ZebOS-XP®
Network Platform

Version 1.4
Extended Performance

Data Center Bridging
Command Reference

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IP Infusion Inc.
3965 Freedom Circle, Suite 200
Santa Clara, CA 95054
+1 408-400-1900
http://www.ipinfusion.com/

For support, questions, or comments via E-mail, contact:
support@ipinfusion.com

Contents

Preface

This document describes the ZebOS-XP commands for Data Center Bridging (DCB).

Audience

This document is intended for network administrators and other engineering professionals who configure and manage DCB.

Conventions

Table P-1 shows the conventions used in this guide.

Table P-1: Conventions

Convention	Description
Italics	Emphasized terms; titles of books
Note:	Special instructions, suggestions, or warnings
`monospaced type`	Code elements such as commands, functions, parameters, files, and directories

Contents

This document contains these chapters:

- Chapter 1, *Command Line Interface*
- Chapter 2, *Enhanced Transmission Selection Commands*
- Chapter 3, *Quantized Congestion Notification Commands*
- Chapter 4, *Priority-based Flow Control Commands*

Related Documents

The following guides are related to this document:

- *Data Center Bridging Developer Guide*
- *Data Center Bridging Configuration Guide*
- *Installation Guide*

Note: All ZebOS-XP technical manuals are available to licensed customers at http://www.ipinfusion.com/support/document_list.

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CHAPTER 1 Command Line Interface

This chapter introduces the ZebOS-XP Command Line Interface (CLI) and how to use its features.

Overview

You use the CLI to configure, monitor, and maintain ZebOS-XP devices. The CLI is text-based and each command is usually associated with a specific task.

You can give the commands described in this manual locally from the console of a device running ZebOS-XP or remotely from a terminal emulator such as `putty` or `xterm`. You can also use the commands in scripts to automate configuration tasks.

Starting the Command Line Interface

You must start daemons as described in this section before you can use the CLI. The general steps are listed below. For details about the ZebOS-XP daemons, see the *Installation Guide.*

1. Start your terminal emulator and connect to the device or go to the console of the device running ZebOS-XP.
2. Connect to the directory where you installed the ZebOS-XP executables.
3. Start the Network Services Module (NSM).
   ```
   # ./nsm -d
   ```
4. Start the protocol module daemons that your organization uses, such as `mstpd`, `ospf6d`, or `ripd`.
   ```
   # ./mstpd -d
   ```
5. Start the Integrated Management Interface (IMI) daemon.
   ```
   # ./imi -d
   ```
6. Start the IMI shell.
   ```
   # ./imish
   ```
   Note: Your organization may use a ZebOS-XP build that does not include `imish`. If that is the case, you must connect to a port on which a protocol daemon is listening. For details, see the *Installation Guide.*

You can now begin using the CLI.

Command Line Interface Help

You access the CLI help by entering a full or partial command string and a question mark “?”. The CLI displays the command keywords or parameters along with a short description. For example, at the CLI command prompt, type:

```
> show ?
```

The CLI displays this keyword list with short descriptions for each keyword:

```
show ?
  application-priority            Application Priority
```

```
  arp                             Internet Protocol (IP)
  bfd                             Bidirectional Forwarding Detection (BFD)
  bgp                             Border Gateway Protocol (BGP)
  bi-lsp                          Bi-directional lsp status and configuration
  bridge                          Bridge group commands
  ce-vlan                         COS Preservation for Customer Edge VLAN
  class-map                       Class map entry
  cli                             Show CLI tree of current mode
  clns                            Connectionless-Mode Network Service (CLNS)
  control-adjacency               Control Adjacency status and configuration
  control-channel                 Control Channel status and configuration
  cspf                            CSPF Information
  customer                        Display Customer spanning-tree
  cvlan                           Display CVLAN information
  debugging                       Debugging functions (see also 'undebug')
  dot1x                           IEEE 802.1X Port-Based Access Control
  etherchannel                    LACP etherchannel
  ethernet                        Layer-2
...
```

If you type the ? in the middle of a keyword, the CLI displays help for that keyword only.

```
> show de?
debugging  Debugging functions (see also 'undebug')
```

If you type the ? in the middle of a keyword, but the incomplete keyword matches several other keywords, ZebOS-XP displays help for all matching keywords.

```
> show i? (CLI does not display the question mark).
interface  Interface status and configuration
ip         IP information
isis       ISIS information
```

Command Completion

The CLI can complete the spelling of a command or a parameter. Begin typing the command or parameter and then press the tab key. For example, at the CLI command prompt type `sh`:

```
> sh
```

Press the tab key. The CLI displays:

```
> show
```

If the spelling of a command or parameter is ambiguous, the CLI displays the choices that match the abbreviation. Type `show i` and press the tab key. The CLI displays:

```
> show i
  interface  ip         ipv6       isis
> show i
```

The CLI displays the `interface` and `ip` keywords. Type `n` to select `interface` and press the tab key. The CLI displays:

```
> show in
> show interface
```

Type ? and the CLI displays the list of parameters for the `show interface` command.

```
> show interface
  IFNAME  Interface name
  |       Output modifiers
```

```
>       Output redirection
<cr>
```

The CLI displays the only parameter associated with this command, the `IFNAME` parameter.

Command Abbreviations

The CLI accepts abbreviations that uniquely identify a keyword in commands. For example:

```
> sh in eth0
```

is an abbreviation for:

```
> show interface eth0
```

Command Line Errors

Any unknown spelling causes the CLI to display the error `Unrecognized command` in response to the ?. The CLI displays the command again as last entered.

```
> show dd?
% Unrecognized command
> show dd
```

When you press the Enter key after typing an invalid command, the CLI displays:

```
(config)#router ospf here
                          ^
% Invalid input detected at '^' marker.
```

where the ^ points to the first character in error in the command.

