
- Tariff Time Change (#1):              17:01:00
- Tariff Time Change (#2):              17:02:00
- Tariff Time Change (#3):              17:03:00
- Tariff Time Change (#4):              17:04:00
- Tariff Time Change (#5):              17:05:00
- Tariff Time Change (#6):              21:25:00
- Tariff Time Change (#7):              21:25:01
- Tariff Time Change (#8):              21:25:03
- Tariff Time Change (#9):              21:25:04
- Tariff Time Change (#10):             21:25:05
- Tariff Time Change (#11):             21:27:35
- Tariff Time Change (#12):             21:27:40

```

Table 7 describes the fields shown in the display.

Table 7 *show gprs charging parameters Field Descriptions*

Field	Description
Charging CDR Aggregation Limit	<p>Maximum number of CDRs that the GGSN aggregates in a charging data transfer message to the charging gateway.</p> <p>You can configure this limit using the gprs charging cdr-aggregation-limit command.</p>
Charging CDR Option : Local Record Sequence Number	<p>Status indicating if the GGSN uses the local record sequence field in G-CDRs. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to use the local record sequence field in G-CDRs using the gprs charging cdr-option local-record-sequence-number command.</p>
Charging CDR Option : APN Selection Mode	<p>Status indicating if the GGSN provides the reason code for APN selection in G-CDRs. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to provide the APN selection mode in G-CDRs using the gprs charging cdr-option apn-selection-mode command.</p>
Charging CDR Option : No Partial CDR Generation	<p>Status indicating if the GGSN can create partial CDRs. The possible values are enabled or disabled.</p> <p>You can disable partial CDR generation by the GGSN using the gprs charging cdr-option no-partial-cdr-generation command.</p>
Charging CDR Option : Node ID	<p>Status indicating if the GGSN specifies the name of the node that generated the CDR in the node ID field of the G-CDR. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to use the node ID field in G-CDRs using the gprs charging cdr-option node-id command.</p>
Charging CDR Option : Packet Count	<p>Status indicating if the GGSN provides uplink and downlink packet counts in the optional record extension field of a G-CDR. The possible values are ON or OFF.</p> <p>You can enable the GGSN to provide packet counts using the gprs charging cdr-option packet-count command.</p>
Charging CDR Option : Served MSISDN	<p>Status indicating if the GGSN provides the mobile station integrated services digital network number from the create PDP context request in a G-CDR. The possible values are enabled or disabled.</p> <p>You can enable the GGSN to provide the MSISDN number using the gprs charging cdr-option served-msisdn command.</p>

Table 7 show gprs charging parameters Field Descriptions (continued)

Field	Description
Charging CDR Option : Private Echo	Status indicating if the GGSN uses private echo signaling for flow control. The possible values are enabled or disabled. You can enable private echo signaling using the gprs charging flow-control private-echo command.
Charging Change Condition Limit	Maximum number of charging containers in each G-CDR. 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. You can configure the path request timer using the gprs charging cg-path-requests command.
Charging MAP DATA TOS	Type of service (ToS) priority currently configured for GPRS charging packets. Value (between 0 and 5) is set in the precedence bits of the IP header of charging packets. You can configure the ToS mapping using the gprs charging map data tos command.
Charging Packet Queue Size	Maximum number of unacknowledged charging data transfer requests that the GGSN maintains in its queue. You can configure the maximum queue size using the gprs charging packet-queue-size command.
Charging Path Protocol (0:UDP, 1:TCP)	Binary value representing the protocol in use between the GGSN and the charging gateway. When 0, UDP is in use; when 1, TCP is in use. You can configure the charging path protocol using the gprs charging path-protocol command.
Charging Port Number	Destination port of the charging gateway. You can configure the destination port using the gprs charging port command.
Charging Roamers CDR Only	Status of the charging for roamers feature on the GGSN. The possible values are enabled or disabled. 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. You can configure the buffer size using the gprs charging send-buffer command.

Table 7 show gprs charging parameters Field Descriptions (continued)

Field	Description
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. You can configure this period of time using the gprs charging server-switch-timer command.
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 GPRS charging tariffs change. 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. 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. 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. 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. 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, or backup, charging gateway. 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. You can configure the default primary charging gateway using the gprs default charging-gateway command.

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 GGSN, use the **show gprs charging statistics** privileged EXEC command.

show gprs charging statistics

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Privileged EXEC

Release	Modification
12.1(1)GA	This command was introduced.
12.1(5)T	This command was integrated in Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was incorporated in 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 incorporated in Cisco IOS Release 12.2(8)YD.
12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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 8 describes the fields shown in the display.

Table 8 *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 GPRS charging configuration.
show gprs charging status	Displays current statistics about the transfer of charging packets between the GGSN and charging gateways.

show gprs charging status

To display current statistics about the transfer of charging packets between the GGSN and charging gateways, use the **show gprs charging status** privileged EXEC command.

show gprs charging status { **tid** *tunnel_id* | **access-point** *access-point-index* | **all** }

Syntax Description	Parameter	Description
	tid <i>tunnel_id</i>	Specifies a tunnel ID for which you want to display charging statistics.
	access-point <i>access-point-index</i>	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 incorporated in 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)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

Usage Guidelines Use the **show gprs charging status** command to display current statistics for the transfer of charging packets between the GGSN and charging gateways 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 1231231111111100
          GPRS Charging Protocol Status for TID
          =====
          * Number of CDRs :                <1>
          * Number of closed CDRs buffered:  <0>
          * Number of Containers:           <0>
```

