CHAPTER 11

Command Reference

Contents

This section describes application-specific commands for the NCE Service Module.

Note All other Cisco IOS software commands are documented in the Cisco IOS command reference publications at Cisco.com, http://www.cisco.com/en/US/products/ps6441/index.html.

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interface transport-opt-service-engine

To enter the interface configuration mode for a Network Capacity Expansion (NCE) service module, use the **interface Transport-Opt-Service-Engine** command in global configuration mode.

interface Transport-Opt-Service-Engine *slot/unit*

Syntax Description

slot	Number of the router chassis slot for the service module. The slash (/) mark is required when specifying the *slot* and *unit* argument.
unit	Interface number where the NCE service module resides in the router. The slash mark (/) is required between the *slot* argument and the *unit* argument.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
12.4(20)T	This command was introduced.

Usage Guidelines

This command may be used only for NCE service modules. If your system does not have this hardware, then you will not be able to enter this command.

A **no** form of this command is not available. To exit the interface configuration mode, use the **exit** command.

Examples

The following example shows the command for entering configuration mode for NCE service modules located in slot 1, unit 1:

```
Router (config)# interface Transport-Opt-Service-Engine 1/1
Router (config-if)# exit
```

Related Commands

Command	Description
service-module Transport-Opt-Service-Engine	Manipulates the NCE service module operating system.
show transport-opt-interface Transport-Opt-Service-Engine stats	Shows basic interface configuration statistics for NCE service modules.
transport-opt	Configures the NCE service module for NCE over WAN.

service-module transport-opt-service-engine

To manipulate the NCE service module, use the **service-module Transport-Opt-Service-Engine** command in privileged EXEC mode.

service-module Transport-Opt-Service-Engine *slot/unit command*

Syntax Description

slot	Number of the router chassis slot for the service module.
unit	Interface number where the NCE resides in the router. The slash mark (/) is required between the *slot* argument and the *unit* argument.
command	Can be any one of the following: • reload—Performs a graceful shutdown and reboot of the NCE service module operating system. • reset—Resets the hardware on NCE service modules. • session [**clear**]—Opens or closes NCE service module session. [**clear**] clears the NCE configuration session. • shutdown —Gracefully shuts down NCE service modules. • statistics—Shows NCE service module statistics. • status—Shows NCE service module status.

Command Default

If no command is entered, the help screen appears:

```
router# service-module transport-Opt-Service-Engine 0/0
  reload      Reload service module
  reset       Hardware reset of Service Module
  session     Service module session
  shutdown    Shutdown service module
  statistics  Service Module Statistics
  status      Service Module Information
```

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20)T	This command was introduced.

Usage Guidelines

reload and reset

Caution Because you may lose data, use the **reset reload** command only to recover from a shutdown or failed state.

At the confirmation prompt, press **Enter** to confirm the action or press **n** to cancel.

session

Only one session at a time is allowed into the service module from the internal NCE service module–side interface.

After starting a session, you can perform any NCE configuration task. You first access the NCE console in a user-level shell. To access the privileged EXEC command shell, where most commands are available, use the **enable** command.

After you finish NCE configuration and exit the NCE console session, use this command with the **clear** keyword to clear the session. At the confirmation prompt, press **Enter** to confirm the action or press **n** to cancel.

shutdown

At the confirmation prompt, press **Enter** to confirm the action or **n** to cancel.

To protect the hard drive, the **service-module Transport-Opt-Service-Engine shutdown** command brings down the operating system of the specified NCE service module in an orderly fashion. When the system is shut down, you can remove the module from the router.

status

Use the **service-module Transport-Opt-Service-Engine status** command to:

- Display the NCE service module's software release version
- Check the NCE service module status (steady or down)
- Display hardware information for the NCE service module, including CPU, memory, interface, and disk drive information

Examples

reload

```
Router# service-module Transport-Opt-Service-Engine 1/0 reload

Do you want to proceed with reload?[confirm]
```

reset

```
Router# service-module Transport-Opt-Service-Engine 1/0 reset

Use reset only to recover from shutdown or failed state
Warning: May lose data on the hard disk!
Do you want to reset?[confirm]
```

session

```
Router# service-module Transport-Opt-Service-Engine 2/0 session

CA-2811#service-module transport-Opt-Service-Engine 0/0 session
Trying 1.4.1.52, 2194 ... Open
se-1-4-1-53>
se-1-4-1-53>
```

The following example clears the session that had been used to configure the NCE in the service module in slot 2:

```
Router# service-module Transport-Opt-Service-Engine 1/0 session clear
```

```
[confirm]
 [OK]
```

shutdown

```
Router# service-module Transport-Opt-Service-Engine 1/0 shutdown

Shutdown is used for Online removal of Service Module.
Do you want to proceed with shutdown?[confirm]
Use service module reset command to recover from shutdown.
```

statistics

```
Router# service-module Transport-Opt-Service-Engine 2/0 statistics

Module Reset Statistics:
  CLI reset count = 1
  CLI reload count = 0
  Registration request timeout reset count = 0
  Error recovery timeout reset count = 0
  Module registration count = 2

The last IOS initiated event was a cli reset at *13:34:33.847 UTC Sun Dec 18 2005

Router# service-module t4/0 status
Service Module is Cisco Transport-Opt-Service-Engine4/0
Service Module supports session via TTY line 258
Service Module is in Steady state
Getting status from the Service Module, please wait..

Transport Optimization Module 0.0.0.230
TPO Running on NM
```

Related Commands

Command	Description
interface Transport-Opt-Service-Engine	Configures an interface for NCE service module and enters interface configuration mode.
transport-opt	Configures the NCE service module for NCE over WAN.

show interfaces transport-opt-service-engine

To display the status of the interfaces of the NCE service module, use the **show interfaces transport-opt-Service-Engine** command in Global configuration mode.

show interface Transport-Opt-Service-Engine *slot/unit all*

Syntax Description

slot	Number of the router chassis slot for the service module.
unit	Number of the interface where the NCE module resides in the router. The slash mark (/) is required between the *slot* argument and the *unit* argument.
all	All the specified WAN interfaces with tpo IDs configured.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
12.4(20)T	This command was introduced.

Usage Guidelines

Use the **show interfaces transport-opt-Service-Engine** command to display details about the NCE service module interface.

Examples

The following example shows interface information for a NCE service module's counters in router slot 0 and unit 0:

```
Router# show interfaces transport-opt-service-engine 0/0 counters all

  tpo-id     WAN interface           Packets             Bytes
      41          ATM0/1/0                 0                 0
      50           Tunnel0           6752887         580748282
      64       Serial0/0/0                 0                 0
```

Table 11-1 describes the significant fields shown in the display.

Table 11-1 show interfaces transport-opt-Service-Engine Field Descriptions

Field	Description
tpo-id	Defines the tpo ID number configured for the WAN interface.
WAN interfaces	Describes the physical WAN interface configured on the router.
Packets	Number of TCP packets sent to the NCE service module.
Bytes	Total data bytes sent to the NCE service module.

Related Commands

Command	Description
show adjacency detail	Shows the adjacency for tpo ID being created for the main interface and for each tpo ID configured for the Wan interface.
transport-opt	Configures the NCE service module for NCE on a WAN interface through TCP packet interception and optimization.

show running-config interface serial

To display current configuration information of the running NCE side of a service module, use the **show running-config interface serial** command in privileged EXEC mode.

show running-config interface serial *slot/unit*

Syntax Description

slot	Number of the router chassis slot for the service module.
unit	Number of the interface where the NCE module resides in the router. The slash mark (*/*) is required between the *slot* argument and the *unit* argument.

Command Default

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(20)T	Transport Performance Optimization was added.

Usage Guidelines

Use the **show running-config interface serial** command to:

- Display the NCE service module's current configuration
- Check the NCE service module status
- Display hardware information for the NCE service module, including interface, IP address, load interval and clock rate

Examples

The following example shows configuration information for a NCE service module:

```
Router# show running-config interface serial 0/0/0
Building configuration...

Current configuration : 197 bytes
!
interface Serial0/0/0
 ip address 30.0.0.1 255.255.255.0
 load-interval 30
 no fair-queue
 clock rate 8064000
transport-opt 64 interface Transport-Opt-Service-Engine0/0
end
```

Related Commands

Command	Description
transport-opt	Configures the NCE service module for NCE on a WAN interface through TCP packet interception and optimization.

transport-opt

To configure the NCE service module for NCE on a WAN interface through TCP packet interception and optimization, use the **transport-opt** command in EXEC mode.

To block reception of NCE signaling messages on a particular socket, use the **no** form of this command.

transport-opt *transport-opt id / multipoint* **interface transport-opt-service-engine** *slot/port*

no transport-opt

Syntax Description

transport-opt id/multipoint	TPO IDs are identification numbers for tpo interfaces configured on the application. the tpo IDs should be the same as the tpo ID configured in the application for the point-to-point configurations. The multipoint option is currently supported only on GE interfaces. When the multipoint option is selected, the transport-opt id is not required to be configured in the IOS CLI command. TPO IDs range from 1 to 64. The tpo ID is constructed into the destination MAC when the intercepted packet is forwarded to the NCE service module.
slot	Number of the router chassis slot for the NCE service module.
port	Interface number where the NCE service module resides in the router.

Command Default

TCPs are enabled.

Command Modes

EXEC

Command History

Release	Modification
12.4(20)T	This command was introduced.

Usage Guidelines

This command controls whether to allow TCP packet interception and optimization to be applied to NCE devices across the network.

To block NCE message formatting on a specific interface, use the **no** form of this command.

To reset this command to the default value, use the **default** command.

Examples

The following example sets the NCE service module on a PVC under a point-to-point subinterface:

```
uut1(config)#int s2/0/0
uut1(config)#encapsulation frame-relay

uut1(config)#int s2/0 /0.1 point-to-point
uut1(config-subif)#frame-relay interface-dlci 65
uut1(config-fr-dlci)# "transport-opt <tpo-id> interface Transport-Opt-Service-Engine
<x/y>"
```

The following example sets the NCE service module on PVC's for a multipoint subinterface:

```
uut1(config)#int s2/0/0
uut1(config)#encapsulation frame-relay

uut1(config)#int s2/0 /0.1multipoint
uut1(config-subif)#frame-relay interface-dlci 150
uut1(config-fr-dlci)# "transport-opt <tpo-id> interface Transport-Opt-Service-Engine
<x/y>"
```

Configure an ATM multipoint interface under ATM PVC.

Related Commands

Command	Description
show transport-opt-interface transport-opt-service-engine stats	Shows basic interface configuration statistics for NCE service modules.

bandwidth

To configure the bandwidth specific to a particular NCE (WAN), use the **bandwidth** command.

As multiple TCP connections are multiplexed into a single Stream Control Transmission Protocol (SCTP) session, it becomes essential for the NCE service module to ensure smooth SCTP flow control.

The NCE Service Module programs the SCTP flow control parameters. With bandwidth configuration, the NCE Service Module controls flooding of data packets on the WAN and eventually this helps the NCE to efficiently regulate WAN usage and packet drops.

Bandwidth can be configured for the NCE Service Module by using the **bandwidth** command. By default, the NCE Service Module assumes an 8 Mbps WAN link, which may not always be the case. Particularly for the links below 8 Mbps, we strongly recommend bandwidth configuration.

bandwidth *peak-bandwidth guaranteed-bandwidth* **tos** *TOS*

Syntax Description

peak bandwidth	Integer value for bandwidth, in kbps.
guaranteed bandwidth	Integer value for bandwidth, in kbps.
TOS	Type of service (TOS) attached to this NCE.

Command Default

Bandwidth is not configured on an NCE service module.

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command is useful for avoiding traffic burst and WAN output packet drops. For better throughput and latency mitigation, we advise configuring the bandwidth if the WAN link is 8 Mbps or less.

Configure the bandwidth based on the actual WAN bandwidth available to NCE. If you configure multiple SCTP pipes to differentiate service, configure the bandwidth for each TOS pipe; otherwise, set TOS to 0.

It is recommended to configure the guaranteed bandwidth to a maximum of 80% of peak bandwidth even when total WAN bandwidth is available for NCE and the particular TOS pipe. Depending upon the traffic profile, the peak bandwidth can be configured to the overall WAN speed, for example, if there is no significant non-NCE traffic.

Sets maximum bandwidth and guaranteed bandwidth available on a WAN link

This command takes effect only when the bandwidth-profile is configured as rate-contro.l

If guaranteed bandwidth is configured as part of the main command, it is distributed equally among all the TOS pipes.

Guaranteed bandwidth can also be configured for an individual TOS pipe which will be applicable only when qos-dscp is enabled.