If a command is incomplete, the CLI displays the following message:

```
> show
% Incomplete command.
```

Some commands are too long for the display line and can wrap mid-parameter or mid-keyword, as shown below. This does *not* cause an error and the command performs as expected:

```
area 10.10.0.18 virtual-link 10.10.0.19 authent
ication-key 57393
```

Command Negation

Many commands have a `no` form that resets a feature to its default value or disables the feature. For example:

- The `ip address` command assigns an IPv4 address to an interface
- The `no ip address` command removes an IPv4 address from an interface

Syntax Conventions

Table 1-1 describes the conventions used to represent command syntax in this reference.

Table 1-1: Syntax conventions

Convention	Description	Example
`monospaced font`	Command strings entered on a command line	`show application-priority bridge 1`
`lowercase`	Keywords that you enter exactly as shown in the command syntax.	`show application-priority bridge 1`
`UPPERCASE`	See Variable Placeholders	`IFNAME`
`()`	Optional parameters, from which you must select one. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	`(A.B.C.D|<0-4294967295>)`
`()`	Optional parameters, from which you select one or none. Vertical bars delimit the selections. Do not enter the parentheses or vertical bars as part of the command.	`(A.B.C.D|<0-4294967295>|)`
`()`	Optional parameter which you can specify or omit. Do not enter the parentheses or vertical bar as part of the command.	`(IFNAME|)`
`{}`	Optional parameters, from which you must select one or more. Vertical bars delimit the selections. Do not enter the braces or vertical bars as part of the command.	`{intra-area <1-255>|inter-area <1-255>|external <1-255>}`
`[]`	Optional parameters, from which you select zero or more. Vertical bars delimit the selections. Do not enter the brackets or vertical bars as part of the command. A '?' before a parameter in square brackets limits that parameter to one occurrence in a command string.	`[<1-65535>|AA:NN|internet|local-AS|no-advertise|no-export]`
`.`	Repeatable parameter. The parameter that follows a period can be repeated more than once. Do not enter the period as part of the command.	`set as-path prepend .<1-65535>`

Variable Placeholders

Table 1-2 shows the tokens used in command syntax use to represent variables for which you supply a value.

Table 1-2: Variable placeholders

Token	Description
WORD	A contiguous text string (excluding spaces)
LINE	A text string, including spaces; no other parameters can follow this parameter
IFNAME	Interface name whose format varies depending on the platform; examples are: eth0, Ethernet0, ethernet0, xe0
A.B.C.D	IPv4 address
A.B.C.D/M	IPv4 address and mask/prefix
X:X::X:X	IPv6 address
X:X::X:X/M	IPv6 address and mask/prefix
HH:MM:SS	Time format
AA:NN	BGP community value
XX:XX:XX:XX:XX:XX	MAC address
<1-5> <1-65535> <0-2147483647> <0-4294967295>	Numeric range

Command Description Format

Table 1-3 explains the sections used to describe each command in this reference.

Table 1-3: Command descriptions

Section	Description
Command Name	The name of the command, followed by what the command does and when should it be used
Command Syntax	The syntax of the command
Parameters	Parameters and options for the command
Default	The state before the command is executed
Command Mode	The mode in which the command runs; see Command Modes
Example	An example of the command being executed

Keyboard Operations

Table 1-4 lists the operations you can perform from the keyboard.

Table 1-4: Keyboard operations

Key combination	Operation
Left arrow or Ctrl+b	Moves one character to the left. When a command extends beyond a single line, you can press left arrow or Ctrl+b repeatedly to scroll toward the beginning of the line, or you can press Ctrl+a to go directly to the beginning of the line.
Right arrow or Ctrl-f	Moves one character to the right. When a command extends beyond a single line, you can press right arrow or Ctrl+f repeatedly to scroll toward the end of the line, or you can press Ctrl+e to go directly to the end of the line.
Esc, b	Moves back one word
Esc, f	Moves forward one word
Ctrl+e	Moves to end of the line
Ctrl+a	Moves to the beginning of the line
Ctrl+u	Deletes the line
Ctrl+w	Deletes from the cursor to the previous whitespace
Alt+d	Deletes the current word
Ctrl+k	Deletes from the cursor to the end of line
Ctrl+y	Pastes text previously deleted with Ctrl+k, Alt+d, Ctrl+w, or Ctrl+u at the cursor

Table 1-4: Keyboard operations (Continued)

Key combination	Operation
Ctrl+t	Transposes the current character with the previous character
Ctrl+c	Ignores the current line and redisplays the command prompt
Ctrl+z	Ends configuration mode and returns to exec mode
Ctrl+l	Clears the screen
Up Arrow or Ctrl+p	Scroll backward through command history
Down Arrow or Ctrl+n	Scroll forward through command history

Show Command Modifiers

You can use two tokens to modify the output of a `show` command. Enter a question mark to display these tokens:

```
# show users ?
  | Output modifiers
  > Output redirection
```

You can type the | (vertical bar character) to use output modifiers. For example:

```
> show rsvp | ?
  begin     Begin with the line that matches
  exclude   Exclude lines that match
  include   Include lines that match
  redirect  Redirect output
```

Begin Modifier

The `begin` modifier displays the output beginning with the first line that contains the input string (everything typed after the `begin` keyword). For example:

```
# show run | begin eth1
...skipping
interface eth1
 ipv6 address fe80::204:75ff:fee6:5393/64
!
interface eth2
 ipv6 address fe80::20d:56ff:fe96:725a/64
!
line con 0
 login
!
end
```

You can specify a regular expression after the `begin` keyword, This example begins the output at a line with either “eth3” or “eth4”:

```
# show run | begin eth[3-4]

...skipping
interface eth3
```

```
 shutdown
!
interface eth4
 shutdown
!
interface svlan0.1
 no shutdown
!
route-map myroute permit 3
!
route-map mymap1 permit 10
!
route-map rmap1 permit 3
!
line con 0
 login
line vty 0 4
 login
!
end
```