Table 9 describes the fields shown in the display.

Table 9 *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 10 describes the fields shown in the display.

Table 10 *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.
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 11 describes the fields shown in the display.

Table 11 *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 GPRS charging configuration.
show gprs charging statistics	Displays cumulative charging statistics for the GGSN.

show gprs gtp parameters

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

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 in Cisco IOS Release 12.1(5)T.
	12.2(4)MX	This command was incorporated in Cisco IOS Release 12.2(4)MX. The following output fields were added to the display: <ul style="list-style-type: none"> • Charging MCC Code • Charging MNC Code • Charging HPLMN Matching Criteria • GTP dynamic echo-timer minimum • GTP dynamic echo-timer smooth factor The following output field was removed: <ul style="list-style-type: none"> • GTP max hold time for old sgsn PDUs T3_tunnel
	12.2(8)YD	This command was incorporated in Cisco IOS Release 12.2(8)YD and the following output field was removed from the display: <ul style="list-style-type: none"> • GPRS HPLMN Matching Criteria
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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
  GPRS MCC Code                    = 310
  GPRS MNC Code                    = 15
    
```

Table 12 describes the fields shown in the display.

Table 12 show gprs gtp parameters Field Descriptions

Field	Description
GPRS MCC Code	Mobile country code (MCC) that the GGSN uses in conjunction with the mobile network node to determine whether a create PDP context request is from a roamer. You can configure the MCC using the gprs mcc mnc command.
GPRS MNC Code	Mobile network node (MNC) that the GGSN uses in conjunction with the mobile country code to determine whether a create PDP context request is from a roamer. You can configure the MNC using the gprs mcc mnc command.
GTP buffer size for receiving N3_buffer	Current size of the receive buffer (in bytes) that the GGSN uses to receive GTP signaling messages and packets sent through the tunneling protocol. You can configure the N3 buffer using the gprs gtp n3-buffer-size command.
GTP dynamic echo-timer minimum	Current minimum time period (in seconds) used by the dynamic echo timer. You can configure the minimum value using the 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. 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. You can configure the maximum number of PDP context requests using the gprs maximum-pdp-context-allowed command.

Table 12 show gprs gtp parameters Field Descriptions (continued)

Field	Description
GTP max retry N3_request	Maximum number of times that the GGSN attempts to send a signaling request to an SGSN. You can configure the maximum number of signaling requests made by the GGSN using the gprs gtp n3-requests command.
GTP path echo interval	Interval, in seconds, that the GGSN waits before sending an echo-request message to the SGSN. You can configure the path echo interval using the 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. 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 GGSN and other GPRS devices, use the **show gprs gtp path** privileged EXEC command.

show gprs gtp path {*ip-address* | **all**}

Syntax Description		
	<i>ip-address</i>	Displays GTP path information for a specified IP address.
	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 in Cisco IOS Release 12.1(5)T.
	12.2(4)MX	This command was incorporated in Cisco IOS Release 12.2(4)MX, and the following output field was added to the display: <ul style="list-style-type: none"> Dynamic echo timer
	12.2(8)YD	This command was incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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

Examples The following is sample output of the **show gprs gtp path all** command:

```
router# show gprs gtp path all
      Total number of path : 2

Path pointer      Local address      Remote address      Dynamic echo timer
0x63100440        10.41.41.1         10.18.18.200        5
0x616378D0        10.10.10.1         10.10.10.4          2
```

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

```
router# show gprs gtp path 10.49.85.100
Path pointer      Local address      Remote address      Dynamic echo timer
0x63100440        10.41.41.1         10.18.18.200        5
```

Table 13 describes the fields shown in the display.

Table 13 *show gprs gtp path Field Descriptions*

Field	Description
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	The local address for the path.
Path pointer	The value of the GGSN internal pointer to the GTP path, in hexadecimal.
Remote address	Address of the remote end of the path.
Total number of paths	Total number of GTP paths.

show gprs gtp pdp-context

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

```
show gprs gtp pdp-context {tid hex-data | imsi hex-data | path ip-address | access-point
    access-point-index | pdp-type {ip | ppp} | qos-precedence {low | normal | high} | qos-delay
    {class1 | class2 | class3 | classbesteffort} | all}
```

Syntax Description		
tid <i>hex-data</i>		Displays PDP contexts by tunnel ID. Enter the TID in hexadecimal format.
imsi <i>hex-data</i>		Displays PDP contexts by International Mobile Subscriber Identity (IMSI). Enter the IMSI in hexadecimal format.
access-point <i>access-point-index</i>		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-precedence		Displays PDP contexts for a specified GPRS quality of service precedence type. You can specify the following precedence types: low , normal , and high .
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 .
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.

Release	Modification
12.2(4)MX	<p>This command was incorporated in Cisco IOS Release 12.2(4)MX.</p> <ul style="list-style-type: none"> • The pdp-type ppp and qos-delay options were added to the command. • The following fields were added to the output display of the tid version of this command: <ul style="list-style-type: none"> – cef_down_byte – cef_down_pkt – cef_drop – cef_up_byte – cef_up_pkt – gtp pdp idle time • The Network Init Information section was added to the output display of the tid version of this command with the following new fields: <ul style="list-style-type: none"> – Buf.Bytes – MNRG Flag – NIP State – PDU Discard Flag – SGSN Addr • The following fields were removed from the output display of the tid version of this command: <ul style="list-style-type: none"> – fast_up_pkt – fast_up_byte – fast_down_pkt – fast_down_byte – fast_drop • 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.
12.2(8)YD	<p>This command was incorporated in Cisco IOS Release 12.2(8)YD and the following fields were added to the output display of the tid version of this command:</p> <ul style="list-style-type: none"> • primary dns • secondary dns • primary nbns • secondary nbns
12.2(8)B	<p>This command was incorporated in Cisco IOS Release 12.2(8)B and the cef_drop field was removed from the output display of the tid version of this command.</p>

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, 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 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 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 Pending      DHCP    10.4.4.11   www.pdn2.com
3456789012345678 10.21.1.1   IPCP    10.1.4.11   www.pdn3.com
4567890123456789 10.31.1.1   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 14 describes the fields shown in the display.

Table 14 *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.
SGSN Addr	IP address of the SGSN that is processing the packets.

Table 14 *show gprs gtp pdp-context all Field Descriptions (continued)*

Field	Description
Source	Source of IP addressing for the MS. The possible values are: <ul style="list-style-type: none"> • DHCP—Dynamic address allocation using DHCP. • IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol. • Pending—Waiting for dynamic address allocation. Dynamic address source is unknown. • Radius—Dynamic address allocation using RADIUS. • 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:

```

router#show gprs gtp pdp 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          ggsn_addr_signal:10.8.0.1
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
mnrflag: 0                          tos mask map:00
gtp pdp idle time:72
gprs qos_req:091101                 canonical Qos class(req.):01
gprs qos_neg:25131F                 canonical Qos class(neg.):01
effective bandwidth:0.0
rcv_byte_count: 0                   rcv_pkt_count: 0
send_byte_count: 0                  send_pkt_count: 0

```

```

cef_up_pkt:          0          cef_up_byte:    0
cef_down_pkt:        0          cef_down_byte:  0
charging_id:         29160231
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