Examples

The following example shows how to configure WAN bandwidth where WAN speed is 8 Mbps, 6 Mbps is dedicated to NCE, and NCE traffic is divided into two profiles:

- 4-Mbps WAN bandwidth for high priority traffic, TOS is 0x7
- The rest of the traffic is default traffic.

```
branch-office(config> conf t
branch-office(config)> tpo id 1
branch-office(config)> bandwidth 8000 2000 tos 0
branch-office(config)> bandwidth 8000 4000 tos 7
branch-office(config)> default policy-action all
branch-office(config)> sctp-peer 1.100.70.123
branch-office(config)> exit


branch-office> show tpo id
Number of TPO-ID: 3
============================================================
TPO-ID: 4, SCTP Peer: 14.14.14.15, Peer Relationship: Acceptor
Capability Exchange: Not Available, Native Version: 2.0
Default Policy-action: compress-sctp, Service Policy: <not configured>
Bandwidth Profile: high-speed-sctp
TCP Connections: 0/0 (active/max)
WCCP Branch Group ID: 3, Assigning Peer: 16.16.16.17
10 sec input rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
10 sec output rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
sctp_tx: 0 pkts, 0 bytes, sctp_rx: 0 pkts, 0 bytes
tcp_tx: 0 bytes, tcp_rx: 0 bytes, dropped: 0 bytes
____________________________________________________________
TOS: 0, DSCP: 0, TCP Connections: 0
Status: DOWN, Waiting for Peer to Initiate Connection
============================================================
============================================================
TPO-ID: 10, SCTP Peer: 2.2.2.3, Peer Relationship: Initiator
Capability Exchange: Compatible, Negotiated Version: 2.0
Default Policy-action: compress-sctp, Service Policy: <not configured>
Press Enter for More or [q] Quit:
Bandwidth Profile: high-speed-sctp
TCP Connections: 0/12496 (active/max)
10 sec input rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
10 sec output rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
sctp_tx: 0 pkts, 0 bytes, sctp_rx: 0 pkts, 0 bytes
tcp_tx: 0 bytes, tcp_rx: 0 bytes, dropped: 0 bytes
____________________________________________________________
TOS: 0, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 1, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 2, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 3, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 4, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 5, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 6, DSCP: 0, TCP Connections: 0
Press Enter for More or [q] Quit:
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 7, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
============================================================
```

Related Commands

Command	Description
show tpo id	Shows detailed configuration and status information for the specified NCE.

bandwidth-profile

To configure bandwidth profile under a specific TPO ID, use the **bandwidth-profile** command. To remove the command setting, use the **default bandwidth-profile** command.

bandwidth-profile *hs-sctp rate-control default-sctp*

default bandwidth-profile

Syntax Description

hs-sctp	High-speed sctp flow and congestion control (default).
rate-control	Static configuration of peak and guaranteed bandwidth.
default-sctp	Standards-compliant SCTP flow and congestion control.

Command Default

None

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

When the rate-control is configured, peak and guaranteed bandwidth should be configured.

If you are configuring a point-to-point link and you know the maximum bandwidth, configure the rate-control or use the default hs-sctp for better performance.

Examples

The following example shows:

```
branch-office>#config t
branch-office>(config)# tpo id 1
branch-office>(config-tpo-id)#bandwidth-profile rate-control
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

bind

To binds the specific network to a particular NCE for multipoint deployment, use the **bind** command.

bind *network-address network-mask*

Syntax Description

network address	Network IP address.
network mask	Network subnet mask.

Command Default

None.

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command is useful for binding a specific network to a particular tpo ID for multipoint deployment where the specific tpo ID is not known.

Examples

The following example shows how to bind network 192.168.1.0 to tpo ID 1, using the **bind** command.

```
branch-office(config)> tpo id 1
branch-office(config-tpo-id)> bind ?
  A.B.C.D      IP address
branch-office(config-tpo-id)> bind 192.168.1.0 ?
  A.B.C.D      Subnet mask
branch-office(config-tpo-id)> bind 192.168.1.0 255.255.255.0
branch-office(config-tpo-id)>
```

clear tpo id statistics

To clear interface level statistics, use the **clear tpo id statistics** command.

clear tpo id statistics

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows how to clear tpo ID statistics at the interface level:

```
se-1-3-252-180> show tpo id 10 stat
Interface Statistics (since last cleared) for tpo id 10
===============================
         Total Connections: 22838
       Deflate Connections: 22838
      TCP Received (in MB): 4.225323
         SCTP Sent (in MB): 4.138203
  Compression Ratio (in %): 2.061859
     SCTP Received (in MB): 76.934978
          TCP Sent (in MB): 1431.528112
Decompression Ratio (in %): 94.625671

se-1-3-252-180> clear tpo id statistics

se-1-3-252-180> show tpo id 10 statistics
Interface Statistics (since last cleared) for tpo id 10
===============================
         Total Connections: 0
       Deflate Connections: 0
      TCP Received (in MB): 0.000000
         SCTP Sent (in MB): 0.000000
  Compression Ratio (in %): 0.000000
     SCTP Received (in MB): 0.000000
          TCP Sent (in MB): 0.000000
Decompression Ratio (in %): 0.000000
===============================
se-1-3-252-180>
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

clear tpo id traffic-profile

To clear a tpo ID traffic profile, use the **clear tpo id traffic-profile** command. To remove the command setting, use the **no** form of this command.

clear tpo id *id* **traffic-profile**

no clear tpo *id* **traffic-profile**

Syntax Description

id	Unique TPO identification number in the range 1 to 64

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows the traffic profile for tpo id 1 is cleared:

```
branch-office> show tpo id 1 traffic-profile
-----------------------------------------------------------------------
  APPLICATION    ACCEPT   BYPASSED  CONNECT  DENIED   TCP-Tx    TCP-Rx
-----------------------------------------------------------------------
       ftp        0        0        1        0        102        522
       ssh        0        0        0        0          0          0
    telnet        0        0        0        0          0          0
      smtp        0        0        0        0          0          0
print_serv        0        0        0        0          0          0
       rlp        0        0        0        0          0          0
  graphics        0        0        0        0          0          0
nameserver        0        0        0        0          0          0
       dns        0        0        0        0          0          0
       mtp        0        0        0        0          0          0
      http        0        0        0        0          0          0
      pop3        0        0        0        0          0          0
       ntp        0        0        0        0          0          0
      snmp        0        0        0        0          0          0
 https/ssl        0        0        0        0          0          0
      cifs        0        0        0        0          0          0
    others        0        0        3        0          0        408

branch-office> clear tpo id 1 traffic-profile

branch-office> show tpo id 1 traffic-profile
-----------------------------------------------------------------------
  APPLICATION    ACCEPT   BYPASSED  CONNECT  DENIED   TCP-Tx    TCP-Rx
-----------------------------------------------------------------------
       ftp        0        0        0        0          0          0
       ssh        0        0        0        0          0          0
```

```
    telnet        0        0        0        0        0        0
      smtp        0        0        0        0        0        0
print_serv        0        0        0        0        0        0
       rlp        0        0        0        0        0        0
  graphics        0        0        0        0        0        0
nameserver        0        0        0        0        0        0
       dns        0        0        0        0        0        0
       mtp        0        0        0        0        0        0
      http        0        0        0        0        0        0
      pop3        0        0        0        0        0        0
       ntp        0        0        0        0        0        0
      snmp        0        0        0        0        0        0
 https/ssl        0        0        0        0        0        0
      cifs        0        0        0        0        0        0
    others        0        0        0        0        0        0
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

clear tpo statistics

To clear global statistics for all interfaces for the filter, gateway, and protocol, use the **clear tpo statistics** command.

clear tpo statistics

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows how to clear global tpo ID statistics:

```
se-1-3-252-180> show tpo stat fil
Filter Information:
Unresetable counters - entries used: 6098 (Get 2384939/Free 2378841), reload 0
In trans: 320996, Out trans: 315853, Err Cnt: 0
GW TCP close: 0, OGW notified: 124685, TGW connect: 0
OGW SYN bypass: 118587, accept: 6078, reject: 0, dup syn drop: 2233
GW Tx: SYN 0, SYNACK 6078, RST 0, FIN 0
GW Rx: SYN 126918, SYNACK 0, RST 97081, FIN 0
Pkt bypass with entry: 0, w/o entry in/out: 4506358/0, inv peer_id: 0
    global/peer bypass: 0/0, ssh,bgp bypass: 0
Throttle on/off: 0/0, throttled connections: 0

se-1-3-252-180> clear tpo statistics

se-1-3-252-180> show tpo statistics filter
Filter Information:
Unresetable counters - entries used: 7110 (Get 2385971/Free 2378861), reload 0
In trans: 13083, Out trans: 12748, Err Cnt: 0
GW TCP close: 0, OGW notified: 250, TGW connect: 0
OGW SYN bypass: 0, accept: 250, reject: 0, dup syn drop: 0
GW Tx: SYN 0, SYNACK 250, RST 0, FIN 0
GW Rx: SYN 250, SYNACK 0, RST 250, FIN 0
Pkt bypass with entry: 0, w/o entry in/out: 0/0, inv peer_id: 0
    global/peer bypass: 0/0, ssh,bgp bypass: 0
Throttle on/off: 0/0, throttled connections: 0
se-1-3-252-180>
```

Related Commands

Command	Description
show tpo id statistics	Shows limited information for all the configured NCEs.

default policy-action

To reconfigure the current default policy, use the **default policy-action** command.

default policy- action [*compress-sctp* | *bypass* | *default-sctp*]

Syntax Description

compress-sctp	All traffic is compressed and optimized.
bypass	All traffic is bypassed. No optimization or compression is applied.
default-sctp	Standards-compliant SCTP flow and congestion control.

Command Default

The *compress-sctp* argument is applied.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

If there is no service-policy configured within a WAN interface, the existing default policy is applied.

Examples

The following example shows how to set the default policy to *compress-sctp*:

```
branch-office(config)> tpo id 1
branch-office(config-tpo-id)> default policy-action compress-sctp
```

Related Commands

Commands	Description
match	Configures a policy match within a policy map.
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces.

description

To reconfigure the description for a tpo ID, use the **description** command.

description *tpo-ID-description*

Syntax Description

tpo-ID-description	NCE description string.

Command Default

None

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command assigned meaningful name to a particular tpo ID. It is mainly useful for administrative purposes.

Examples

The following example shows how to set the description as “Cisco Systems” for tpo ID 1:

```
branch-office(config)> tpo id 1
branch-office(config-tpo-id)> description "Cisco Systems"
branch-office(config-tpo-id)>
```

Related Commands

Command	Description
show tpo id	Shows detailed configuration and status information for a specific NCE.

match

To configure a policy match within a policy-map, use the **match** command. The **match** command has the flexibility to configure any kind of match using the **any** keyword within the IP address and the port number configurations or you can set a specific policy match type. To disable, use the **no** form of this command.

match *any* | *src-ip [any* | *ip_address*] *dest-ip [any* | *ip_address*]
any | *src-port [any* | *port-number*] *dest-port [any* | *port-number*]]
action [*compress-sctp* | *bypass* | *default-sctp*]

Syntax Description

any	Match all available IP addresses or port numbers.
src-ip	Specifies that the following field contains the IP address to match. Alternatively, **any** can be used to match all available IP addresses. If configured on OGW, src-ip is the address of the client and if configured on TGW, src-ip is the address of the server.
dst-ip	Specifies that the following field contains the IP address to match. Alternatively, **any** can be used to match all available IP addresses. If configured on OGW, dst-ip is the address of the server and if configured on TGW, dst-ip is the address of the client
src-port	The source port number from the direction of connection. In the OGW, it is the client port.
dst-port	The destination port of the server.
action	The action of the policy on the connection (optimize, bypass, all).
any	Any source port, destination port, source IP, or destination IP.
ip_address	IP v4 address.
port-number	Specifies the TCP port-number to which the traffic is destined.
compress-sctp	All traffic is compressed and optimized.
bypass	Traffic is bypassed. No optimization or compression is applied.
default-sctp	Standards-compliant SCTP flow and congestion control.
?	Provides a list of all possible responses.

Command Default

This command defaults to applying **All** optimizations.

Command Modes

Policy map configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

The **any** keyword can be used to match any source or destination IP address or port number.

All of the match qualifiers are optional, however to configure a match at least one of the qualifier is required.

Instead of a subnet mask, a wildcard bit is used. To specify a range of IP addresses, for example, from 10.1.1.5 to 10.1.1.15, use the command:

match src_ip 10.1.1.5 0.0.0.15

Because the software stops testing conditions after it encounters the first match, wisely configuring the most likely matches or more frequently queried matches before the less frequent conditions will help reduce the processing time and resources used on the system.

Examples

The following example shows how to enter a match sequence using the **?** help feature:

```
(config-policymap)# match  ?
       src-ip                Source ip address
       dest-ip              Destination ip address
       any                    Match any source or destination ip
```

Here's a sample sequence:

```
------------------------
(config-policymap)> match ?
    any          Match any source or destination ip address
    dst-ip       Destination ip address
    move         Move a match up or down from current position
    src-ip       Source ip address
(config-policymap)> match src-ip ?
    A.B.C.D      IP address
    any          Match any source ip address
(config-policymap)> match src-ip any ?
    dst-ip       Destination ip address
(config-policymap)> match src-ip any dst-ip ?
    A.B.C.D      IP address
    any          Match any destination ip address
(config-policymap)> $st-ip 12.12.12.12 255.255.255.140 ?
    any          Match any source or destination port number
    dst-port     Destination port number
    src-port     Source port number
(config-policymap)> $12.12.12 255.255.255.140 dst-port ?
    NUMBER       Port number
    any          Match any destination port number
(config-policymap)> $2.12 255.255.255.140 dst-port any ?
    src-port     Source port number
(config-policymap)> $255.140 dst-port any src-port any ?
    action       Action to perform on match
(config-policymap)> $ dst-port any src-port any action
    % Incomplete command.
(config-policymap)> $ dst-port any src-port any action ?
    all          (TCP Optimization + Deflate)
    bypass       Bypass any optimization
    optimize     TCP optimization
```

The following example are complete **match** commands:

```
(config-policymap)# match any any action all
(config-policymap)# match any dst-port 80 src-port 80 action all
(config-policymap)# match dst-ip 12.12.12.12 255.255.255.240 src-ip any dst-port 80
src-port any action deflate
(config-policymap)# match src-ip 12.13.13.13. 255.255.255.255 dst-ip any dst-port any
src-port 80 action all
```

match move

To move matches within a policy-map, use the **match move** command. Moves across policy-maps are not be supported.

match move *from-location to-location*

Syntax Description

from-location	Policy map *from* location number.
to-location	Policy map *to* location number.

Command Default

Matches are ordered in the order in which they are entered.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

This example swaps the matches in position 1 and position 5.