Include Modifier

The `include` modifier includes only those lines of output that contain the input string. In the output below, all lines containing the word “input” are included:

```
# show interface eth1 | include input
    input packets 80434552, bytes 2147483647, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 1, missed 0
```

You can specify a regular expression after the `include` keyword. This examples includes all lines with “input” or “output”:

```
#show int eth0 | include (in|out)put
    input packets 597058, bytes 338081476, dropped 0, multicast packets 0
    input errors 0, length 0, overrun 0, CRC 0, frame 0, fifo 0, missed 0
    output packets 613147, bytes 126055987, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
```

Exclude Modifier

The `exclude` modifier excludes all lines of output that contain the input string. In the following output example, all lines containing the word “input” are excluded:

```
# show interface eth1 | exclude input
Interface eth1
  Scope: both
  Hardware is Ethernet, address is 0004.75e6.5393
  index 3 metric 1 mtu 1500 <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Administrative Group(s): None
  DSTE Bandwidth Constraint Mode is MAM
  inet6 fe80::204:75ff:fee6:5393/64
    output packets 4438, bytes 394940, dropped 0
    output errors 0, aborted 0, carrier 0, fifo 0, heartbeat 0, window 0
    collisions 0
```

You can specify a regular expression after the `exclude` keyword. This example excludes lines with “output” or “input”:


```
# show interface eth0 | exclude (in|out)put
Interface eth0
  Scope: both
  Hardware is Ethernet  Current HW addr: 001b.2139.6c4a
  Physical:001b.2139.6c4a  Logical:(not set)
  index 2 metric 1 mtu 1500 duplex-full arp ageing timeout 3000
  <UP,BROADCAST,RUNNING,MULTICAST>
  VRF Binding: Not bound
  Bandwidth 100m
  DHCP client is disabled.
  inet 10.1.2.173/24 broadcast 10.1.2.255
  VRRP Master of :  VRRP is not configured on this interface.
  inet6 fe80::21b:21ff:fe39:6c4a/64
    collisions 0
```

Redirect Modifier

The `redirect` modifier writes the output into a file. The output is not displayed.

```
# show history | redirect /var/frame.txt
```

The output redirection token (>) does the same thing:

```
# show history >/var/frame.txt
```

Command Modes

Commands are grouped into modes arranged in a hierarchy. Each mode has its own set of commands. Table 1-5 lists the command modes common to all protocols.

Table 1-5: Common command modes

Name	Description
Executive mode	Also called *view* mode, this is the first mode to appear after you start the CLI. It is a base mode from where you can perform basic commands such as `show`, `exit`, `quit`, `help`, `list`, and `enable`.
Privileged executive mode	Also called *enable* mode, in this mode you can run additional basic commands such as `debug`, `write`, and `show`.
Configure mode	Also called *configure terminal* mode, in this mode you can run configuration commands and go into other modes such as interface, router, route map, key chain, and address family.
Interface mode	In this mode you can configure protocol-specific settings for a particular interface. Any setting you configure in this mode overrides a setting configured in router mode.
Router mode	This mode is used to configure router-specific settings for a protocol such as RIP or OSPF.

Command Mode Tree

The diagram below shows the common command mode hierarchy.

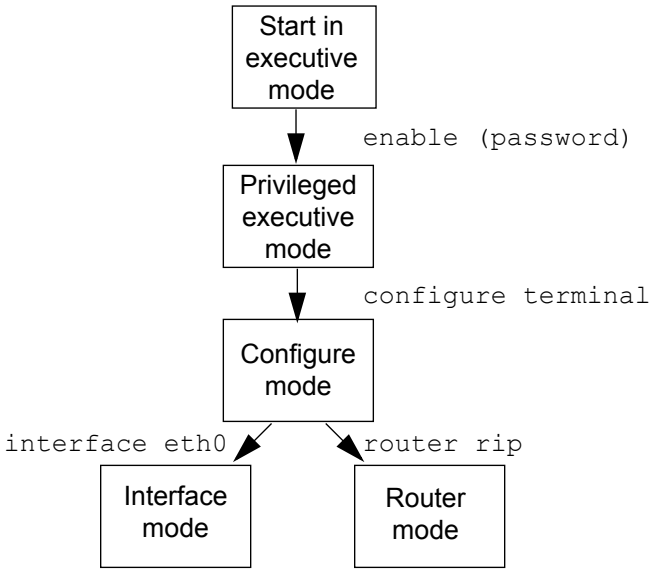

Figure 1-1: Common command modes

To change modes:

1. Enter privileged executive mode by entering `enable` in Executive mode.
2. Enter configure mode by entering `configure terminal` in Privileged Executive mode.

The example below shows starting `imish` and then moving from executive mode to privileged executive mode to configure mode and finally to router mode:

```
# ./imish
> enable mypassword
# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
(config)# router rip
(config-router)#
```

Note: Each protocol can have modes in addition to the common command modes. See the command reference for the respective protocol for details.

Debug Command

Whether the settings you make for a `debug` command persist between sessions depends on the mode where you make the settings:

- When you make settings for a `debug` command in executive mode, the configuration is valid for the current session only and is not saved in the `ZebOS.conf` file.
- When you make settings for a `debug` command in configuration mode, the configuration is retained and saved in `ZebOS.conf` and used even after the session restarts.

CHAPTER 2 Enhanced Transmission Selection Commands

This section list and describe the commands that can be used to configure Enhanced Transmission Selection (ETS) in a Data Center Bridging (DCB) environment. It includes the following commands:

application-priority advertise-local-config

Use this command to enable advertising mode for ETS feature on the interface.

Use the no form of this command to disable advertising mode for the interface.

Command Syntax

```
application-priority advertise-local-config
no application-priority advertise-local-config
```

Parameters

None

Command Mode

Interface mode

Example

```
#configure terminal
(config)#interface eth1
(config-if)#application-priority advertise-local-config
```

application-priority enable (interface)

Use this command to enable the application priority feature of DCB on an interface.