** 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 15 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.

Table 15 *show gprs gtp pdp-context tid Field Descriptions*

Field	Description
APN	Access point name where the PDP context is active.
canonical Qos class (neg.)	Negotiated canonical quality of service class for the PDP context, with the following values: <ul style="list-style-type: none"> • 01—Best effort • 02—Normal • 03—Premium
canonical Qos class (req.)	Requested canonical quality of service class by the PDP context, with the following values: <ul style="list-style-type: none"> • 01—Best effort • 02—Normal • 03—Premium
cef_down_byte	Total number of G-PDU bytes received and successfully processed in the CEF path on the downlink, from the GGSN to the SGSN.
cef_down_pkt	Total number of G-PDU packets received and successfully processed in the CEF path on the downlink, from the GGSN to the SGSN.
cef_up_byte	Total number of G-PDU bytes received and successfully processed in the CEF path on the uplink, from the SGSN to the GGSN.
cef_up_pkt	Total number of G-PDU packets received and successfully processed in the CEF path on the uplink, from the SGSN to the GGSN.

Table 15 show gprs gtp pdp-context tid Field Descriptions (continued)



Field	Description
charging_id	Unique 4-octet value generated by the GGSN for the PDP context. The value 0 is reserved.
current time	Date and time of the show command output.
downstream_data_flow	Flow label of downlink G-PDUs.
downstream_signal_flow	Flow label of downlink signaling messages.
effective bandwidth	<p>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.</p> <p> Note The effective bandwidth does not represent actual bandwidth usage.</p>
ggsn_addr_signal	IP address of the GGSN.
gprs qos_neg	<p>Negotiated quality of service for the PDP context. The field is in the format <i>vwxyz</i>, which represents the following QoS classes (as defined in the GSM specifications for quality of service profiles):</p> <ul style="list-style-type: none"> • <i>v</i>—Delay class • <i>w</i>—Reliability class • <i>x</i>—Peak throughput class • <i>y</i>—Precedence class • <i>zz</i>—Mean throughput class <p> 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 <i>Cisco IOS Mobile Wireless Configuration Guide</i>.</p>

Table 15 show gprs gtp pdp-context tid Field Descriptions (continued)


Field	Description
gprs qos_req	<p>Requested quality of service by the PDP context. The field is in the format <i>vwxyz</i>, which represents the following QoS classes (as defined in the GSM specifications for quality of service profiles):</p> <ul style="list-style-type: none"> • <i>v</i>—Delay class • <i>w</i>—Reliability class • <i>x</i>—Peak throughput class • <i>y</i>—Precedence class • <i>zz</i>—Mean throughput class <p> Note See the Note in the description of the <code>gprs qos_neg</code> output field above.</p>
gtp pdp idle time	Current setting for the gprs idle-pdp-context purge-timer command, unless the session idle-time command is configured. Indicates the amount of idle time (in hours) allowed before PDP contexts are deleted.
last_access_time	<p>Time when the PDP context for this TID was last accessed. The date format is MMM DD YYYY. The time format is hours:minutes:seconds.</p> <p>When a signaling packet or data packet for a PDP context arrives on the GGSN, the <code>last_access_time</code> is reset to the current date and time. If the <code>last_access_time</code> exceeds the purge timer for idle PDP contexts, then the PDP context is purged by the GGSN.</p>
mnrflag	Mobile not reachable flag, with the following values: <ul style="list-style-type: none"> • 0—flag is off. • 1—flag is on, indicating that the MS is not reachable
MS_ADDR and MS Address	IP address of the mobile station.
MS International PSTN/ISDN Number (MSISDN)	Integrated Services Digital Network (ISDN) number of the mobile station.
ntwk_init_pdp	Network initiated PDP context indicator, with the following values: <ul style="list-style-type: none"> • 0—Not a network initiated PDP context. This indicates a mobile initiated PDP context. • 1—Network initiated PDP context
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 <code>pdp</code> reference counter shows a value of 2.

Table 15 *show gprs gtp pdp-context tid Field Descriptions (continued)*

Field	Description
primary dns	IP address of the primary DNS server.
primary nbns	IP address of the primary NetBIOS Name Service (NBNS).
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.
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).
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.
SGSN_addr	IP address of the SGSN that is processing the packets.
sgsn_addr_signal	
signal_sequence	Last sequence number used in the GTP signaling message.
Source	Source of IP addressing for the MS. The possible values are: <ul style="list-style-type: none"> • DHCP—Dynamic address allocation using DHCP. • IPCP—Dynamic address allocation for PPP PDP types, or for IP PDP types with PPP regeneration, using PPP IP Control Protocol. • Pending—Waiting for dynamic address allocation. Dynamic address source is unknown. • Radius—Dynamic address allocation using RADIUS. • Static—IP address is not dynamically assigned.
TID	Tunnel ID for the PDP context.
tos mask map	ToS value in IP header of this PDP context.
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.