```
Example:
(config-policymap)# match move 5 to 1
```

Related Commands

Command	Description
match	Configures a policy match within a policy-map.
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces.

maximum-sessions

To configures the maximum allowed sessions for a specific peer, use the **maximum-sessions** command.

maximum-sessions *max sessions*

Syntax Description

max sessions	Maximum number of sessions allowed.

Command Default

None

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

Depending on the hardware module there are a fixed number of total maximum TCP sessions

- For AIM-TPO-1, 1023 sessions are the maximum allowed.
- Total active sessions supported: 2048 for AIM-TPO-2, 4096 for NM-AGGR.

Once the limit is reached, further sessions are bypassed even if the policy is not configured as “bypass”.

This command is useful for putting a logical limit for a specific NCE for the maximum allowed sessions so that it can avoid reaching the global limit and thus avoid bypassing the sessions for all the NCEs.

Examples

The following example shows how to set 512 maximum allowed sessions for tpo ID 1:

```
branch-office(config)> tpo ID 1
branch-office(config-tpo-id)> maximum-sessions ?
  INTEGER      Max sessions (Range: 1 - (1023 AIM-TPO-1)(4096 AIM-TPO-2/NME-TPO)
branch-office(config-tpo-id)> maximum-sessions 512
branch-office(config-tpo-id)>
```

policy-map

To create or modify a policy map that can be attached to one or more interfaces to specify a service policy, use the **policy-map** command in global configuration mode. To delete a policy map, use the **no** form of this command. The **policy-map** command enters policy-map configuration mode, in which you can configure or modify the class policies for that policy map. To delete a policy map, use the **no** form of this command.

policy-map *id-string*

no policy-map

Syntax Description

id-string	Unique string identifier.

Command Default

None

Command Modes

Policy map configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

You can define one or more policies by using this command in global configuration mode. Policies are independent of NCE service engine configuration. To delete a policy map, use the **no** form of this command A control policy is made of one or more control policy rules. A control policy rule is an association of a control class and one or more actions. The control class defines the conditions that must be met before the actions will be executed. The **policy-map** command enters policy-map configuration mode, in which you can configure or modify the class policies for that policy map.

Examples

The following commands create the policy map, which is defined to contain policy specification for class1 and the default class:

```
policy-map one
 match any dst-port 21 src-port any action bypass
 match any dst-port 80 src-port any action bypass
 match any dst-port 110 src-port any action bypass
 match any dst-port 25 src-port any action sctp-only
 exit
policy-map two
 exit
policy-map four
 match dst-ip any src-ip 11.11.11.0 0.0.0.255 any action bypass
 match dst-ip any src-ip 11.11.11.0 255.255.255.0 any action bypass
 exit
```

Related Commands

Command	Description
match	Configures a policy match within a policy map.
match move	Facilitates match ordering within a policy map.

qos-dscp

To configure DSCP marking on SCTP packets based on the incoming TCP connections, use the **qos-dscp** command. To delete scp marking, use the **no** form of this command.

qos-dscp [*dscp1*][*dscp2*][*dscp3*][*dscp4*][*dscp5*][*dscp6*][*dscp7*][*dscp8*]

no qos-dscp

Syntax Description

dscp 1 - 8	Differentiated services code point value (0-63). One value per SCTP pipe with a max of 8 pipes.

Command Default

DSCP is not configured.

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows how qos-dscp is configured on the NCE module:

```
CA-2821-1(config)> tpo id 10
CA-2821-1(config-tpo-id)> qos-dscp ?
  <cr>
  INTEGER      Differentiated services codepoint value (0-63)

tpo id 10
 qos-dscp  0 8 16 26 32 46 48 56   < Default values >
 default policy-action  compress-sctp
 bandwidth-profile default-sctp
```

sctp-peer

To configure the maximum Stream Control Transmission Protocol (SCTP) peer address, use the **sctp-peer** command.

sctp-peer *IP Address*

Syntax Description

IP address	The IP address of the peer.

Command Default

None

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

NCE is a synchronous solution and the user needs to know the peer at the destination end. At present, automatic SCTP peer discovery is not supported. This command configures the destination SCTP peer statically.

Examples

The following example shows how to set SCTP peer as 192.168.1.1.

```
branch-office(config-tpo-id)> sctp-peer ?
  A.B.C.D      IP address
branch-office(config-tpo-id)> sctp-peer 192.168.1.1
branch-office(config-tpo-id)>
```

Related Commands

Command	Description
show tpo id	Shows sctp information at the interface level.

sctp-peer tos

To configure maximum Stream Control Transmission Protocol (SCTP) parameters, use the **sctp-peer tos** command.

sctp-peer *IP Address* **tos** *tos*

Syntax Description

IP address	The IP address of the peer.
tos	Service level.

Command Default

None

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

NCE is a synchronous solution and the user needs to know the peer at the destination end. At present, automatic SCTP peer discovery is not supported. This command configures the destination SCTP peer statically.

Examples

The following example shows how to set SCTP peer as 192.168.1.1.

```
branch-office(config-tpo-id)> sctp-peer ?
  A.B.C.D      IP address
branch-office(config-tpo-id)> sctp-peer 192.168.1.1 tos 0
branch-office(config-tpo-id)>
```

Related Commands

Command	Description
show tpo id	Shows sctp information at the interface level.

service-policy

To configures the specific policy map to NCE, use the **service-policy** command.

service-policy *service-policy-identifier-name*

Syntax Description

service-policy-identifier-name	A unique policy name created by using the **policy-map** command.

Command Default

None

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

The service policy applies to a tpo ID.

The service policy that is configured takes precedence over the default policy. The default policy is used when no service policy is configured.

The user can configure multiple policies by using the **policy-map** command. These policies are independent of the NCE. Each policy is identified by a unique word. Multiple actions can be attached to the policy. The command is useful for attaching one of the policies to a specific tpo ID.

Examples

The following example shows how to attach policy “test” to tpo ID 1.

```
branch-office(config)> tpo id 1
branch-office(config-tpo-id)> service-policy ?
  WORD         Service Policy identifier name
branch-office(config-tpo-id)> service-policy test
branch-office(config-tpo-id)>
```

Related Commands

Command	Description
show policy-map	To display a specific policy map, use the **show policy-map** command in global configuration mode.

show policy-map (all)

To display the policy maps that have been configured, use the **show policy-map** command in Global configuration mode.

show policy-map

Syntax Description

This command has no arguments or keywords.

Command Default

The configuration information for all the policy maps is displayed.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

Use the **show policy-map** command to check the current configurations of the policy maps.

Examples

The following example shows all the policy map configurations, listed by name:

```
show policy-map
================================================================================================
Policy-Map: one
Number of Associations: 0, Match Count: 4
------------------------------------------------------------------------------------------------
    src ip   src wildcard   dst ip   dst wildcard   src port  dst port   action hit
------------------------------------------------------------------------------------------------
1:   any      any           any        any            0        21     Bypass [0]
2:   any      any           any        any            0        80     Bypass [0]
3:   any      any           any        any            0       110     Bypass [0]
4:   any      any           any        any            0        25     TCP Optimization [0]
================================================================================================
Policy-Map: four
Number of Associations: 0, Match Count: 2
------------------------------------------------------------------------------------------------
    src ip    src wildcard   dst ip   dst wildcard   src port  dst port    action hit
------------------------------------------------------------------------------------------------
1:  11.11.11.0  0.0.0.255      any      any             0      0 Bypass               [0]
2:  11.11.11.0  255.255.255.0  any      any             0      0 Bypass               [0]
================================================================================================
Policy-Map: five
Number of Associations: 0, Match Count: 1
------------------------------------------------------------------------------------------------
Press Enter for More or [q] Quit:
    src ip    src wildcard    dst ip   dst wildcard   src port  dst port   action   hit
------------------------------------------------------------------------------------------------
1:  11.11.11.0  0.0.0.255  9.9.9.0 0.0.0.255      0      0 Bypass               [0]
branch-office>
```

```
branch-office> show policy-map one
================================================================================================
Policy-Map: one
Number of Associations: 0, Match Count: 4
------------------------------------------------------------------------------------------------
    src ip   src wildcard   dst ip    dst wildcard   src port  dst port  action   hit
------------------------------------------------------------------------------------------------
1:   any        any           any        any           0     21 Bypass               [0]
2:   any        any           any        any           0     80 Bypass               [0]
3:   any        any           any        any           0    110 Bypass               [0]
4:   any        any           any        any           0     25 TCP Optimization     [0]
```

The following example shows all the policy map configurations, listed by name:

```
show policy-map http-sj
policy-map : http-sj
match src-ip 12.22.23.3 255.255.255.254 dst-ip any any action deflate
match dst-ip 124.34.36.12 255.255.255.254 dst-port 80 action bypass
```

Table 11-2 describes the significant fields shown in the display.

Table 11-2 show policy-map Field Descriptions

Field	Description
src ip	Source IP address.
src wildcard	Source IP address is ANY.
dst ip	Destination IP address.
dst wildcard	Destination IP address is ANY.
src port	Source TCP port.
dst port	Destination TCP port.
action hit	The number of times the specific match (src IP and dst IP and src port and dst port) has been made.

Related Commands

Command	Description
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.

show policy-map

To display a specific policy map, use the **show policy-map** command in global configuration mode.

show policy-map *policy-map-name*

Syntax Description		
	policy-map-name	Shows a specific policy map configuration.

Command Default Shows the configuration information for the named policy map.

Command Modes Global configuration

Command History	Release	Modification
	2.0.1	This command was introduced.

Usage Guidelines Use this command to check the current configurations of the policy maps.

Examples The following example shows all the policy map configurations, listed by name:

```
show policy-map one
================================================================================================
Policy-Map: one
Number of Associations: 0, Match Count: 4
------------------------------------------------------------------------------------------------
    src ip   src wildcard   dst ip   dst wildcard   src port  dst port   action hit
------------------------------------------------------------------------------------------------
1:   any      any           any        any            0        21     Bypass [0]
2:   any      any           any        any            0        80     Bypass [0]
3:   any      any           any        any            0       110     Bypass [0]
4:   any      any           any        any            0        25     TCP Optimization [0]
================================================================================================
branch-office>
```

Table 11-3 describes the significant fields shown in the display.

Table 11-3 show policy-map Field Descriptions

Field	Description
src ip	Source IP address.
src wildcard	Source IP address is ANY.
dst ip	Destination IP address.
dst wildcard	Destination IP address is ANY.
src port	Source TCP port.

Table 11-3 show policy-map Field Descriptions (continued)

Field	Description
dst port	Destination TCP port.
action hit	The number of times a specific match (src Ip and dst IP and src port and dst port) has been made.

Related Commands

Command	Description
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.

show running config

To show the running configuration on the NCE service module, use the **show running config** command.

show running-config

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command is used to show the complete running config on the service module.

Examples

The following example shows the complete configuration on the service module:

```
Router> show running-config
Generating configuration:


clock timezone America/Los_Angeles

hostname branch-office

ip domain-name (none)

software download server url "ftp://127.0.0.1/ftp" credentials hidden
"6u/dKTN/hsEuSAEfw40XlF2eFHnZfyUTSd8ZZNgd+Y9J3xlk2B35j0nfGWTYHfmPSd8ZZNgd+Y9J3xlk2B35j0nfG
WTYHfmPSd8ZZNgd+Y9J3xlk2B35j0nfGWTYHfmP"

groupname Administrators create
groupname Broadcasters create

username admin create
username adin create
username yadmin create
username cisco create

groupname Administrators member admin
groupname Administrators member adin
groupname Administrators member yadmin
groupname Administrators member cisco
groupname Administrators privilege superuser
groupname Broadcasters privilege broadcast
groupname Administrators privilege ManagePrompts
groupname Administrators privilege broadcast
```

```
groupname Administrators privilege local-broadcast
groupname Administrators privilege ManagePublicList
groupname Administrators privilege ViewPrivateList
groupname Administrators privilege vm-imap
groupname Administrators privilege ViewHistoricalReports
groupname Administrators privilege ViewRealTimeReports

backup server url "ftp://127.0.0.1/ftp" credentials hidden
"EWlTygcMhYmjazXhE/VNXHCkplVV4KjescbDaLa4fl4WLSPFvv1rWUnfGWTYHfmPSd8ZZNgd+Y9J3xlk2B35j0nfG
WTYHfmPSd8ZZNgd+Y9J3xlk2B35j0nfGWTYHfmP"

log console errors

policy-map one
 match any dst-port 21 src-port any action bypass
 match any dst-port 80 src-port any action bypass
 match any dst-port 110 src-port any action bypass
 match any dst-port 25 src-port any action sctp-only
 exit
policy-map two
 exit
policy-map four
 match dst-ip any src-ip 11.11.11.0 255.255.255.0 any action bypass
 match dst-ip any src-ip 11.11.11.0 0.0.0.255 any action bypass
 exit
policy-map five
 match dst-ip 9.9.9.0 0.0.0.255 src-ip 11.11.11.0 0.0.0.255 any action bypass
 exit


tpo id 1
 bandwidth 2000 1000 tos 0
 default policy-action  compress-sctp
 bandwidth-profile rate-control
 sctp-peer 20.20.20.20 tos 0
 sctp-peer 20.20.20.20 tos 1
 sctp-peer 20.20.20.20 tos 2
 sctp-peer 20.20.20.20 tos 3
 sctp-peer 20.20.20.20 tos 4
 sctp-peer 20.20.20.20 tos 5
 sctp-peer 20.20.20.20 tos 6
 sctp-peer 20.20.20.20 tos 7
 exit
tpo id 2
 default policy-action  compress-sctp
 sctp-peer 9.9.9.9 tos 0
 exit

 tpo lookup tpo-id
end
```

Related Commands

Command	Description
tpo	Create or modify a NCE.

show software version

To show shows version and serial number information for different components on the NCE service module, use the **show software version** command.

show software version

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows version information:

```
#show software version
Installed Packages:
Software Version: 2.0.1.2

 - Installer  2.0.1.2
 - Bootloader (Primary)  2.1.14
 - Infrastructure  2.3.2.0
 - Global  2.0.1.2
 - Bootloader (Secondary)  2.1.14
 - Core  2.3.0.2
 - WAN Optimization  0.0.0.1
 - GPL Infrastructure  2.2.1.0
```

Related Commands

Command	Description
transport-opt	Configures the NCE service module for NCE on a WAN interface through TCP packet interception and optimization.

show tpo buffers

To display buffer information for all TPOs, use the **show tpo buffers** command. To remove the command setting, use the no form of this command.

show tpo buffers

no show tpo buffers

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows the tpo buffers:

```
router> show tpo buffers
Hardware Buffer Pool Status:
128K Buffer Pool: total 16 buffers, 16 buffers free
64K Buffer Pool: total 1500 buffers, 600 buffers free
32K Buffer Pool: total 32 buffers, 32 buffers free
16K Buffer Pool: total 32 buffers, 32 buffers free
8K Buffer Pool: total 32 buffers, 32 buffers free
4K Buffer Pool: total 1500 buffers, 1499 buffers free
2K Buffer Pool: total 32 buffers, 32 buffers free
1K Buffer Pool: total 1024 buffers, 1021 buffers free
Total Session Buffers: 5120
Session Buffers Allocated: 4003
Max Concurrent Sessions Allocated: 4056  Run Out of HW buffers: 0
64K alloc to stream: 4 Len: 59859
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

show tpo id (all)

To display configurations and status information for all configured NCEs, use the **show tpo id** command.

show tpo id

Syntax Description

This command has no arguments or keywords.