Use the no form of this command to disable application priority on an interface.

Command Syntax

```
application-priority enable
no application-priority
```

Parameters

None

Command Mode

Interface mode

Example

```
#configure terminal
(config)#interface eth1
(config-if)#application-priority enable
```

application-priority enable (switch)

Use this command to enable the application priority feature of DCB on a switch (bridge).

Use the no form of this command to disable application priority on a switch.

Command Syntax

```
application-priority enable
application-priority enable bridge <1-32>
no application-priority
no application-priority enable bridge <1-32>
```

Parameters

`bridge`	Bridge ID. If a bridge ID is not given, the command enables application priority on the default bridge.

Command Mode

Configure mode

Example

```
#configure terminal
(config)#application-priority enable
```

bandwidth-percentage

Use this command to assign a percentage of bandwidth to a traffic class group. The total percentage bandwidth should be equal to 100 percent.

Command Syntax

```
bandwidth-percentage (<0-7> <0-100> | <0-7> <0-100> <0-7> <0-100> | <0-7> <0-100>
  <0-7> <0-100> <0-7> <0-100> | <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-
  100> | <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> | <0-
  7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> | <0-7> <0-100>
  <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-
  100> | <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-7> <0-100> <0-
  7> <0-100> <0-7> <0-100> <0-7> <0-100>)
```

For ZebIC:

```
bandwidth-percentage (<0-1> <0-100> | <0-1> <0-100> <0-1> <0-100> | <0-1> <0-100>
  <0-1> <0-100> <0-1> <0-100> | <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-
  100> | <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> | <0-
  1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> | <0-1> <0-100>
  <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-
  100> | <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-1> <0-100> <0-
  1> <0-100> <0-1> <0-100> <0-1> <0-100>)
```

Parameters

<0-7>	Specify the traffic class group ID. You can set a bandwidth percentage for up to eight IDs.
<0-100>	Specify the bandwidth percentage for the traffic class group.

For ZebIC:

<0-1>	Specify the traffic class group ID. You can set a bandwidth percentage for up to two IDs.
<0-100>	Specify the bandwidth percentage for the traffic class group.

Command Mode

Interface mode

Example

```
(config)#interface eth1
(config-if)#bandwidth-percentage 0 50 1 30 1 20
```

data-center-bridging

Use this command to enable DCB (Data Center Bridging) on a switch (bridge).

Use the `no` form of this command to disable DCB.

Command Syntax

```
data-center-bridging enable
data-center-bridging enable bridge <1-32>
no data-center-bridging enable
no data-center-bridging enable bridge <1-32>
```

Parameters

`bridge`	Bridge ID. If you do not specify a bridge ID, this command enables or disables DCB on the default bridge.

Command Mode

Configure mode

Default

DCB is enabled.

Examples

```
#configure terminal
(config)#data-center-bridging enable bridge 1

#configure terminal
(config)#data-center-bridging enable

#configure terminal
(config)#no data-center-bridging enable bridge 1

#configure terminal
(config)#no data-center-bridging enable
```

dcbx enable

Use this command to enables DCBX (Data Center Bridging Exchange) on the interface.

Use the `no` form of this command to disable DCBX.

Command Syntax

```
dcbx enable
no dcbx enable
```

Parameters

None

Command Mode

Interface mode

Default

DCB is enabled.

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#dcbx enable
```

enhanced-transmission-selection accept-peer-config

Use this command to enable willing mode for ETS on the interface.

Use the `no` form of this command to disable willing mode.

Command Syntax

```
enhanced-transmission-selection accept-peer-config
no enhanced-transmission-selection accept-peer-config
```

Parameters

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#enhanced-transmission-selection accept-peer-config
```

enhanced-transmission-selection advertise-local-config

Use this command to enable advertising mode for ETS on the interface.

Use the `no` form of this command to disable advertising mode.

Command Syntax

```
enhanced-transmission-selection advertise-local-config
no enhanced-transmission-selection advertise-local-config
```

Parameters

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#enhanced-transmission-selection advertise-local-config
```

enhanced-transmission-selection (switch)

Use this command to enable the ETS feature of DCB on a switch (bridge).

Use the `no` form of this command to disable ETS.

Command Syntax

```
enhanced-transmission-selection enable
enhanced-transmission-selection enable bridge <1-32>
no enhanced-transmission-selection
no enhanced-transmission-selection bridge <1-32>
```

Parameters

`<1-32>`	Bridge ID. If you do not specify a bridge ID, the command enables or disables ETS on the default bridge.

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#enhanced-transmission-selection enable bridge 1

#configure terminal
(config)#enhanced-transmission-selection enable

#configure terminal
(config)#no enhanced-transmission-selection bridge 1

#configure terminal
(config)#no enhanced-transmission-selection enable
```

enhanced-transmission-selection (interface)

Use this command to enable the ETS feature of DCB on an interface.

Use the `no` from of this command to disable the ETS at an interface.

Command Syntax

```
enhanced-transmission-selection mode (on|auto)
no enhanced-transmission-selection
```

Parameters

`auto`	Select auto to negotiate ETS capabilities.
`on`	Select on to force enable ETS.

Default

Default is Auto.

Command Mode

Interface mode

Examples

```
(config)#interface eth1
(config-if)#enhanced-transmission-selection mode on

(config)#interface eth1
(config-if)#no enhanced-transmission-selection
```

ethertype

Use this command to set the application priority based on the Ethertype.

Use the `no` parameter along with this command to unset the application priority based on the Ethertype.