Table 16 describes the fields shown in the Network Init Information section of the output.



Note

The Network Init Information section of the output appears only when network-initiated PDP contexts are unsuccessful.

Table 16 *show gprs gtp pdp-context tid Network Init Information Field Descriptions*

Field	Description
Buf.Bytes	Number of bytes currently buffered for this network-initiated PDP context.
last_access_time	Time when the PDP context for this TID was last accessed. The date format is MMM DD YYYY. The time format is hours:minutes:seconds. When a signaling packet or data packet for a PDP context arrives on the GGSN, the last_access_time is reset to the current date and time. If the last_access_time exceeds the purge timer for idle PDP contexts, then the PDP context is purged by the GGSN.
MNRG Flag	Mobile not reachable flag, with the following values: <ul style="list-style-type: none"> • 0—flag is off. • 1—flag is on, indicating that the MS is not reachable
NIP State	State information for the network initiated PDP process on the GGSN.
PDU Discard Flag	Discarded PDU indicator for a network initiated PDP context, with the following values: <ul style="list-style-type: none"> • 0—PDUs are not discarded. This indicates that PDUs for a network initiated PDP context are being sent to the SGSN. • 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.” <p>When the flag is set to 1, the GGSN ignores PDUs destined for that MS for the specified PDU discard period. The default period is 300 seconds (5 minutes). You can configure the PDU discard time using the gprs ntwk-init-pdp pdu-discard-period command.</p>
SGSN Addr	IP address of the SGSN that is associated with the network-initiated procedure for this PDP context (used for paging).

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 GGSN (such as IE, GTP signaling, and GTP PDU statistics), use the **show gprs gtp statistics** privileged EXEC command.

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	The following fields were added to the output display: <ul style="list-style-type: none"> total created_pdp total deleted_pdp
	12.1(5)T	This command was integrated in Cisco IOS Release 12.1(5)T.
	12.2(4)MX	This command was incorporated in Cisco IOS Release 12.2(4)MX, and the following new output fields were added: <ul style="list-style-type: none"> ntwk_init_pdp_act_rej ppp_regen_pending ppp_regen_pending_peak ppp_regen_total_drop ppp_regen_no_resource total created_ppp_pdp total ntwkInit created pdp
	12.2(8)YD	This command was incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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

Examples

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

```

router# show gprs gtp statistics
GPRS GTP Statistics:
  version_not_support      0          msg_too_short          0
  unknown_msg              0          unexpected_sig_msg     1
  unexpected_data_msg      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 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       4          snd_signalling_msg     8
  rcv_pdu_msg              0          snd_pdu_msg            1
  rcv_pdu_bytes            0          snd_pdu_bytes          100
  total_created_pdp        1          total_deleted_pdp      0
  total_created_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 1
    
```

Table 17 describes the fields shown in the display:

Table 17 show gprs gtp statistics Field Descriptions

Field	Description
data_msg_dropped	Number of GTP PDUs dropped.
get_pak_buffer_failure	Number of times the GGSN has failed to obtain a GTP packet.
ie_duplicated	Number of GTP messages received with a duplicated information element.
ie_out_of_order	Number of GTP messages received with an information element (IE) out of order.
ie_unexpected	Number of GTP messages received with an information element that not expected in the GTP message, but is defined in GTP. GTP messages with unexpected IEs are processed as if the IE was not present.
ie_unknown	Number of GTP messages received with an information element of an unknown type.
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.
no_resource	Number of times a resource was not available for transmitting GTP messages. For example, the router may be out of memory.
ntwk_init_pdp_act_rej	Number of rejected PDP context requests that were initiated by the network (PDN).

Table 17 *show gprs gtp statistics Field Descriptions (continued)*

Field	Description
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.
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.
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.
signalling_msg_dropped	Number of GTP signaling messages dropped.
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.
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_dropped	Number of GTP messages dropped.
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.
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.