Command Default

Shows the configuration information for all the NCE service modules.

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command shows the configurations of all NCE service modules and the status of the individual SCTP associations. Also includes WCCP group ID, assigning WC, and CoS DSCP.

Examples

The following example shows status and configuration information for all configured NCE service modules:

```
branch-office> show tpo id
Number of TPO-ID: 3
============================================================
TPO-ID: 4, SCTP Peer: 14.14.14.15, Peer Relationship: Acceptor
Capability Exchange: Not Available, Native Version: 2.0
Default Policy-action: compress-sctp, Service Policy: <not configured>
Bandwidth Profile: high-speed-sctp
TCP Connections: 0/0 (active/max)
WCCP Branch Group ID: 3, Assigning Peer: 16.16.16.17
10 sec input rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
10 sec output rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
sctp_tx: 0 pkts, 0 bytes, sctp_rx: 0 pkts, 0 bytes
tcp_tx: 0 bytes, tcp_rx: 0 bytes, dropped: 0 bytes
____________________________________________________________
TOS: 0, DSCP: 0, TCP Connections: 0
Status: DOWN, Waiting for Peer to Initiate Connection
============================================================
============================================================
TPO-ID: 10, SCTP Peer: 2.2.2.3, Peer Relationship: Initiator
Capability Exchange: Compatible, Negotiated Version: 2.0
Default Policy-action: compress-sctp, Service Policy: <not configured>
Press Enter for More or [q] Quit:
Bandwidth Profile: high-speed-sctp
TCP Connections: 0/12496 (active/max)
10 sec input rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
10 sec output rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
sctp_tx: 0 pkts, 0 bytes, sctp_rx: 0 pkts, 0 bytes
```

```
tcp_tx: 0 bytes, tcp_rx: 0 bytes, dropped: 0 bytes
_____________________________________________________________
TOS: 0, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 1, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 2, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 3, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 4, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 5, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 6, DSCP: 0, TCP Connections: 0
Press Enter for More or [q] Quit:
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 7, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
=============================================================
```

Table 11-4 describes the significant fields shown in the display.

Table 11-4 show tpo id Field Descriptions

Field	Description
Number of NCE-IDs	Total number of NCEs configured.
NCE-ID	Unique tpo identification number.
Bandwidth	Configured bandwidth in bits/second.
Policing Rate	SCTP packet sending rate from GW prospective.
Service Policy	Unique Service Policy name applied to this NCE.
Default Policy Action	Policy action applied to this NCE, all, optimize or bypass.
Description	Description string for this NCE.
Cap Exchange Status	This is mainly to ensure compatibility between two NCE systems shows the capability exchange status and negotiated version number.
Peer Address	IP address of the destination SCTP peer NCE.
TOS	Type of Service (TOS) attached to this NCE.
Status	Current status of SCTP association, UP, Down or Going UP.
Streams Used	Total number of TCP sessions on this NCE.
Max Stream Allowed	Maximum number of TCP sessions allowed on this NCE.
Role	Role of this NCE, “acceptor” or “initiator”.

Related Commands

Command	Description
tpo	Create or modify a NCE.

show tpo id

To show detailed configuration and status information for a specific tpo ID, use the **show tpo id** command.

show tpo id *tpo-id*

Syntax Description		
	tpo-id	Unique TPO identification number in the range of 1 to 64.

Command Default Shows the configuration information for all NCE modules.

Command Modes Exec

Command History	Release	Modification
	2.0.1	This command was introduced.

Examples The following example shows all the configuration information:

```
BRANCH-1-C3845-1> show tpo id 10
============================================================
TPO-ID: 10, SCTP Peer: 2.2.2.3, Peer Relationship: Initiator
Capability Exchange: Compatible, Negotiated Version: 2.0
Default Policy-action: compress-sctp, Service Policy: <not configured>
Bandwidth Profile: high-speed-sctp
TCP Connections: 0/12496 (active/max)
10 sec input rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
10 sec output rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
sctp_tx: 0 pkts, 0 bytes, sctp_rx: 0 pkts, 0 bytes
tcp_tx: 0 bytes, tcp_rx: 0 bytes, dropped: 0 bytes
____________________________________________________________
TOS: 0, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 1, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 2, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 3, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 4, DSCP: 0, TCP Connections: 0
Press Enter for More or [q] Quit:
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 5, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 6, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
TOS: 7, DSCP: 0, TCP Connections: 0
Status: UP, going down -> UP at Fri Mar 27 14:41:31 2009
============================================================
```

Table 11-5 describes the significant fields shown in the display.

Table 11-5 show tpo id Field Descriptions

Field	Description
tpo ID	Unique TPO identification number.
Bandwidth	Configured bandwidth in bits per second.
Policing Rate	SCTP packet sending rate from GW prospective.
Service Policy	Unique Service Policy name applied to this tpo ID.
Default Policy Action	Policy action applied to this NCE, all, optimize or bypass.
Description	Descriptive string for this tpo ID.
Cap Exchange Status	Ensures compatibility between two NCE systems. Shows the capability exchange status and negotiated version number.
Peer Address	IP address of the destination SCTP peer NCE.
TOS	Type of service (TOS) attached to this tpo ID.
Status	Current status of SCTP association, UP, Down or Going UP.
Streams Used	Total number of TCP sessions on this NCE.
Max Stream Allowed	Maximum number of TCP sessions allowed on this NCE.
Role	Role of this NCE: “acceptor” or “initiator.” Role is used to decide who starts the SCTP association. The rule is that whoever has a higher IP address starts and is the Initiator — the other end is the Acceptor.

Related Commands

Command	Description
tpo	Create or modify a NCE.

show tpo id brief

To show limited configuration and status information for a specific NCE, use the **show tpo id brief** command.

show tpo id *tpo-id* **brief**

Syntax Description		
	tpo-id	Unique TPO identification number in the range of 1 to 64.

Command Default Shows the configuration information for all NCE modules.

Command Modes Exec

Command History	Release	Modification
	2.0.1	This command was introduced.

Usage Guidelines This command is useful for NCE monitoring purpose. It gives brief details of the control and data plane for a specific NCE.

Examples The following example shows all the configuration information:

```
#branch-office> show tpo id 1 brief

TPO-ID: 1   Peer-IP: 10.1.1.22
***********************************
        TOS    Streams       Status
         0          0         UP

TPO-ID: 2, Peer: 10.1.1.25, WCCP: group-id:1, Assigning WC:10.1.1.40
************************************************
    TOS    COS    Streams    Status
    0      0      0          UP

branch-office>
```

Table 11-5 describes the significant fields shown in the display.

Table 11-6 show tpo id {tpo-id} Field Descriptions

Field	Description
tpo ID	Unique TPO Identification number.
Peer IP	IP address of the destination SCTP peer NCE.
TOS	Type of service (TOS) attached to this NCE.

Table 11-6 show tpo id {tpo-id} Field Descriptions (continued)

Field	Description
Status	Current status of SCTP association: UP, Down, or Going UP.
Streams Used	Total number of TCP sessions on this NCE.

Related Commands

Command	Description
tpo id	Creates or modifies a NCE.

show tpo id connection

To show detailed connection information for a specific NCE, use the **show tpo id connection** command.

show tpo id *tpo-id* **connection**

Syntax Description

tpo-id	Unique tpo identification number in the range of 1 to 64.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command is useful for connection monitoring purpose. It gives complete details about all the connections established on a specific NCE.

Examples

The following example shows all the configuration information:

```
#branch-office> show tpo id 1 connection

Pipe 0 Connections:
DA            SA         DP  SP  SS RS  FD Role State fc_flags Action Ttx  Trx  Stx  Srx
TxTcpQ TxSctpQ Duration
================================================================================
9.1.1.2   8.1.1.2   80 34907 43 42 37 OGW  0x100011 0x1  ALL  17191368  177  173  17208272
0 0 26s
9.1.1.2   8.1.1.2   80 34908 45 44 36 OGW  0x100011 0x1  ALL  11558636  177  173  11570004
0 0 26s
9.1.1.2   8.1.1.2   80 34909 47 46 35 OGW  0x100011 0x1  ALL  17069328  177  173  17086112
0 0 26s
9.1.1.2   8.1.1.2   80 34910 49 48 38 OGW  0x100011 0x1  ALL  11862288  177  173  11873952
0 0 26s
9.1.1.2   8.1.1.2   80 34911 51 50 39 OGW  0x100011 0x1  ALL  11809404  177  173  11821016
0 0 26s
9.1.1.2   8.1.1.2   80 34912 53 52 41 OGW  0x100011 0x1  ALL  11577528  177  173  11588912
0 0 26s
9.1.1.2   8.1.1.2   80 34913 55 54 40 OGW  0x100011 0x1  ALL  13029804  177  173  13042616
0 0 26s
9.1.1.2   8.1.1.2   80 34914 57 56 42 OGW  0x100011 0x1  ALL  15466536  177  173  15481744
0 0 26s
9.1.1.2   8.1.1.2   80 34915 59 58 44 OGW  0x100211 0x1  ALL  12175524  177  173  12187496
0 0 26s
9.1.1.2   8.1.1.2   80 34916 61 60 43 OGW  0x100011 0x1  ALL  16926948  177  173  16943592
0 0 26s
Total Connections for tpo-id 1, pipe 0: 10
branch-office>
```

Table 11-7 describes the significant fields shown in the display.

Table 11-7 show tpo id {tpo-id} connection Field Descriptions

Field	Description
DA	Destination Address
SA	Source Address
DP	Destination Port.
SP	Source Port.
SS	Send Stream Number.
RS	Receive Stream Number.
FD	TCP FD number.
Role	Role as Originating Gateway (OGW) or Terminating Gateway (TGW).
State	Session's Control Flag, useful only for debugging.
Fc_flags	Pipe's Control Flag, useful only for debugging.
Action	Policy Action, "ALL" or "optimize".
Ttx	Total number of TCP bytes sent.
Trx	Total number of TCP bytes Received.
Stx	Total number of SCTP bytes Sent.
Srx	Total number of SCTP bytes Received.
TxTcpQ	Total number of TCP bytes pending for transmit.
TxSctpQ	Total number of SCTP Bytes pending for transmit.
Duration	Duration of TCP connection.

Note TxTcpQ and TxSctpQ have non-zero values when there is congestion at the TCP and SCTP side.

The show tpo id {tpo id} connection shows status flags. The top 16 bits are used for the control plane

- SESS_CP_TCP_CONN_INIT_SENT_TO_TGW = 0x10000,
- SESS_CP_TCP_CONN_INIT_RESP_SENT = 0x20000,
- SESS_CP_TCP_CONN_INIT_SUCCESSFUL = 0x40000,
- SESS_CP_TCP_CONN_INIT_FAILED = 0x80000,
- SESS_CP_TCP_CONN_UP_TCP = 0x100000, // TCP is up
- SESS_CP_TCP_CONN_CLOSE_ONEWAY = 0x200000, // TCP socket closed
- SESS_CP_TCP_CONN_SYSTEM_ERROR = 0x400000,
- SESS_CP_TCP_LOCAL_CONNECT_IN_PROGRESS = 0x800000,
- SESS_CP_TCP_LOCAL_CONNECT_FAILED = 0x1000000,
- SESS_CP_TCP_LOCAL_CONNECT_SUCCESS = 0x2000000,
- SESS_CP_TCP_CONN_LOCAL_FIN = 0x4000000,
- SESS_CP_TCP_CONN_INIT_RESP_RECVD = 0x8000000,

Related Commands

Command	Description
tpo id	Create or modify a NCE.

show tpo id sctp

To show SCTP information at the interface level, use the **show tpo id sctp** command.

show tpo id *tpo-id* **sctp**

Syntax Description

tpo-id	A number in the range of 1 to 64.