Command Syntax

```
ethertype (value ETHERTYPE | name ETHERNAME) priority <0-7>
no ethertype (value ETHERTYPE | name ETHERNAME) priority <0-7>
```

Parameters

`value`	Ethertype value in hexadecimal notation (such as “0xhhhh”).
`name`	Enter a well-known Ethertype string. Ethertype supports the following protocol names: ip (IPv4), ipv6 (IPv6), ipx (IPX), x25 (CCITT X.25), arp (Address Resolution), rarp (Reverse Address Resolution), atalkddp (Appletalk DDP), atalkaarp (Appletalk AARP), atmmulti (MultiProtocol over ATM), atmtransport (Frame-based ATM Transport), pppdiscovery (PPPoE discovery), pppsession (PPPoE Session), xeroxpup (Xerox PUP), xeroxaddrtrans (Xerox PUP Address Translation), g8bpqx25 (G8BPQ AX.25), ieeepup (Xerox IEEE802.3 PUP), ieeeaddrtrans (Xerox IEEE802.3 PUP Address Translation), dec (DEC Assigned), decdnadumpload (DEC DNA Dump/Load), decdnaremoteconsole (DEC DNA Remote Console), decdnarouting (DEC DNA Routing), declat (DEC LAT), decdiagnostics (DEC Diagnostics), deccustom (DEC Customer Use), decsyscomm (DEC Systems Comms Arch)
`priority`	User priority value <0-7>.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#ethertype value 0x0800 priority 6

(config)#interface eth1
(config-if)#ethertype name arp priority 6

(config)#interface eth1
(config-if)#no ethertype value 0x0800 priority 6

(config)#interface eth1
(config-if)#no ethertype name arp priority 6
```

lldp fast-init enable

Use this command to enable fast exchange of TLVs initially which makes DCBX converge fast.

Use the `no` form of this command to disable this feature.

Command Syntax

```
lldp fast-init enable
no lldp fast-init enable
```

Parameters

None

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#lldp fast-init enable
```

max-traffic-class-group

Use this command to configure the maximum number of traffic classes that you can enable on ETS.

Use the `no` form of this command to set the maximum number of traffic classes to 0 which is the default.

If the value is 0, you can add priorities for all 8 traffic classes with the traffic-class-group command. When the number of traffic classes is not 0, you can add priorities with the traffic-class-group command until the maximum is reached.

Command Syntax

```
max-traffic-class-group <0-7>
```

For ZebIC:

```
max-traffic-class-group <0-2>
no max-traffic-class-group
```

Parameters

`<0-7>`	The maximum number of traffic class groups.

For ZebIC:

`<0-2>`	The maximum number of traffic class groups.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#max-traffic-class-group 2
(config-if)#
```

show application-priority bridge

Use this command to display application priority table for a bridge (switch).

Command Syntax

```
show application-priority bridge <1-32>
```

Parameter

<1-32>	Bridge ID.

Command Mode

Exec mode

Example 1

```
#show application-priority bridge 2
bridge : 2

Admin Configuration
intf  Admin Config    Protocol    ProtoId   Priorities
      Mode  Advertise
================================================================================
eth1  On    On        Ethertype   ip         6
eth1  On    On        Ethertype   arp        6
eth1  On    On        udp         telnet     6
eth1  On    On        tcp         telnet     6
```

show application-priority interface

Use this command to display application priority table for an interface.

Command Syntax

```
show application-priority interface IFNAME
```

Parameter

IFNAME	Name of the interface.

Command Mode

Exec mode

Example 1

```
#show application-priority interface eth1
bridge : 2
Application Priority : On

Admin Configuration
intf  Admin Config    Protocol    ProtoId   Priorities
      Mode  Advertise
================================================================================
eth1  On    On        Off        -          -         -
```

show data-center-bridging

Use this command to display administrative, operational, and remote parameters for DCBX.

Command Syntax

```
show data-center-bridging (admin-details | operational-details | remote-details)
  interface IFNAME
```

Parameter

admin-details	Administrative details.
operational-details	Operational details.
remote-details	Remote details.
interface	Interface.
IFNAME	Name of the interface.

Command Mode

Exec mode

Example 1

```
#show data-center-bridging operational-details interface eth1
PFC Operational details
interface : eth1
state cap    syncd priorities
================================================================================
Off   0      Off


ETS Operational details
interface : eth1
State MAX_TCGs  TCG-ID    BW%  priorities
================================================================================
On    0         0         0
On    0         1         0     1 2 3 4 5 6 7
On    0         2         0
On    0         3         0
On    0         4         0
On    0         5         0
On    0         6         0
On    0         7         0
On    0         15        NA    0


Application priority operational details
interface : eth1
State Adv   Will  Proto ProtoID   priorities    app
================================================================================
```

show enhanced-transmission-selection bridge

Use this command to display all traffic class groups for a bridge (switch).

Command Syntax

```
show enhanced-transmission-selection bridge <1-32>
```

Parameter

<1-32>	Bridge ID.

Command Mode

Exec mode

Example 1

```
#show enhanced-transmission-selection bridge 2
bridge : 2
Admin Configuration
intf  Admin Config    Willing   Max-TCG  TCGID BW% Priorities
      Mode  Advertise
================================================================================
eth1  On    On        On        0        15    NA   0 1 2 3 4 5 6 7

Operational Configuration
intf  Oper  Max-Tcg  TCGID BW% Priorities
      State
================================================================================
eth1  On    15    NA   0 1 2 3 4 5 6 7
```

show enhanced-transmission-selection interface

Use this command to display all traffic class groups for an interface.

Command Syntax

```
show enhanced-transmission-selection interface IFNAME
```

Parameter

IFNAME	Name of the interface.

Command Mode

Exec mode

Example 1

```
#show enhanced-transmission-selection interface eth1
Interface : eth1
Enhanced Transmission Selection : on

Admin Configuration

Mode  Advertise Willing   Max-TCG  TCG-ID  BW%   Priorities
================================================================================
On    On        On        0        15      NA     0 1 2 3 4 5 6 7

Operational Configuration
Oper  Max_TCG TCG-ID  BW%   Priorities
State
================================================================================
On    0       15      NA     0 1 2 3 4 5 6 7
```

tcp

Use this to set the application priority based on TCP. The protocol ID is the protocol number in decimal value or protocol service name.

Use the `no` parameter along with this command to unset the application priority based on the selection type.

Command Syntax