Table 17 show gprs gtp statistics Field Descriptions (continued)

Field	Description
unknown_msg	Number of unknown GTP messages received.
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 GGSN (such as activated PDP contexts, throughput, and QoS statistics), use the **show gprs gtp status** privileged EXEC command.

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 in Cisco IOS Release 12.1(5)T.
	12.2(4)MX	This command was incorporated in Cisco IOS Release 12.2(4)MX, and the following output fields were added: <ul style="list-style-type: none"> • activated_ppp_pdp • activated_ppp_regen_pdp • ntwk_init_pdp • qos_delay1_pdp • qos_delay2_pdp • qos_delay3_pdp • qos_delaybesteffort_pdp
	12.2(8)YD	This command was incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

Usage Guidelines Use the **show gprs gtp status** command to display information about the status of GTP running on the GGSN. The output fields displayed by the **show gprs gtp status** command vary by the type of QoS method that is enabled on the GGSN.

The values displayed by the **show gprs gtp status** command show the current counts since the GGSN was started. Unlike the values displayed by the **show gprs gtp statistics** command, these values cannot be cleared.

Examples

Example 1

The following example shows output from the **show gprs gtp status** command for an activated network-initiated PDP context using the canonical QoS method:

```
Router# show gprs gtp status
GPRS GTP Status:
  gsn_used_bandwidth      7399   total_gsn_resource      4294967295
  activated_pdp            1     ntwk_init_pdp           1
  mean_throughput_premium  1110.000
  mean_throughput_normal  0.000   mean_throughput_besteffort 0.000
  qos_high_pdp            1     qos_normal_pdp          0
  qos_low_pdp             0     qos_premium_mean-throughput-deviation 0.100
```

Example 2

The following example shows output from the **show gprs gtp status** command for activated 2 PPP PDP contexts using the canonical QoS method. Both of the PDP contexts are using the premium QoS class, indicated by the `qos_high_pdp` output field:

```
Router# show gprs gtp status
GPRS GTP Status:
  gsn_used_bandwidth      14798  total_gsn_resource      1048576
  activated_pdp            2     ntwk_init_pdp           0
  activated_ppp_pdp        2
  mean_throughput_premium  2220.000
  mean_throughput_normal  0.000   mean_throughput_besteffort 0.000
  qos_high_pdp            2     qos_normal_pdp          0
  qos_low_pdp             0     qos_premium_mean-throughput-deviation 0.100
```



Note

All output fields except those related to PDP context creation appear only when canonical QoS is enabled on the GGSN.

Example 3

The following example shows output from the **show gprs gtp status** command for 3 activated PPP regenerated PDP contexts not using either the canonical or delay QoS method:

```
Router# show gprs gtp status
GPRS GTP Status:
  activated_pdp            3     ntwk_init_pdp           0
  activated_ppp_pdp        0     activated_ppp_regen_pdp  3
```

Example 4

The following example shows output from the **show gprs gtp status** command for 4 activated PDP contexts using the delay QoS method. The PDP contexts are using the delay class 1, delay class 2, and delay best effort class:

```
Router# show gprs gtp status
GPRS GTP Status:
  activated_pdp            4     ntwk_init_pdp           0
  activated_ppp_pdp        0     activated_ppp_regen_pdp  0
  qos_delay1_pdp          1     qos_delay2_pdp          1
  qos_delay3_pdp          0     qos_delaybesteffort_pdp  2
```

Table 18 describes the fields shown in the display.

Table 18 *show gprs gtp status Field Descriptions*

Field	Description
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.
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.
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.
ntwk_init_pdp	Current number of active PDP contexts that are initiated by the network to an MS.
qos_delay1_pdp	Current number of active PDP contexts that are classified in the class 1 delay QoS class. This field only appears when delay QoS is enabled.
qos_delay2_pdp	Current number of active PDP contexts that are classified in the class 2 delay QoS class. This field only appears when delay QoS is enabled.
qos_delay3_pdp	Current number of active PDP contexts that are classified in the class 3 delay QoS class. This field only appears when delay QoS is enabled.
qos_delaybesteffort_pdp	Current number of active PDP contexts that are classified in the best effort delay QoS class. This field only appears when delay QoS is enabled.
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.

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

Field	Description
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.