Command Default None

Command Modes Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples The following example shows all the configuration information:

```
BRANCH-1-C3845-1> sh tpo id 10 sctp
SCTP Socket Status:
- - - - - - - - - - TOS 0 - - - - - - - - - - - - - - - - - - - - - - - - -
Local
assoc id: 2, state ESTABLISHED, rwnd 2047984, uacked 0, pend 0 snd_buf 1024000
in streams 25000, out streams 25000
rto_initial 3000, rto_max 5000, rto_min 1000
max_rxt 10, no_peer_destination 1
peer_rwnd: 2047984, local_rwnd 2047980, cookie_life 60000
Remote
assoc id 2, address 2.2.2.3/9540, state ACTIVE
cwnd 36864, srtt 247, rto 1000, mtu 9216, Flight Size:0
cwnd_buffer_low: 0, cwnd_fast_xmit: 0, cwnd_t3_xmit: 2, cwnd_inactive: 0
tpo_peak: 0, tpo_ssthresh: 36864/<not configured> (current/configurued)
Total Packets Seen: 0, Nagle Delayed: 74
SCTP Socket Status:
- - - - - - - - - - TOS 1 - - - - - - - - - - - - - - - - - - - - - - - - -
Local
assoc id: 1, state ESTABLISHED, rwnd 2047984, uacked 0, pend 0 snd_buf 1024000
in streams 25000, out streams 25000
rto_initial 3000, rto_max 5000, rto_min 1000
Press Enter for More or [q] Quit:
max_rxt 10, no_peer_destination 1
peer_rwnd: 2047984, local_rwnd 2047980, cookie_life 60000
Remote
assoc id 1, address 2.2.2.3/9541, state ACTIVE
cwnd 36864, srtt 247, rto 1000, mtu 9216, Flight Size:0
cwnd_buffer_low: 0, cwnd_fast_xmit: 0, cwnd_t3_xmit: 2, cwnd_inactive: 0
tpo_peak: 0, tpo_ssthresh: 36864/<not configured> (current/configurued)
Total Packets Seen: 0, Nagle Delayed: 69
SCTP Socket Status:
```

Related Commands

Command	Description
sctp-peer	Configures the maximum SCTP peer IP.

show tpo id statistics

To show connection statistics for a particular tpo ID, use the **show tpo id statistics** command.

show tpo id *tpo-id* **statistics**

Syntax Description

tpo-id	Unique TPO identification number in the range of 1 to 64.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command includes the number of the optimized connections and compression ratios.

Examples

The following example shows the output on the NCE module:

```
BRANCH-1-C3845-1> sh tpo id statistics
Statistics for all active interfaces (since last cleared)
==============================
Statistics for tpo-id: 10, TOS: 0
Total Connections: 0
Optimized Connections: 0
TCP Received (in MB): 0.00
SCTP Sent (in MB): 0.00
Average Compression Over Past 10 Sec (in %): 0.00
SCTP Received (in MB): 0.00
TCP Sent (in MB): 0.00
Average Decompression Over Past 10 Sec (in %): 0.00
Statistics for tpo-id: 10, TOS: 1
Total Connections: 0
Optimized Connections: 0
TCP Received (in MB): 0.00
SCTP Sent (in MB): 0.00
Average Compression Over Past 10 Sec (in %): 0.00
SCTP Received (in MB): 0.00
TCP Sent (in MB): 0.00
Average Decompression Over Past 10 Sec (in %): 0.00
Press Enter for More or [q] Quit:
Statistics for tpo-id: 10, TOS: 2
Total Connections: 0
Optimized Connections: 0
TCP Received (in MB): 0.00
SCTP Sent (in MB): 0.00
Average Compression Over Past 10 Sec (in %): 0.00
SCTP Received (in MB): 0.00
```

```
TCP Sent (in MB): 0.00
Average Decompression Over Past 10 Sec (in %): 0.00
```

Table 11-8 describes the significant fields shown in the display.

Table 11-8 show tpo id statistics Field Descriptions

Field	Description
Total Connections	Total number of TCP connections created on this NCE.
Deflate Connections	Total TCP connections where compression is applied.
TCP Received	Total data (in MB) received on all TCP connections on this NCE.
SCTP Sent	SCTP data (in MB) sent to other end on this NCE.
Compression Ratio	Overall compression ratio.
SCTP Received	SCTP data received (in MB) from other end on this NCE.
TCP Send	Total data (in MB) sent on all TCP connections on this NCE.
Decompression Ratio	Overall decompression ratio.

Note Compression and decompression ratios mainly signify how well the data can be compressed, higher ratios mean better throughput.

Related Commands

Command	Description
tpo id	Create or modify a NCE.

show tpo id statistics (all)

To shows limited information for all the configured NCEs, use the **show tpo id statistics** command.

show tpo id statistics

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows all the configuration information:

```
branch-office> show tpo id statistics

Interface Statistics for all active interfaces (since last cleared)
=====================================================================
Interface Statistics for tpo-id: 1
         Total Connections: 20
       Deflate Connections: 20
      TCP Received (in MB): 0.003376
         SCTP Sent (in MB): 0.003300
  Compression Ratio (in %): 2.259888
     SCTP Received (in MB): 907.646774
          TCP Sent (in MB): 906.755150
Decompression Ratio (in %): 0.098244
==============================
Interface Statistics for tpo-id: 2
         Total Connections: 0
       Deflate Connections: 0
      TCP Received (in MB): 0.000000
         SCTP Sent (in MB): 0.000000
  Compression Ratio (in %): 0.000000
     SCTP Received (in MB): 0.000000
          TCP Sent (in MB): 0.000000
Decompression Ratio (in %): 0.000000
=====================================================================

branch-office>
```

Table 11-9 describes the significant fields shown in the display.

Table 11-9 show tpo id statistics Field Descriptions

Field	Description
Total Connections	Total number of TCP connections created on this NCE.
Deflate Connections	Total TCP connections where compression is applied.
TCP Received	Total data (in MB) received on all TCP connections on this NCE.
SCTP Sent	SCTP data (in MB) sent to other end on this NCE.
Compression Ratio	Overall compression ratio.
SCTP Received	SCTP data received (in MB) from other end on this NCE.
TCP Send	Total data (in MB) sent on all TCP connections on this NCE.
Decompression Ratio	Overall decompression ratio.

Note Compression and decompression ratios mainly signify how well the data can be compressed, higher ratios mean better throughput.

Related Commands

Command	Description
tpo id	Create or modify a NCE.

show tpo id statistics history

To display NCE historical statistics for each peer level use the **show tpo id statistics history** command.

show tpo id *tpo-id* **statistics history** *minute*

Syntax Description

tpo-id	NCE service module identification number.
minute	Optional. Request detailed status information.

Command Default

Shows the statistics for all the NCE modules.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

Use the **show tpo id statistics history** command to monitor the system performance and usage. The statistics are created and updated by the Statistics Manager for each system. The historical statistics are provided only for configured interfaces. They are not be reset when the interface level statistics are cleared.

Examples

This example display the historical statistics for the specified time:

```
# Service-module> show tpo id 10 statistics history ?
  10           Historical stats for past 10 minutes
  120          Historical stats for past 120 minutes
  150          Historical stats for past 150 minutes
  180          Historical stats for past 180 minutes
  30           Historical stats for past 30 minutes
  5            Historical stats for past 5 minutes
  60           Historical stats for past 60 minutes
  90           Historical stats for past 90 minutes

se-1-3-252-180> show tpo id 10 statistics history 10   [ for Past 10 minutes]
Historical Statistics for tpo id 10
==============================
Total Connections: 47722
Deflated Connections: 47722
Bytes Received (in MB): 8.874693
Bytes Sent (in MB): 8.692648
Used Memory (in KB): 183736
Free Memory (in KB): 634056
Stats Last Updated at: Tue Sep 11 07:02:10 2007
Current System Time: Tue Sep 11 07:03:44 2007
==============================
```

Table 11-10 describes the significant fields shown in the display.

Table 11-10 show tpo id statistics history Field Descriptions

Field	Description
Total Connections	Total number of connections established
Deflated Connections	Total number of deflate connections
Bytes Received (in MB)	Total number of bytes received
Bytes Sent (in MB)	Total number of bytes sent
Used Memory (in KB)	Memory used
Free Memory (in KB)	Memory available
Stats Last Updated at	Tue Sep 11 07:02:10 2007
Current System Time	Tue Sep 11 07:03:44 2007

Related Commands

Command	Description
show tpo id *tpo-id* **statistics**	Shows brief control and data plane information for a specific NCE.

show tpo id traffic profile

To show the traffic profile for each tpo ID, use the **show tpo id traffic profile** command. To remove the command setting, use the **no** form of this command.

show tpo id *id* **traffic profile**

Syntax Description

id	Unique TPO identification number in the range 1 to 64

Command Default

None

Command Modes

Exec

Command History

Release	Modification
	This command was introduced.

Examples

The following example shows a traffic profile for tpo id 1:

```
branch-office> show tpo id 1 traffic-profile
-----------------------------------------------------------------------
  APPLICATION    ACCEPT   BYPASSED  CONNECT  DENIED   TCP-Tx    TCP-Rx
-----------------------------------------------------------------------
       ftp        0        0        1        0        102        522
       ssh        0        0        0        0          0          0
    telnet        0        0        0        0          0          0
      smtp        0        0        0        0          0          0
print_serv        0        0        0        0          0          0
       rlp        0        0        0        0          0          0
  graphics        0        0        0        0          0          0
nameserver        0        0        0        0          0          0
       dns        0        0        0        0          0          0
       mtp        0        0        0        0          0          0
      http        0        0        0        0          0          0
      pop3        0        0        0        0          0          0
       ntp        0        0        0        0          0          0
      snmp        0        0        0        0          0          0
 https/ssl        0        0        0        0          0          0
      cifs        0        0        0        0          0          0
    others        0        0        3        0          0        408

branch-office>
```

show tpo module-capacity

To shows module capabilities, use the **show tpo module-capacity** command.

show tpo module-capacity

Syntax Description

This command has no arguments or keywords.

Command Default

Shows module capabilities.

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows module capabilities:

```
#branch-office> show tpo module-capacity
=======================================
Module Capacity Info:
---------------------
Module Type: NME-TPO
Maximum no of Matches: 1024
Maximum no of Interfaces: 50
Maximum no of Policy Maps: 64
=======================================

branch-office>
```

Table 11-11 describes the significant fields shown in the display.

Table 11-11 show tpo module-capacity Field Descriptions

Field	Description
Module Type	Type of hardware.
Maximum no of Matches	Total number of matches, which can be configured on this module.
Maximum no of Interfaces	Total number of NCEs, which can be configured on this module.
Maximum no of Policy Maps	Total number of Policy maps, which can be configured on this module.

Note Compression and Decompression ratios mainly signify how well the data can be compressed, higher ratios mean better throughput.

Related Commands

Command	Description
transport-opt	Configures the NCE service module for NCE on a WAN interface through TCP packet interception and optimization.

show tpo policy-manager

To display policy configurations, use the **show tpo policy-manager** command.

show tpo policy-manager

Syntax Description

This command has no arguments or keywords.

Command Default

Shows information about the NCE policy.

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows information about the NCE policy configuration:

```
# se-1-100-70-117# show tpo policy-manager
Number of configured tpo-id with policy maps: 0
Number of configured Policy Maps: 1
Number of configured Matches: 1
Number of activated statistical records: 0
```

Related Commands

Command	Description
policy-map	Creates or modifies a policy map that can be attached to one or more interfaces to specify a service policy.

show tpo statistics

To display the status of the NCE service module directly connected to the current router, use the **show tpo statistics** command.

show tpo statistics

Syntax Description

This command has no arguments or keywords.

Command Default

Display limited information about the NCE application.

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows NCE statistics:

```
branch-office> show tpo statistics
System Statistics
==============================
Gateway Process: Is Running
Process Manager: Is Running
Statistics Manager: Is Running
Total Memory (in KB): 362112
Free Memory (in KB): 223488
Used Memory (in KB): 138624
==============================
branch-office>
```

Related Commands

Command	Description
show tpo id *tpo-id* **statistics**	Shows brief control and data plane information for a specific NCE.

show tpo statistics filter

To display detailed status information about the filter module, use the **show tpo statistics filter** command.

show tpo statistics filter

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

This command is useful for diagnostic purpose. It gives detailed control and data plane information.

Examples

The following example shows detailed status information about the filter module:

```
# BRANCH-1-C3845-1> show tpo statistics filter
Filter Information:
===================
Unresetable counters - entries used: 0 (Get 323/Free 323), reload 0
In trans: 0, Out trans: 0, Err Cnt: 0
GW TCP close: 0, OGW notified: 0, TGW connect: 0
OGW SYN bypass: 0, accept: 0, reject: 0, dup syn drop: 0
GW Tx: SYN 0, SYNACK 0, RST 0, FIN 0
GW Rx: SYN 0, SYNACK 0, RST 0, FIN 0
TCP Shutdown: Graceful 0, Aborts 0
Pkt bypass with entry: 0, w/o entry in/out: 0/0, inv peer_id: 0
global/peer bypass: 0/0, ssh,bgp bypass: 0
IP Fragments stats:
Frag-seen:0, Translated:0, Dropped:0, Bypassed:0, out-of-order: 0
Flow-created:0, deleted:0, Create-Error:0, expired:0
Fragment route-error:0 sent-error:0, corrupted:0, share-error:0
```

Table 11-12 describes the significant fields shown in the display.

Table 11-12 show tpo statistics filter Field Descriptions

Field	Description
Entries Used	Total number of filter table entries.
Reload	Filter Module reload count.
In trans	Total number of input translations.