```
tcp (port-no <1-1023>) priority <0-7>>]
no tcp (port-no <1-1023>) priority <0-7>
tcp (service-name [PROTOSERV]) priority <0-7>
no tcp (service-name [PROTOSERV]) priority <0-7>
```

Parameters

`port-no`	Enter a well-known protocol number in decimal <1-1023>.
`service-name`	Protocol service name. Enter a well-known service name, such as telnet.
`priority`	Default priority for CFM frames to be relayed <0-7>.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#tcp port-no 23 priority 6

(config)#interface eth1
(config-if)#tcp service-name telnet priority 6

(config)#interface eth1
(config-if)#no tcp port-no 23 priority 6

(config)#interface eth1
(config-if)#no tcp service-name telnet priority 6
```

traffic-class-group

Use this command to add or remove priorities for a traffic class group.

Use the `no` form of this command to remove all traffic-class-groups.

Command Syntax

```
traffic-class-group <0-7> add priority <0-7> (<0-7>(<0-7>(<0-7>(<0-7>(<0-7>(<0-
  7>(<0-7>|)|)|)|)|)|)|)
traffic-class-group <0-7> remove priority <0-7> (<0-7>(<0-7>(<0-7>(<0-7>(<0-7>(<0-
  7>(<0-7>|)|)|)|)|)|)|)
no traffic-class-groups
```

Parameters

`<0-7>`	Specify traffic-class-group ID.
`add priority`	Specify to add a traffic class group
`<0-7>`	Traffic-priority value. Up to seven priorities can be added.
`remove priority`	Specify to remove a traffic class group
`<0-7>`	Traffic-priority value. Up to seven priorities can be removed.

Command Mode

Interface mode

Example

```
#configure terminal
(config)#interface eth1
(config-if)#traffic-class-group 1 add priority 1 2 3 4 5 6 7

(config)#interface eth1
(config-if)#traffic-class-group 1 remove priority 3 6

(config)#interface eth1
(config-if)#no traffic-class-group
```

udp

Use this to set the application priority based on UDP. The protocol ID is the protocol number in decimal value or protocol service name.

Use the `no` parameter along with this command to unset the application priority.

Command Syntax

```
udp (port-no <1-1023>) priority <0-7>
no udp (port-no <1-1023>) priority <0-7>
udp (service-name [PROTOSERV]) priority <0-7>
no udp (service-name [PROTOSERV]) priority <0-7>
```

Parameters

`port-no`	Enter a well-known protocol number in decimal <1-1023>.
`service-name`	Protocol service name. Enter a well-known service name, such as telnet.
`priority`	Default priority for CFM frames to be relayed <0-7>.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#udp port-no 23 priority 6

(config)#interface eth1
(config-if)#udp service-name telnet priority 6

(config)#interface eth1
(config-if)#no udp port-no 23 priority 6

(config)#interface eth1
(config-if)#no udp service-name telnet priority 6
```

CHAPTER 3 Quantized Congestion Notification Commands

This section describes the commands that you use to configure Quantized Congestion Notification (QCN) in a Data Center Bridging (DCB) environment. QCN is a IEEE 802.1Qau mechanism that manages network congestion. When a queue reaches a configured threshold, QCN throttles traffic at the source of the congestion by transmitting messages that propagate back to the source and temporarily stop the source from transmitting. When the queue crosses the threshold that indicates the congestion has dissipated, QCN sends a message to allow the source to resume transmitting frames. QCN includes the following commands:

cnpv

Use this command to enable Congestion Notification Priority Values (CNPV). A CNPV corresponds to a class of applications or a single application, such as interprocess communications or disk storage, that have different requirements for network resources as such as latency or bandwidth. There are total of eight CNPVs with one reserved for “best-effort” traffic, meaning you can assign up to seven CNPVs.

Use the `no` form of this command to disable CNPVs.

Command Syntax

```
cnpv <0-7> (<0-7>(<0-7>(<0-7>(<0-7>(<0-7>(<0-7>|)|)|)|)|)|)
no cnpv <0-7> (<0-7>(<0-7>(<0-7>(<0-7>(<0-7>(<0-7>|)|)|)|)|)|)
```

Parameters

`<0-7>`	Congestion notification priority values (up to seven).

Command Mode

QCN mode

Examples

```
#configure terminal
(config)#qcn enable bridge 1
(config-qcn)#cnpv 4 6
```

cp enable

Use this command to create a Congestion Point (CP) for a Congestion Notification Priority Value (CNPV).

Use the `no` form of this command to disable a CP.

Command Syntax

```
cp enable ((cnpv <0-7>|) (sample-base <10000-4294967295>|) (weight WEIGHT|) (min-
  header-octet <0-64>|)| )
no cp (cnpv <0-7>|)
```

Parameters

`cnpv`	Congestion notification priority.
`<0-7>`	Congestion notification priority value.
`sample-base`	Sample base.
`<10000-4294967295>`	The minimum number of octets to enqueue in the Congestion Point's queue between transmissions of Congestion Notification Messages (CNMs). The default is 150,000.
`weight`	Weight in offset calculation.
`WEIGHT`	The weight change in queue length used to calculate whether the queue length is moving toward or away from the target number of octets for the CP's queue <-10 - 10>. The default is one (1).
`min-header-octet`	Minimum header octet.
`<0-64>`	The minimum number of octets that the CP returns in the MSDU (MAC Service Data Unit) field of each CNM it generates. The default is zero (0).

Command Mode

Interface mode

Examples