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 gtp-director pending-request

To display a list of the create PDP context requests sent by GDM to a real GGSN that are pending expiration of the retry timer, use the **show gprs gtp-director pending-request** privileged EXEC command.

show gprs gtp-director pending-request { **tid** *hex-data* | **all** }

Syntax Description	Parameter	Description
	tid <i>hex-data</i>	Displays the create PDP context currently requested by GDM for the specified tunnel ID. Enter the TID in hexadecimal format.
	all	Displays a list of all create PDP contexts currently requested by GDM.

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 incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

Usage Guidelines Use the **show gprs gtp-director pending-request** command to display a list of the create PDP context requests currently sent by GDM to a real GGSN that are pending expiration of the retry timer.



Note

The **show gprs gtp-director pending-request** command shows only those PDP contexts that have been *requested* by GDM for a real GGSN—it does not represent the number of PDP contexts that are currently *active* with that GGSN.

The create PDP context requests that have been sent will continue to appear in the GDM output display until the GTP director retry timeout period has expired. You can configure the GTP director retry timeout period using the **gprs gtp-director retry-timeout** command.

Examples

Example 1

The following is sample output of the **show gprs gtp-director pending-request tid** command. The output shows that GDM has sent a create PDP context request for TID 1234120000000000 to the real GGSN with IP address 10.41.41.1 for a real APN called corporateb.com.

GDM received the original create PDP context request from the SGSN with IP address 10.23.23.1, for an APN called corporate. The corporate APN is a virtual APN that is configured at the HLR and at the DNS server used by the SGSN. The DNS server used by the SGSN should return the IP address of the GDM router for the virtual APN name.

Notice that corporateb.com appears under the output field called Domain-Name, which represents the domain portion of the username. The username (with format login@domain) is specified in the protocol configuration option (PCO) of the original create PDP context request from the SGSN. The domain name becomes the APN that GDM specifies in its create PDP context request sent to the real GGSN. In this case, GDM has sent a create PDP context request for TID 1234120000000000 to GGSN 10.41.41.1 for the corporateb.com APN:

```
router# show gprs gtp-director pending-request tid 1234120000000000
TID          GGSN-ADDR      SGSN-ADDR      APN-NAME      DOMAIN-NAME
1234120000000000  10.41.41.1    10.23.23.1    corporate     corporateb.com
```

Example 2

The following is sample output of the **show gprs gtp-director pending-request all** command:

```
router# show gprs gtp-director pending-request all
TID          GGSN-ADDR      SGSN-ADDR      APN-NAME      DOMAIN-NAME
1234000000000000  10.41.41.1    10.23.23.1    corporate     corporatea.com
1234120000000000  10.41.41.1    10.23.23.1    corporate     corporateb.com
8808000000000000  10.41.41.1    10.23.23.1    corporate     corporattec.com
```

Example 3

The following is sample output of the **show gprs gtp-director pending-request tid** command, where no domain name has been provided in the PCO IE. In this case, GDM specifies corporatea.com as the APN in the create PDP context request to the GGSN at 10.41.41.1:



```
router# show gprs gtp-director pending-request tid 1111220000333000
TID          GGSN-ADDR      SGSN-ADDR      APN-NAME      DOMAIN-NAME
1111220000333000  10.41.41.1    10.23.23.1    corporatea.com  -
```

Table 19 describes the fields shown in the displays:

Table 19 *show gprs gtp-director pending-request Field Descriptions*

Field	Description
TID	Tunnel identifier of the PDP context request.
GGSN-ADDR	IP address of the real GGSN to which GDM has sent the create PDP context request.
SGSN-ADDR	IP address of the SGSN from which the original create PDP context request was received by GDM.

Table 19 show gprs gtp-director pending-request Field Descriptions (continued)

Field	Description
APN-NAME	<p>APN name specified in the original create PDP context request from the SGSN.</p> <p> Note In the case where a domain name is provided in the PCO information element (IE) of the create PDP context request, this APN represents a virtual APN name, which means that this APN does not correspond to a real destination network. GDM determines the real destination network by the domain requested in the PCO IE.</p>
DOMAIN-NAME	<p>Domain name specified in the username portion of the PCO. This domain is the APN of the real destination network that is requested by GDM in the create PDP context request to the real GGSN.</p> <p> Note If the Domain-Name field contains a dash, it indicates that the domain name is not provided in the PCO IE. In this case, GDM uses the value of the APN as the real destination network.</p>

Related Commands

Command	Description
gprs gtp-director retry-timeout	Specifies the amount of time during which the GTP director forwards retries from an SGSN to the selected GGSN to establish a PDP context.

show gprs gtp-director statistics

To display the current statistics for create requests received by GDM, use the **show gprs gtp-director statistics** privileged EXEC command.

show gprs gtp-director statistics

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Privileged EXEC

Command History	Release	Modification
	12.2(4)MX	This command was introduced.
	12.2(8)YD	This command was incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

Usage Guidelines Use the **show gprs gtp-director statistics** command to display the current statistics for create requests received by GDM.