Table 11-12 show tpo statistics filter Field Descriptions (continued)

Field	Description
Out trans	Total number of output translations.
Err Cnt	Total errors occurred.
GW TCP Close	Total number of times, GW called TCP close.
OGW notified	Total number of times, filter notified GW for incoming TCP connections.
TGW connect	Total number of times, GW called TCP connect.
OGW SYN bypass	Total number of times, filter module bypassed the new incoming TCP connections.
Accept	Total number of TCP connections accepted by the filter module.
Reject	Total number of TCP connections rejected by the filter module.
Dup syn drop	Total number of duplicate TCP SYN dropped by filter module.
GW Tx SYN	Total number of TCP SYN originated by the GW application.
GW Tx SYNACK	Total number of TCP SYNACK originated by the GW application.
GW Tx FIN	Total number of TCP FIN originated by the GW application.
GW Tx RST	Total number of TCP RST originated by the GW application.
GW Rx SYN	Total number of TCP SYN received by the GW application.
GW Rx SYNACK	Total number of TCP SYNACK received by the GW application.
GW Rx FIN	Total number of TCP FIN received by the GW application.
GW Rx RST	Total number of TCP RST received by the GW application.
Pkt bypass with entry	Total number of packet bypassed due to “bypass” policy.
Pkt bypass without entry	Total number of packet bypassed due to invalid filter entry.
Inv Peer ID	Total number of packets bypassed due to invalid Peer ID.
Global bypass	Total number of packets bypassed due to global bypass policy.
Peer bypass	Total number of packets bypassed due to peer level bypass policy.
IP Fragments seen	Total number of IP fragments processed by filter module.
IP Fragments translated	Total number of IP Fragments translated by filter module.
IP Fragments dropped	Total number of IP fragments dropped due to an error.
IP Fragments Bypassed	Total number of IP fragments bypassed due to bypass policy.
IP Fragments flow created	Total number of IP fragments flows created by the filter module.
IP Fragments flow deleted	Total number of IP fragments flows deleted by the filter module.

Table 11-12 show tpo statistics filter Field Descriptions (continued)

Field	Description
IP Fragments flow create-err	Total number of errors occurred while creating IP fragments flow.
IP Fragments flow expired	Total number of IP Fragments timeouts.
IP Fragments route-error	Total number of errors occurred while routing the IP Fragments.
IP Fragments sent-error	Total number of errors occurred while sending the IP Fragments.
IP Fragments share-error	Total number of errors occurred while sharing the SKB for the IP Fragments.
IP Fragments corrupted	Total number of corrupted IP fragments received.

Related Commands

Command	Description
show tpo statistics	To display the status of the NCE service module directly connected to the current router, use the **show tpo statistics** command in Global configuration mode.

show tpo statistics filter tpo id

To show filter statistics for each peer, use the **show tpo stat filter tpo id** command. This command shows each filter entry and its corresponding optimized TCP connection.

show tpo statistics filter tpo id *tpo-id*

Syntax Description

tpo-id	The tpo ID to show statistics on.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows HTTP protocol statistics:

```
se-1-3-252-180> show tpo filter tpo id 10
Filter Entry Dump:
DA            SA          DP     SP     state   peer_id   mode
=============================================================
90.0.0.3   70.0.0.5   80   50712  Established   10    OGW
90.0.0.3   70.0.0.5   80   50713  Established   10    OGW
90.0.0.3   70.0.0.3   80   50714  Established   10    OGW
90.0.0.3   70.0.0.3   80   50715  Established   10    OGW
90.0.0.3   70.0.0.4   80   50716  Established   10    OGW
90.0.0.3   70.0.0.4   80   50717  Established   10    OGW
90.0.0.3   70.0.0.4   80   50718  Established   10    OGW
```

Table 11-13 describes the significant fields shown in the display.

Table 11-13 **show tpo statistics filter tpo id** *n* ***Field Descriptions***

Field	Description
DA	Destination IP address.
SA	Source IP address.
DP	Destination port number.
SP	Source port number.
Peer ID	Transport optimization ID.
Mode	Connection terminating or originating gateway.

Related Commands

Command	Description
show tpo statistics filter	To display detailed status information about the filter module.

show tpo statistics gateway

To show detailed global status information about gateway, use the **show tpo stat gateway** command.

show tpo statistics gateway

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows NCE statistics for the gateway:

```
#RANCH-1-C3845-1> show tpo statistics gateway
Gateway Global Statistics:
Control Plane -
OGW SYN Seen: 0, TCP terminated: 0, TCP bypassed 0
TGW TCP connect attempted: 0, TCP terminated: 0, Ports Inuse 0
Cap Exchange Req Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Cap Exchange Resp Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
INIT Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
INIT RESP Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
TEARDOWN Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
COMPLETE_TEARDOWN Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
DENY Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
HASH UPDATE Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
MASK UPDATE Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
WCCP Update Query Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
KEEP ALIVE Sent: 885616 Received: 885616 Send Failed: 0
SCTP Partial Delivery: 0
No buffer bypass: 0 No matching tpo bypass: 0 Multi-point lookups: 0
Policy Bypass: 0 No Streams Bypass: 0, No Pipes Bypass: 0, Remote Denied Bypass: 0
Data Plane -
Flow-Reset Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Press Enter for More or [q] Quit:
Flow-Query Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Stop Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Stop-Ack Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Allow Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Allow-Ack Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Deflate: 0 Inflate: 0 Uncompressable: 0
Deflate Err: 0, Inflate Err: 0, Inv tcp fd: 0, Tx SCTP Err: 0
Hung connections: 0
```

Table 11-14 describes the significant fields shown in the display.

Table 11-14 show tpo statistics gateway Field Descriptions

Field	Description
OGW SYN Seen	Total number of TCP SYN processed by the gateway.
OGW TCP Terminated	Total number of TCP connections terminated at the gateway by accepts.
OGW TCP bypassed	Total number of TCP connections bypassed by the gateway due to either bypass policy or sessions exceeded the module/NCE limit.
TGW TCP Connect	Total number of TCP connects attempted by the gateway.
TGW TCP Terminated	Total number of TCP connections terminated at the gateway by connects.
TGW Ports In use	Total number of TCP ports currently used by the gateway.
SCTP Partial Delivery	Total number of partial SCTP packet received by the gateway.
Deflate	Total number of packets compressed.
Inflate	Total number of packets un-compressed.
Uncompressible	Total number of uncompressible packets, packets results in bigger length after compression.
Deflate Err	Total number of compression errors.
Inflate Err	Total number of decompression errors.
Inv TCP fd	Total number of packets dropped due to invalid TCP FD.
Tx SCTP error	Total number of SCTP Transmit errors.

SCTP Messages Statistics	
<MSG> Sent	Total number of <MSG > sent.
<MSG> Received	Total number of <MSG > received.
<MSG> Send Failed	Total number of <MSG > sent.
<MSG> Pending	Total number of <MSG > pending for sends.
<MSG> Retry	Total number of <MSG > re-transmits.

Where <MSG> is the following
• Cap Exchange Req—Capability Exchange Request
• Cap Exchange Resp—Capability Exchange Response
• INIT—SCTP connection INIT Request
• INIT Resp—SCTP connection INIT Response
• TEARDOWN—SCTP connection Teardown request
• COMPLETE_TEARDOWN—SCTP Connection complete Teardown request
• DENY—SCTP connection deny response
• KEEP ALIVE—SCTP PIPE keep-alive message.

Table 11-14 show tpo statistics gateway Field Descriptions (continued)

Field	Description
• Flow Reset—SCTP Flow Control RESET message.	
• Flow-Query—SCTP Flow Control QUERY message.	
• Flow-Stop—SCTP Flow Control STOP message.	
• Flow-Stop-ack—SCTP Flow Control STOP-ACK message.	
• Flow-Allow—SCTP Flow control ALLOW message.	
• Flow-Allow-ack—SCTP Flow control ALLOW-ACK message.	

Related Commands

Command	Description
show tpo statistics gatewaytpo-id	Shows detailed status information about gateway for a specific NCE.

show tpo statistics gateway tpo-id

To show detailed status information about gateway for a specific NCE, use the **show tpo statistics gatewaytpo-id** command.

show tpo statistics gateway tpo-id *tpo-id*

Syntax Description

tpo-id	Unique TPO identification number.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows status information for tpo ID 1.

```
#RANCH-1-C3845-1> show tpo statistics gateway tpo-id 10
- - SCTP Peer 10 Statistics - - -
Control Plane -
OGW SYN Seen: 0, TCP terminated: 0, TCP bypassed 0
CAP Exchange Req Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
CAP Exchange Resp Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
INIT Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
INIT RESP Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
TEARDOWN Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
COMPLETE_TEARDOWN Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
DENY Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
HASH UPDATE Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
MASK UPDATE Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
WCCP Update Query Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
KEEP ALIVE Sent: 442816 Received: 442824 Send Failed: 0
Data Plane -
Flow-Reset Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Query Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Stop Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Stop-Ack Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Flow-Allow Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Press Enter for More or [q] Quit:
Flow-Allow-Ack Sent: 0 Received: 0 Send Failed: 0 Pending: 0 Retry: 0
Deflate: 0, Inflate: 0, Uncompressable: 0
Sessions Allowed: 0 Used: 0 Max Used: 1
10 Seconds Packet Rate:
TCP Read Rate : 0 bps 0 Packets/Sec
TCP Write Rate : 0 bps 0 Packets/Sec
SCTP Read Rate : 0 bps 0 Packets/Sec
SCTP Write Rate : 0 bps 0 Packets/Sec
SCTP Write-Try Rate : 0 bps 0 Packets/Sec
```

Table 11-15 describes the significant fields shown in the display.

Table 11-15 show tpo statistics gateway tpo-id Field Descriptions

Field	Description
OGW SYN Seen	Total number of TCP SYN processed by the gateway.
OGW TCP Terminated	Total number of TCP connections terminated at the gateway by accepts.
OGW TCP bypassed	Total number of TCP connections bypassed by the gateway due to either bypass policy or sessions exceeded the module/NCE limit.
TGW TCP Connect	Total number of TCP connects attempted by the gateway.
TGW TCP Terminated	Total number of TCP connections terminated at the gateway by connects.
TGW Ports In use	Total number of TCP ports currently used by the gateway.
SCTP Partial Delivery	Total number of partial SCTP packet received by the gateway.
Deflate	Total number of packets compressed.
Inflate	Total number of packets un-compressed.
Uncompressible	Total number of uncompressible packets, packets results in bigger length after compression.
Deflate Err	Total number of compression errors.
Inflate Err	Total number of decompression errors.
Inv TCP fd	Total number of packets dropped due to invalid TCP FD.
Tx SCTP error	Total number of SCTP Transmit errors.
SCTP Messages Statistics	
<MSG> Sent	Total number of <MSG > sent.
<MSG> Received	Total number of <MSG > received.
<MSG> Send Failed	Total number of <MSG > sent.
<MSG> Pending	Total number of <MSG > pending for sends.
<MSG> Retry	Total number of <MSG > re-transmits.
Where <MSG> is the following	
• Cap Exchange Req—Capability Exchange Request.	
• Cap Exchange Resp —Capability Exchange Response.	
• INIT—SCTP connection INIT Request.	
• INIT Resp—SCTP connection INIT Response.	
• TEARDOWN—SCTP connection Teardown request.	
• COMPLETE_TEARDOWN—SCTP Connection complete Teardown request.	
• DENY—SCTP connection deny response.	
• KEEP ALIVE—SCTP PIPE keep-alive message.	
• Flow Reset—SCTP Flow Control RESET message.	
• Flow-Query—SCTP Flow Control QUERY message.	

Table 11-15 show tpo statistics gateway tpo-id Field Descriptions (continued)

Field	Description
• Flow-Stop—SCTP Flow Control STOP message.	
• Flow-Stop-ack—SCTP Flow Control STOP-ACK message.	
• Flow-Allow—SCTP Flow control ALLOW message.	
• Flow-Allow-ack—SCTP Flow control ALLOW-ACK message.	
• TCP Read Rate—TCP Read Rate in bits per second and packets per second.	
• TCP Write Rate—TCP Write Rate in bits per second and packets per second.	
• SCTP Read Rate—SCTP Read Rate in bits per second and packets per second.	
• SCTP Write Rate—SCTP Send Rate in bits per second and packets per second.	
• SCTP Write-Try Rate—SCTP Write Rate in bits per second and packets per second at which gateway is trying to send SCTP data.	

Note As long as the SCTP pipe is not congested, SCTP write-try rate and SCTP write rate are the same. Once the pipe is congested, the SCTP write rate is the rate at which SCTP packets are transmitted on the WAN and the SCTP write-try rate is the rate at which the gateway is trying to send packets.

Related Commands

Command	Description
show tpo statistics gateway	Shows detailed global status information about the gateway.

show tpo statistics protocol

To show TCP protocol statistics based on TCP port numbers, use the **show tpo stat protocol** command.

show tpo statistics protocol *tcp-port*

Syntax Description

tcp-port	TCP port number.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

Table 11-16 **TCP based application protocols.**

DNS	FTP	HTTP	HTTPS
IMAP	IRC	LDAP	LDAP
NNTP	POP	POP3	RPC
RTSP	SFTP	SMTP	SNMP
SSH	TELNET	TFTP	UUCP

Examples

The following example shows TCP protocol statistics:

```
Service-module> show tpo statistics protocol tcp
Protocol Statistics Table (since last Gateway restart) :
Port TotalConn  BytesRxTCP  BytesTxSCTP BytesRxSCTP BytesTxTCP DeflateConn
=================================================================
  80     11334        2.10        2.06       45.16     1404.81       11314
 636         0        0.00        0.00        0.00        0.00           0
 554         0        0.00        0.00        0.00        0.00           0
 540         0        0.00        0.00        0.00        0.00           0
 530         0        0.00        0.00        0.00        0.00           0
 443         0        0.00        0.00        0.00        0.00           0
 389         0        0.00        0.00        0.00        0.00           0
 194         0        0.00        0.00        0.00        0.00           0
 161         0        0.00        0.00        0.00        0.00           0
 143         0        0.00        0.00        0.00        0.00           0
 119         0        0.00        0.00        0.00        0.00           0
 115         0        0.00        0.00        0.00        0.00           0
 110         0        0.00        0.00        0.00        0.00           0
 109         0        0.00        0.00        0.00        0.00           0
  69         0        0.00        0.00        0.00        0.00           0
  53         0        0.00        0.00        0.00        0.00           0
  25         0        0.00        0.00        0.00        0.00           0
```

```
  23          0         0.00         0.00         0.00         0.00           0
  22          0         0.00         0.00         0.00         0.00           0
  21          0         0.00         0.00         0.00         0.00           0
Other         0         0.00         0.00         0.00         0.00           0
se-1-3-252-180>
```

Table 11-17 describes the significant fields shown in the display.