```
>ena
#con term
Enter configuration commands, one per line.  End with CNTL/Z.
(config)#interface eth0
(config-if)#cp enable sample-base 100000 weight 2
```

defense-mode cnpv

Use this command to set the defense mode for a Congestion Notification Priority Value (CNPV).

In QCN mode, you can:

- Specify an `admin` type to explicitly set the defense mode and the alternate priority.
- Specify `auto` to derive the defense mode from LLDP Congestion Notification TLVs.

In addition, in interface mode, you can specify `component` to set the defense mode the same as the bridge-level defense mode.

Command Syntax

QCN mode:

```
defense-mode cnpv <0-7> (admin (disabled|edge|interior|interior-ready) alternate-
  priority <0-7> | auto)
```

Interface mode:

```
defense-mode cnpv <0-7> (admin (disabled|edge|interior|interior-ready) alternate-
  priority <0-7> |auto |component)
```

Parameters

`cnpv`	CNPV.
`<0-7>`	CNPV.
`admin`	Explicitly set the defense mode:
`disabled`	Congestion notification is disabled for this CNPV and interface.
`edge`	On this interface and for this CNPV, the priority parameters of input frames are remapped to an alternate value. Congestion notification tags are not output.
`interior`	On this interface and for this CNPV, the priority parameters of input frames are not remapped to another value. Congestion notification tags are not output.
`interior-ready`	On this interface and for this CNPV, the priority parameters of input frames are not remapped to another value. Congestion notification tags can be output.
`alternate-priority`	Explicitly set the alternate priority.
`<0-7>`	Alternate priority value.
`auto`	Set the defense mode according to LLDP Congestion Notification TLVs and set the alternate priority to the cncpAutoAltPri variable as defined in the 802.1Qau standard.
`component`	Set the defense mode the same as the bridge-level defense mode and set the alternate priority to the cncpAutoAltPri variable as defined in the 802.1Qau standard.

Command Mode

QCN mode and interface mode

Examples

```
#configure terminal
```

```
(config)#qcn enable bridge 1
(config-qcn)#defense-mode cnpv 4 admin edge alternate-priority 6

#configure terminal
 config)#interface eth1
(config-if)#defense-mode cnpv 4 comp
```

qcn enable

Use this command to enable QCN at the switch (bridge) level. This command initializes the QCN module with default values.

If a bridge is not specified, then the operation is performed on the default bridge.

Use the `no` form of this command to disable QCN.

Command Syntax

```
qcn enable (cnm-transmit-priority <0-7> | )
qcn enable bridge <1-32> (cnm-transmit-priority <0-7> | )
no qcn
no qcn bridge <1-32>
```

Parameters

`<1-32>`	Bridge ID.
`<0-7>`	Priority to use when transmitting Congestion Notification Messages (CNMs).

Command Mode

Configure mode

Example

```
>enable
#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
(config)#qcn enable bridge 1 cnm-transmit-priority 4
```

show qcn configuration

Use this command to show the configuration of the QCN module.

Command Syntax

```
show qcn configuration
show qcn configuration bridge <1-32>
```

Parameters

<1-32>	Bridge ID.

Command Mode

Exec mode

Examples

```
#show qcn configuration bridge 2

 QCN:   Enable
 CNM Transmit Priority: 6
 Discarded Frames: 0
 Errored Port List: NONE

 Priority       CNPV
 ========       ====
 0              No
 1              No
 2              Yes
 3              Yes
 4              No
 5              No
 6              No
 7              No

 CNPV details:

 CNPV  DefModeChoice  AltPriority  DefenseMode
 ====  =============  ===========  ==============
 2     AUTO           0            EDGE
 3     AUTO           0            EDGE

 CNPV details per interface:
 Interface       CNPV  DefModeChoice  AltPriority  DefenseMode     XmitReady
 ==============  ====  =============  ===========  ==============  =========
 eth1            2     ADMIN          1            INTERIOR        TRUE
 eth1            3     ADMIN          6            EDGE            FALSE

 Congestion Point Details:
 Interface       CpId      W     SampleBase  MinHdrOctet  Qsp
 ==============  ========  ====  ==========  ===========  ===
 eth1            ********  2.00  0           0            0
```

show qcn cnpv

Use this command to display application priority table per interface.

Command Syntax

```
show qcn cnpv
show qcn cnpv ((bridge BRIDGE_ID) | (interface PORT_ID ))
```

Parameter

bridge	Bridge.
<1-32>	Bridge ID.
interface	Interface.
PORT_ID	Interface name.

Command Mode

Exec mode

Example 1

```
#show qcn cnpv bridge 2

 Priority       CNPV
 ========       ====
 0              No
 1              No
 2              Yes
 3              Yes
 4              No
 5              No
 6              No
 7              No

 CNPV details:

 CNPV  DefModeChoice  AltPriority  DefenseMode
 ====  =============  ===========  ==============
 2     AUTO           0            EDGE
 3     AUTO           0            EDGE

 CNPV details per interface:
 Interface       CNPV  DefModeChoice  AltPriority  DefenseMode     XmitReady
 ==============  ====  =============  ===========  ==============  =========
 eth1            2     ADMIN          1            INTERIOR        TRUE
 eth1            3     ADMIN          6            EDGE            FALSE

#show qcn cnpv interface eth1

 CNPV details per interface:
 Interface       CNPV  DefModeChoice  AltPriority  DefenseMode     XmitReady
 ==============  ====  =============  ===========  ==============  =========
 eth1            2     ADMIN          1            INTERIOR        TRUE
 eth1            3     ADMIN          6            EDGE            FALSE
```

show qcn cp

Use this command to show the configuration of all congestion points on the interface.

Command Syntax

```
show qcn cp
show qcn cp ((bridge <1-32> )|(interface PORT_ID))
```

Parameters

bridge	Bridge.
<1-32>	Bridge ID.
interface	Interface.
PORT_ID	Interface name.

Command Mode

Exec mode

Examples

```
#show qcn cp bridge 2

 Congestion Point Details:
 Interface       CpId      W     SampleBase  MinHdrOctet  Qsp
 ==============  ========  ====  ==========  ===========  ===
 eth1            ********  2.00  0           0            0