Most of the counter values displayed by this command represent totals accumulated since the last time the statistical counters were cleared using the **clear gprs gtp-director statistics** command. However, the counter for the number of unique PDP contexts pending retry timeout increments and decrements as the GTP director idle time-out period is reached for a forwarded PDP context.

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

```
router# show gprs gtp-director statistics
      GTP-Director Statistics
Number of unique pdp-contexts forwarded:      23
Total number of create requests forwarded:    50
Total number of create requests rejected:      0
Number of unique pdp-contexts pending retry-timeout: 2
Total number of unsupported messages received: 0
Total number of requests dropped:             0
```


Table 20 describes the fields shown in the display.

Table 20 *show gprs gtp-director statistics Field Descriptions*

Field	Description
Number of unique pdp-contexts forwarded	Number of create PDP context requests with unique TIDs that GDM has forwarded to a real GGSN. This number does not include retries by the SGSN.
Total number of create requests forwarded	Total number of create PDP context requests, including retries from the SGSN, that GDM has forwarded to a real GGSN.
Total number of create requests rejected	Total number of create PDP context requests sent by the SGSN that GDM has rejected. For example, if an invalid domain name is requested, the create PDP context request is rejected.
Number of unique pdp-contexts pending retry-timeout	Number of create PDP context requests with unique TIDs, that have been forwarded by GDM to a real GGSN, whose retry timeout period has not expired. When the retry timeout period is reached, this counter is decremented. You can display the create PDP context requests that are pending retry timeout using the show gprs gtp-director pending-request command.
Total number of unsupported messages received	Total number of messages received that GDM cannot process (for example, delete PDP context requests or echo messages). Under normal conditions, this counter should not increment. If the counter is incrementing, a problem in the network is indicated. The only signaling message that GDM receives and processes is a create PDP context request.
Total number of requests dropped	Total number of create PDP context requests that were unable to be forwarded by GDM. Dropped requests indicate a routing problem between the GTP stack and the IP stack. However, this counter does not indicate problems at the IP level.

Related Commands

Command	Description
clear gprs gtp-director statistics	Clears the current GDM forwarded and rejected request counters.
gprs gtp-director retry-timeout	Specifies the amount of time during which the GTP director forwards retries from an SGSN to the selected GGSN to establish a PDP context.
show gprs gtp-director pending-request	Displays a list of the create PDP context requests sent by GDM to a real GGSN that are pending retry timeout.

show gprs ms-address exclude-range

To display the IP address range(s) configured on the GGSN for the GPRS network, use the **show gprs ms-address exclude-range** privileged EXEC command.

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 incorporated in Cisco IOS Release 12.2(8)YD.
	12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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 21 describes the fields shown in the display.

Table 21 *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.

subscription-required

To specify that the 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** access-point configuration command. To specify that no subscription is required, use the **no** form of this command.

subscription-required

no subscription-required

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 in Cisco IOS Release 12.1(5)T.
12.2(4)MX	This command was incorporated in Cisco IOS Release 12.2(4)MX.
12.2(8)YD	This command was incorporated in Cisco IOS Release 12.2(8)YD.
12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

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
```

vrf

To configure VPN routing and forwarding at a GGSN access point and associate the access point with a particular VRF instance, use the **vrf** access-point configuration command.

vrf *vrf-name*

Syntax Description

<i>vrf-name</i>	Name of the corresponding VRF instance with which the access point is associated.
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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 incorporated in Cisco IOS Release 12.2(8)YD.
12.2(8)B	This command was incorporated in Cisco IOS Release 12.2(8)B.

Usage Guidelines

Use the **vrf** command to configure VPN routing and forwarding (VRF) at a GGSN access point and associate the access point with a particular 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 VPN Routing and Forwarding (VRF).

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 Virtual-Template1
  ip address 10.8.0.1 255.255.0.0
  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.