Table 11-17 show tpo statistics protocol Field Descriptions

Field	Description
Port	Specifies the port based on the Application Protocol, for example, port 80 for HTTP.
TotalConn	Total number of connections established.
BytesRxTCP	Bytes received on the TCP leg.
BytesTxSCTP	Bytes sent on the SCTP leg.
BytesRxSCTP	Total bytes received on the SCTP leg.
BytesTxTCP	Total Bytes Sent on the TCP leg.
DeflateConn	Total number of deflate connections.

show tpo statistics sctp

To show statistics for SCTP chunks, use the **show tpo stat sctp** command. This command provides message counts for each chunk, chunks received in order, control chunks, SCTP checksum errors, shutdowns, total in and total out SCTP packets.

show tpo statistics sctp

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows statistics for SCTP chunks:

```
# Service-module> show tpo stat sctp
===========================================
 Global SCTP Statistics
===========================================
SctpCurrEstab                        1
SctpActiveEstabs                     0
SctpPassiveEstabs                    5
SctpAborteds                         4
SctpShutdowns                        0
SctpOutOfBlues                       0
SctpChecksumErrors                   0
SctpOutCtrlChunks              1043732
SctpOutOrderChunks              439092
SctpOutUnorderChunks                 0
SctpInCtrlChunks                178119
SctpInOrderChunks              5079474
SctpInUnorderChunks                  0
SctpFragUsrMsgs                      0
SctpReasmUsrMsgs                     0
SctpOutSCTPPacks               1349787
SctpInSCTPPacks                2200292
```

Table 11-18 describes the significant fields shown in the display.

Table 11-18 show tpo stat sctp Field Descriptions

Field	Description
SctpCurrEstab	The number of associations for which the current state is either ESTABLISHED, SHUTDOWN-RECEIVED or SHUTDOWN-PENDING.
SctpActiveEstabs	The number of times that associations have made a direct transition to the ESTABLISHED state from the COOKIE-ECHOED state: COOKIE-ECHOED -> ESTABLISHED. The upper layer initiated the association attempt.
SctpPassiveEstabs	The number of times that associations have made a direct transition to the ESTABLISHED state from the CLOSED state: CLOSED -> ESTABLISHED. The remote endpoint initiated the association attempt.
SctpAborteds	The number of times that associations have made a direct transition to the CLOSED state from any state using the primitive 'ABORT': AnyState --Abort--> CLOSED. Ungraceful termination of the association.
SctpShutdowns	The number of times that associations have made a direct transition to the CLOSED state from either the SHUTDOWN-SENT state or the SHUTDOWN-ACK-SENT state. Graceful termination of the association.
SctpOutOfBlues	The number of out of the blue packets received by the host. An out of the blue packet is an SCTP packet correctly formed, including the proper checksum, but for which the receiver was unable to identify an appropriate association.
SctpChecksumErrors	The number of SCTP packets received with an invalid checksum.
SctpOutCtrlChunks	The number of SCTP control chunks sent (retransmissions are not included). Control chunks are those chunks different from DATA.
SctpOutOrderChunks	The number of SCTP ordered data chunks sent (retransmissions are not included)
SctpOutUnorderChunks	The number of SCTP unordered chunks (data chunks in which the U bit is set to 1) sent (retransmissions are not included).
SctpInCtrlChunks	The number of SCTP control chunks received (no duplicate chunks included).
SctpInOrderChunks	The number of SCTP ordered data chunks received (no duplicate chunks included).
SctpInUnorderChunks	The number of SCTP unordered chunks (data chunks in which the U bit is set to 1) received (no duplicate chunks included).
SctpFragUsrMsgs	The number of user messages that have to be fragmented because of the MTU.
SctpReasmUsrMsgs	The number of user messages reassembled, after conversion into DATA chunks.
SctpOutSCTPPacks	The number of SCTP packets sent. Retransmitted DATA chunks are included.
SctpInSCTPPacks	The number of SCTP packets received. Duplicates are included.

Related Commands

Command	Description
sctp-peer	Configures the maximum SCTP peer IP.

show tpo wccp group-id redirection-table

To display WCCP redirection table at branch side for a specific WCCP group id, use the **show tpo wccp group-id redirection-table** command. To remove the default setting, use the no form of this command.

show tpo wccp group-id redirection-table

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows the hash-based load balancing:

```
module(config)>show tpo wccp group-id 1 redirection-table
WCCP Group ID: 1, Assigning WC: 10.1.1.25
  Assignment: HASH, Service Flags:   dst-ip
  ***************************************
    Value    TPO ID
    1-63     tpo-id: 1 - tpo-id: 63
    00       bypass
  ***************************************
  Bucket|  0  1  2  3   4  5  6  7   8  9  A  B   C  D  E  F
  -------------------------------------------------------------
  00-0F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  10-1F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  20-2F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  30-3F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  40-4F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  50-5F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  60-6F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  70-7F |  04 04 04 04  04 04 04 04  04 04 04 04  04 04 04 04
  80-8F |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
  90-9F |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
  A0-AF |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
  B0-BF |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
  C0-CF |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
  D0-DF |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
  E0-EF |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
  F0-FF |  02 02 02 02  02 02 02 02  02 02 02 02  02 02 02 02
```

The following example shows the mask-based load balancing:

```
module(config)>show tpo wccp group-id 1 redirection-table
WCCP Group ID: 1, Assigning WC: 10.1.1.40
  Assignment: MASK
  ***************************************
  Mask  SrcAddr    DstAddr    SrcPort DstPort
  ----  -------    -------    ------- -------
  0000: 0x00001741 0x00000000 0x0000  0x0000
  ***************************************
  Value SrcAddr    DstAddr    SrcPort DstPort Tpo-Id
  ----- -------    -------    ------- ------- -------
  0000: 0x00000000 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0001: 0x00000001 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0002: 0x00000040 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0003: 0x00000041 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0004: 0x00000100 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0005: 0x00000101 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0006: 0x00000140 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0007: 0x00000141 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0008: 0x00000200 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0009: 0x00000201 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0010: 0x00000240 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0011: 0x00000241 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0012: 0x00000300 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0013: 0x00000301 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0014: 0x00000340 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0015: 0x00000341 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0016: 0x00000400 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0017: 0x00000401 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0018: 0x00000440 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0019: 0x00000441 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0020: 0x00000500 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0021: 0x00000501 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0022: 0x00000540 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0023: 0x00000541 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0024: 0x00000600 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0025: 0x00000601 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0026: 0x00000640 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0027: 0x00000641 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0028: 0x00000700 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0029: 0x00000701 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0030: 0x00000740 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0031: 0x00000741 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0032: 0x00001000 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0033: 0x00001001 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)

...Removed


  0062: 0x00001740 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
  0063: 0x00001741 0x00000000 0x0000  0x0000  04 (peer: 10.1.1.40)
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

show tpo wccp redirection-table

To display WCCP redirection table at head-end side, use the **show tpo wccp redirection-table** command. To remove the default setting, use the no form of this command.

show tpo wccp redirection-table

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows the WCCP redirection table at the head end side:

```
module>show tpo wccp redirection-table
Assignment: HASH, Service Flags:  src-ip
  ***************************************
    Index    WCCP Client
    00       10.1.1.40
    01       10.1.1.25
    FF       NOT ASSIGNED
  ***************************************
  Bucket|  0  1  2  3   4  5  6  7   8  9  A  B   C  D  E  F
  -------------------------------------------------------------
  00-0F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  10-1F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  20-2F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  30-3F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  40-4F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  50-5F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  60-6F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  70-7F |  01 01 01 01  01 01 01 01  01 01 01 01  01 01 01 01
  80-8F |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
  90-9F |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
  A0-AF |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
  B0-BF |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
  C0-CF |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
  D0-DF |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
  E0-EF |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
  F0-FF |  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00

  Assignment: MASK
  ***************************************
  Mask  SrcAddr    DstAddr    SrcPort DstPort
  ----  -------    -------    ------- -------
  0000: 0x00000000 0x00001741 0x0000  0x0000
  ***************************************
```

```
  Value SrcAddr     DstAddr     SrcPort DstPort CE-IP
  ----- -------     -------     ------- ------- -------
  0000: 0x00000000 0x00000000 0x0000  0x0000  10.1.1.40
  0001: 0x00000000 0x00000001 0x0000  0x0000  10.1.1.40
  0002: 0x00000000 0x00000040 0x0000  0x0000  10.1.1.40
  0003: 0x00000000 0x00000041 0x0000  0x0000  10.1.1.40
  0004: 0x00000000 0x00000100 0x0000  0x0000  10.1.1.40
  0005: 0x00000000 0x00000101 0x0000  0x0000  10.1.1.40
  0006: 0x00000000 0x00000140 0x0000  0x0000  10.1.1.40
  0007: 0x00000000 0x00000141 0x0000  0x0000  10.1.1.40
  0008: 0x00000000 0x00000200 0x0000  0x0000  10.1.1.40
  0009: 0x00000000 0x00000201 0x0000  0x0000  10.1.1.40
  0010: 0x00000000 0x00000240 0x0000  0x0000  10.1.1.40
  0011: 0x00000000 0x00000241 0x0000  0x0000  10.1.1.40
  0012: 0x00000000 0x00000300 0x0000  0x0000  10.1.1.40
  0013: 0x00000000 0x00000301 0x0000  0x0000  10.1.1.40
  0014: 0x00000000 0x00000340 0x0000  0x0000  10.1.1.40
  0015: 0x00000000 0x00000341 0x0000  0x0000  10.1.1.40
  0016: 0x00000000 0x00000400 0x0000  0x0000  10.1.1.40
  0017: 0x00000000 0x00000401 0x0000  0x0000  10.1.1.40
  0018: 0x00000000 0x00000440 0x0000  0x0000  10.1.1.40
  0019: 0x00000000 0x00000441 0x0000  0x0000  10.1.1.40
  0020: 0x00000000 0x00000500 0x0000  0x0000  10.1.1.40
  0021: 0x00000000 0x00000501 0x0000  0x0000  10.1.1.40
  0022: 0x00000000 0x00000540 0x0000  0x0000  10.1.1.40
  0023: 0x00000000 0x00000541 0x0000  0x0000  10.1.1.40
  0024: 0x00000000 0x00000600 0x0000  0x0000  10.1.1.40
  0025: 0x00000000 0x00000601 0x0000  0x0000  10.1.1.40
  0026: 0x00000000 0x00000640 0x0000  0x0000  10.1.1.40

...Removed

  0047: 0x00000000 0x00001341 0x0000  0x0000  10.1.1.40
  0048: 0x00000000 0x00001400 0x0000  0x0000  10.1.1.40
  0049: 0x00000000 0x00001401 0x0000  0x0000  10.1.1.40
  0050: 0x00000000 0x00001440 0x0000  0x0000  10.1.1.40
  0051: 0x00000000 0x00001441 0x0000  0x0000  10.1.1.40
  0052: 0x00000000 0x00001500 0x0000  0x0000  10.1.1.40
  0053: 0x00000000 0x00001501 0x0000  0x0000  10.1.1.40
  0054: 0x00000000 0x00001540 0x0000  0x0000  10.1.1.40
  0055: 0x00000000 0x00001541 0x0000  0x0000  10.1.1.40
  0056: 0x00000000 0x00001600 0x0000  0x0000  10.1.1.40
  0057: 0x00000000 0x00001601 0x0000  0x0000  10.1.1.40
  0058: 0x00000000 0x00001640 0x0000  0x0000  10.1.1.40
  0059: 0x00000000 0x00001641 0x0000  0x0000  10.1.1.40
  0060: 0x00000000 0x00001700 0x0000  0x0000  10.1.1.40
  0061: 0x00000000 0x00001701 0x0000  0x0000  10.1.1.40
  0062: 0x00000000 0x00001740 0x0000  0x0000  10.1.1.40
  0063: 0x00000000 0x00001741 0x0000  0x0000  10.1.1.40
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

show tpo wccp statistics

To to check WCCP traffic statistics, use the **show tpo wccp statistics** command. To remove the command setting, use the **no** form of this command.

show tpo wccp statistics

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

The packets-received & packets-accepted counters shows no. of packets redirected to this NCE module from IOS wan interface, and accepted by the module. Packets sent back to router, counter shows total no. of packets bypassed and not optimized.