#show qcn cp interface eth1

Congestion Point Details:
 Interface       CpId      W     SampleBase  MinHdrOctet  Qsp
 ==============  ========  ====  ==========  ===========  ===
 eth1            ********  2.00  0           0            0
```

CHAPTER 4 Priority-based Flow Control Commands

This section lists and describes the commands that can be used to configure Priority-based Flow Control (PFC) in a Data Center Bridging (DCB) environment.It includes the following commands:

priority-flow-control accept-peer-config

Use this command to enable willing mode for PFC on the interface.

If willing is enabled, then by default advertise mode is also enabled.

Use the `no` form of this command to disable willing mode.

Command Syntax

```
priority-flow-control accept-peer-config
no priority-flow-control accept-peer-config
```

Parameters

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#priority-flow-control accept-peer-config
```

priority-flow-control advertise-local-config

Use this command to enable advertising mode for PFC on the interface.

Use the `no` form of this command to disable advertising mode.

Command Syntax

```
priority-flow-control advertise-local-config
no priority-flow-control advertise-local-config
```

Parameters

None

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#priority-flow-control advertise-local-config
```

priority-flow-control enable

Use this command to enable Priority-based Flow Control (PFC) on a switch (bridge).

Use the `no` form of this command to disable PFC.

Command Syntax

```
priority-flow-control enable
priority-flow-control enable bridge <1-32>
no priority-flow-control
no priority-flow-control bridge <1-32>
```

Parameters

`<1-32>`	Bridge ID. If you do not specify a bridge ID, this command enables PFC on the default bridge.

Command Mode

Configure mode

Default

PFC is disabled by default.

Example

```
#configure terminal
(config)#priority-flow-control enable

#configure terminal
(config)#priority-flow-control enable bridge 32

#configure terminal
(config)#no priority-flow-control enable

#configure terminal
(config)#no priority-flow-control enable bridge 32
```

priority-flow-control cap

Use this command to configure a priority-flow-control cap for the number of priorities allowed on an interface.

Use the `no` parameter along with this command to return the value to its default level.

Command Syntax

```
priority-flow-control cap <0-8>
no priority-flow-control cap <0-8>
```

Parameters

`<0-8>`	Select a cap value. Zero indicates that there is no limitations.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#priority-flow-control cap 7
(config)#
```

priority-flow-control enable priority

Use this command to enable the PFC at the interface level for a specific priority.

Use the `no` parameter along with this command to disable PFC for a priority.

Command Syntax

```
priority-flow-control enable priority <0-7> (<0-7>(<0-7>(<0-7> (<0-7>(<0-7>(<0-
  7>(<0-7>|)|)|)|)|)|)|)
no priority-flow-control enable priority <0-7> (<0-7>(<0-7>(<0-7>(<0-7>(<0-7>(<0-
  7>(<0-7>|)|)|)|)|)|)|)
```

Parameter

`<0-7>`	Traffic-priority value. You can specify up to seven priorities.

Command Mode

Interface mode

Default

PFC is disabled by default.

Examples

```
(config)#interface eth1
(config-if)#priority-flow-control enable priority 1 2 3 4 5 6 7

(config)#interface eth1
(config-if)#no priority-flow-control enable priority 2 3 4
```

priority-flow-control link-delay-allowance

Use this command to set PFC link delay allowance on an interface. This command provides allowance for round-trip propagation delay of the link in bits; moreover, it is one of the factors that determines when to trigger PAUSE.

Use the `no` parameter along with this command to unset PFC link delay allowance on an interface.

Command Syntax

```
priority-flow-control link-delay-allowance <0-4294967296>
no priority-flow-control link-delay-allowance
```

Parameter

`<0-4294967296>` Link characteristics that affect the link delay (for example, link length).

Command Mode

Interface mode

Default

Default value is zero.

Example

```
#configure terminal
(config)#interface eth1
(config-if)#priority-flow-control link-delay-allowance 5

(config)#interface eth1
(config-if)#no priority-flow-control link-delay-allowance
```

priority-flow-control mode

Use this command to enable Priority-based Flow Control (PFC) on an interface.

Us the `no` form of this command to disable PFC on an interface.

Command Syntax

```
priority-flow-control mode (on | auto)
no priority-flow-control
```

Parameters

`auto`	Negotiate ETS capabilities.
`on`	Force-enable ETS, overriding negotiation.

Command Mode

Interface mode

Default

PFC is disabled by default.

Example

```
#configure terminal
(config)#interface eth1
(config-if)#priority-flow-control mode auto
```

show priority-flow-control details

Use this command to display the PFC details for a specified interface or bridge. If you do not specify a bridge or interface, this commands shows statistics for the default bridge.

Command Syntax

```
show priority-flow-control details ((interface IFNAME)|(bridge <1-32>))
```

Parameters

IFNAME	Name of the input or output interface.
<1-32>	Specify a bridge ID.

Command Mode

Exec mode

Example

```
#show priority-flow-control details interface eth1
bridge : 2
priority flow control : on
interface : eth1

Admin Configuration
mode  advertise willing   cap   link        priorities
                                delay
                                allowance
================================================================================
on    on        off       5     128         2 3 4 5

Operational Configuration
state cap   link        priorities
            delay
            allowance
================================================================================
on    5     128         2 3 4 5
```

show priority-flow-control statistics

Use this command to display statistics about the number of PFC Pause frames sent and received for a specified interface or bridge. If you do not specify a bridge or interface, this commands shows statistics for the default bridge.

Command Syntax

```
show priority-flow-control statistics ((interface IFNAME)| (bridge <1-32>))
```

Parameters

`bridge`	Specify a bridge group command.
`interface`	Name of the input or output interface.

Command Mode

Exec mode

Example

```
#show priority-flow-control statistics interface eth1
bridge : 2
interface : eth1
pause sent     pause received
================================
5968061499624837205834574861
```

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