Examples

The following example shows WCCP traffic statistics. The *Packets received* and *Packets accepted* counters show the number of packets redirected to this NCE module from the Cisco IOS WAN interface and accepted by the module. *Packets sent back to router* shows total number of packets bypassed and not optimized.

```
NCE-HQ> show tpo wccp statistics
       WCCP Statistics:
        Transparent GRE packets received: 5346715
        Transparent non-WCCP packets received: 0
        Transparent non-TCP packets received: 0
        Total packets accepted: 5346715
        Invalid packets received: 0
        Packets received with invalid service: 0
        Packets received on a disabled service: 0
        Packets dropped due to zero TTL: 0
        Packets sent back to router: 0
        GRE fragments redirected: 0
        Packets dropped due to invalid fwd method: 0
        Packets w/WCCP GRE received too small: 0
        Packets dropped due to received on loopback:0
        Packets fragmented for bypass: 0
        Packet pullups needed: 0
        Packets dropped due to no route found: 0
        NCE-HQ>
```

show tpo wccp status

To display WCCP control information on NCE module, use the **show tpo wccp status** command. To remove the default setting, use the **no** form of this command.

show tpo wccp status

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows WCCP control information on an NCE module:

```
NCE-HQ> show tpo wccp status
 WCCP Service ID: 61, Version: 2.0
 ************************************
 Router IP: 90.0.0.1, Status: ACTIVE, Recv-ID: 6320, ID: 90.0.0.1
 NCE Status: ACTIVE, Service Flags: 0x1
 Redirection: GRE, Packet Return: GRE, Assignment: HASH
 NCE Modules in this service group: 1.3.252.111
 ************************************
```

Table 11-19 describes the significant fields shown in the display.

Table 11-19 show tpo wccp status Field Descriptions

Field	Description
WCCP Service ID	61, NCE supports WCCP service 61(TCP promiscuous Mode).
Router IP	IP address of the WCCP router configured on the NCE module.
NCE Status	Shows NCE status. If the NCE is successfully registered with WCCP router, it is Active, otherwise it is Inactive.
Redirection	GRE or L2 Redirection. Default is GRE.
Assignment	Mask or Hash. Default is Hash.
NCE Modules in the same WCCP group	The NCE module IP address which is registered with the same WCCP group.

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

show version

To shows version and serial number information for different components on the NCE service module, use the **show version** command.

show version

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows the version information:

```
#Service-module> show version
System Type:                  EBH3100
CPU Model:                    Cavium Networks Octeon CN31XX V0.2
BogoMIPS:                     1000.28
Chassis Type:                 C3845
Chassis Serial:               FTX0930A5Y9
Module Type:                  NME-TPO
Module Serial:                FHH111903DZ
Encryption/Compression:       ON
SDRAM (MByte):                1024
```

Related Commands

Command	Description
transport-opt	Configures the NCE service module for NCE on a WAN interface through TCP packet interception and optimization.

shutdown

To shutdown the TPO-ID, use the **shutdown** command.

shutdown

Syntax Description

This command has no arguments or keywords.

Command Default

A tpo ID is not already shutdown.

Command Modes

NCE specific

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows how shut down TPO ID 1:

```
module(config)>tpo id 61
module(config)>shutdown
module(config)> show tpo id 61
  ================================================================
  TPO-ID: 61, SCTP Peer: 7.7.7.8, Peer Relationship:  Initiator
   Capability Exchange: Not Available, Native Version: 2.0
Default Policy-action: bypass, Service Policy: <not configured>
   Bandwidth Profile: default-sctp,  TCP Connections: 0/10240 (active/max)
   10 sec input rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
   10 sec output rate: SCTP: 0 bits/sec, 0 pkts/sec TCP: 0 bits/sec
     sctp_tx: 0 pkts, 0 bytes, sctp_rx: 0 pkts, 0 bytes
     tcp_tx: 0 bytes, tcp_rx: 0 bytes, dropped: 0 bytes
    ____________________________________________________________
    TOS: 0, DSCP: 0, TCP Connections: 0
      Status: administratively down, UP -> DOWN at Tue Jan 20 22:52:34 2009
  ================================================================
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

tpo id

To create or modify a tpo ID, use the **tpo id** command in configuration mode.

tpo id

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

You can define one or more tpo IDs by using this command in global configuration mode. To delete a NCE configuration, use the **no** form of the command. The **tpo** command enters NCE configuration mode, in which you can configure or modify the NCE configurations for that specific tpo ID. To disable the tpo ID, use the **no** form of this command.

Examples

The following example:

Related Commands

Command	Description
show tpo id	Shows detailed configuration and status information for the specific NCE.

tpo debug filter-events

To view filter events, use the **tpo debug filter-events** command. To remove the command setting, use the **no** form of this command.

tpo debug filter-events [*all* | *detailed-trace* | *errors* | *events* | *informational* | *nat*]

no tpo debug filter-events

Syntax Description

all	Display all messages.
detailed-trace	Display detailed-trace messages.
errors	Display error messages.
events	Display event messages.
informational	Display informational messages.
nat	Display NAT messages.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows debug filter events:

```
branch-office(config)> tpo debug ?
  filter-events View filter event details
  packets      View details of packets received by Filter module

branch-office(config)> tpo debug filter-events ?
  all          View all details
  detailed-trace View detailed trace
  errors       View error details
  events       View event details
  informational View informational details
  nat          View NAT details
```

tpo debug packets

To view packets, use the **tpo debug packets** command. To remove the command setting, use the **no** form of this command.

tpo debug packets [*all* | *ip* | *sctp* | *tcp*]

no tpo debug packets

Syntax Description

all	Display packets of all protocol types.
ip	Display IP packets.
sctp	Display SCTP packets.
tcp	Display TCP packets.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows the tpo debug command:

```
branch-office(config)> tpo debug ?
  filter-events View filter event details
  packets       View details of packets received by Filter module

branch-office(config)> tpo debug packets ?
  all           All packets
  ip            All IP packets
  sctp          SCTP packets
  tcp           TCP packets
```

tpo lookup

To configure TPO lookup based on binding or the transport-opt TPO ID, use the **tpo lookup** command. To remove the default setting, use the **no** form of this command.

tpo lookup *mode*

no tpo lookup

Syntax Description

bind	Based on binding information configured on the module.
tpo-id	Based on transport-opt TPO-ID configured on Cisco IOS.

Command Default

TPO lookup is based on the transport-opt TPO ID configured on Cisco IOS.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows how tpo lookup is configured on the NCE module:

```
module(config)> tpo lookup tpo-id
```

Related Commands

Command	Description
clear tpo statistics	Clears global statistics for all interfaces for filter, gateway, and protocol.

tpo ip nat inside source

To map the source ip address to the destination address, use the **tpo ip nat inside source** command in global configuration mode. To disable NAT on NCE, use the **no** form of this command.

tpo ip nat inside source *source-IP-address destination-IP-address subnet-mask*

no tpo ip nat inside source

Syntax Description

source IP address	Inside global IP address.
destination IP address	Destination IP address.
subnet mask	Subnet mask.

Command Default

NAT is not configured.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

After configuring the client side, login into the server side module. The remote end SCTP peer IP now needs to be mapped to the NAT Global IP address on the client end.

Because NAT is only on the client side in this case, the public networks needs to be accessed from the service module and the router and the server on the remote side.

Examples

The following example shows the command:

```
router#tpo ip nat inside source 10.10.10.11 9.9.9.0 255.255.255.0
```

Related Commands

Command	Description
show run	Shows detailed configuration and status information.

tpo wccp 61

To enable and disable WCCP on a web cache, use the **tpo wccp 61** command in global configuration mode. To remove the command setting, use the **no** form of this command.

tpo wccp 61

no tpo wccp 61

Syntax Description

This command has no arguments or keywords.

Command Default

WCCP is disabled.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

To enable WCCP on the NCE module, you must configure TPO lookup as bind using the **tpo lookup bind** command on the NCE module.

Examples

The following example shows how to enable WCCP on a web cache:

```
branch-office(config)> NCE-HQ(config)# [no] tpo wccp 61 ?
  <cr>
61 - TCP Promiscuous mode, to intercept TCP traffic
```

Related Commands

Command	Description
tpo lookup	Configures TPO lookup based on binding.

tpo wccp group-id bind

To bind the destination network with a WCCP group ID, use the **tpo wccp group-id bind** command.

tpo wccp group-id *id* **bind** *ip-address subnet-mask*

Syntax Description

id	WCCP group ID in the range 1 to 63.
ip address	Destination IP address.
subnet mask	Subnet mask.

Command Default

Bind is not configured for a TPO WCCP group.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

The group ID is based on the Transport-opt TPO ID configured in Cisco IOS.

Examples

The following example shows a TPO WCCP group binded to an IP address:

```
branch-office(config)> tpo wccp group-id 10 bind 1.1.1.1 255.255.255.0
branch-office(config)>
```

Related Commands

Command	Description
tpo id	Create or modify a NCE.

tpo wccp group-id map-tpo-id

To bind a WCCP group to a specific network/subnet or a specific transport opt id (tpo id), use the **tpo wccp group-id map-tpo-id** command.

tpo wccp group-id *id* **map-tpo-id**

Syntax Description

id	Group ID number in the range 1 to 63.

Command Default

No WCCP group is configured.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Examples

The following example shows:

```
branch-office(config)> tpo wccp group-id 10 map-tpo-id
```

Related Commands

Command	Description
tpo id	Create or modify a NCE.

tpo wccp group-id

To configure a WCCP group, use the **tpo wccp group-id** command. To remove the command setting, use the **no** form of this command.

tpo wccp group-id *group ID*

no tpo wccp group-id

Syntax Description

group ID	Group ID number in the range 1 to 63.

Command Default

There is no WCCP group ID configured.

Command Modes

Exec

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

Tpo lookup bind needs to be configured to use the **tpo wccp group-id** command.

Configure WCCP group on branch service modules with the **group ID bind** command, where this WCCP group binds with the given destination network address. This group ID is then attached to all tpo IDs associated with the peers configured on the Data Center NCE modules. This command is required on branch service modules when there are multiple NCE modules configured ondata center service modules in a WCCP service group.

Traffic is optimized based on the destination address. For different destination network, traffic is bypassed.

For example, if there are four NCE modules on the head end, then four TPO IDs must be configured on the branch, one for each Data Center NCE module. This wccp group-id is attached to all the four TPO IDs. One WCCP group ID associates a single WCCP service group on the Data Center NCE module.

Examples

The following example shows the **tpo wccp group-id** command:

```
NCE-BRANCH(config)> tpo wccp group-id  <id>  ?
  bind              Based on Binding
  map-tpo-id        Based on Transport-opt TPO ID configured on IOS
NCE-BRANCH(config)> tpo wccp group-id <id> bind ?
  A.B.C.D      Destination Network IP address
NCE-BRANCH(config)> tpo wccp group-id <id> bind <ip address> <subnet mask>
```

tpo wccp load-balance

To load balance traffic across multiple WCCP clients, use the **tpo wccp load-balance** command.

tpo wccp load-balance *hash mask*

no tpo wccp load-balance

Syntax Description

hash	• dst-ip—Destination ip address • dst-port—Destination port number • src-ip—Source ip address • src-port—Source port number
mask	• src-ip-mask—Specify sub-mask used in packet source-IP address. Mask is Hexadecimal number (0x0 - 0xFFFFFFFF). • dst-ip-mask—Specify sub-mask used in packet destination-IP address. Mask is Hexadecimal number (0x0 - 0xFFFFFFFF). • src-port-mask—Specify sub-mask used in packet source port number. Mask is Hexadecimal number (0x0 - 0xFFF).

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

WCCP v2.0 protocol allows either hash or mask as the assignment method. A single WCCP client within a service group (the one with the lowest IP address) is elected as the designated or *master* WCCP client. Its responsibility is to provide routers within the same service group with the hash table and mask/value sets for load balancing in the service group.

The designated NCE module distributes the hash table to the router based on the load balance configuration. The designated NCE module also passes the hash table to all the available branches to transport TCP traffic to right SCTP tunnel.

Whenever we change the hash table, the existing connections on the old hash bucket is reset. The router starts redirecting the TCP packets based on the new hash as it works on packet-by-packet rather than data flows.

The masking method can only be used for load balancing with the Catalyst 6500 /3750 series switches and Cisco 7600 series routers.

Examples

The following example shows how load balancing is configured on the data center service module:

```
CA-2821-1(config)> tpo wccp load-balance ?
  hash         Hash Parameters
  mask         Mask Parameters
CA-2821-1(config)> tpo wccp load-balance hash ?
  dst-ip       Destination ip address
  src-ip       Source ip address
CA-2821-1(config)> tpo wccp load-balance hash dst-ip ?
  <cr>
  src-ip       Source ip address
CA-2821-1(config)> tpo wccp load-balance hash dst-ip src-ip ?
  <cr>
CA-2821-1(config)> tpo wccp load-balance hash dst-ip src-ip

CA-2821-1(config)> tpo wccp load-balance mask src-ip-mask ?
  Hexadecimal  Mask in Hexadecimal number (0x0 - 0xFE000000)
CA-2821-1(config)> tpo wccp load-balance mask src-ip-mask 0xFE000000 ?
  <cr>
  dst-ip-mask  Specify sub-mask used in packet destination-IP address
CA-2821-1(config)> $ask src-ip-mask 0xFE000000 dst-ip-mask 0xFE000000
```

tpo wccp router-list

To specify a router IP interface address, use the **tpo wccp router-list** command. To remove the IP addresses from the existing list, use the **no** form of this command.

tpo wccp router-list *address*

no tpo wccp router-list

Syntax Description

address	Router IP address.

Command Default

A router list is not configured.

Command Modes

Global configuration

Command History

Release	Modification
2.0.1	This command was introduced.

Usage Guidelines

Up to 32 WCCP router IP interface addresses can be specified for the routers with WCCP service 61 enabled.

Examples

The following example shows the **tpo wcc router-list** command:

```
NCE-HQ(config)# tpo wccp router-list ?
  A.B.C.D      Router's IP Address
NCE-HQ(config)# tpo wccp router-list (wccp-router1-ip) (wccp-router2-ip)
<wccp-router32-ip>
```

coincidental.