



ZebOS-XP®

Network Platform

Version 1.4

Extended Performance

**Edge Virtual Bridging
Command Reference**

December 2015

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Preface

This document describes the ZebOS-XP commands for Edge Virtual Bridging (EVB).

Audience

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

Conventions

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

Table P-1: Conventions

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

Contents

This document contains these chapters and appendices:

- [Chapter 1](#), *Command Line Interface*
- [Chapter 2](#), *Edge Virtual Bridging Commands*

Related Documents

The following guides are related to this document:

- *Edge Virtual Bridging Developer Guide*
- *Edge Virtual 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	<code>show evb ecp statistics</code>
lowercase	Keywords that you enter exactly as shown in the command syntax.	<code>show evb ecp statistics</code>
UPPERCASE	See Variable Placeholders	<code>IFNAME</code>
()	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.	<code>(A.B.C.D <0-4294967295>)</code>
()	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.	<code>(A.B.C.D <0-4294967295>)</code>
()	Optional parameter which you can specify or omit. Do not enter the parentheses or vertical bar as part of the command.	<code>(IFNAME)</code>
{ }	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.	<code>{intra-area <1-255> inter-area <1-255> external <1-255>}</code>
[]	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.	<code>[<1-65535> AA:NN internet local-AS no-advertise no-export]</code>
.	Repeatable parameter. The parameter that follows a period can be repeated more than once. Do not enter the period as part of the command.	<code>set as-path prepend .<1-65535></code>

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: <code>eth0</code> , <code>Ethernet0</code> , <code>ethernet0</code> , <code>xe0</code>
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 redisplay 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 <i>view</i> 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 <code>show</code> , <code>exit</code> , <code>quit</code> , <code>help</code> , <code>list</code> , and <code>enable</code> .
Privileged executive mode	Also called <i>enable</i> mode, in this mode you can run additional basic commands such as <code>debug</code> , <code>write</code> , and <code>show</code> .
Configure mode	Also called <i>configure terminal</i> mode, in this mode you can run configuration commands and go into other modes such as <code>interface</code> , <code>router</code> , <code>route map</code> , <code>key chain</code> , and <code>address family</code> .
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.

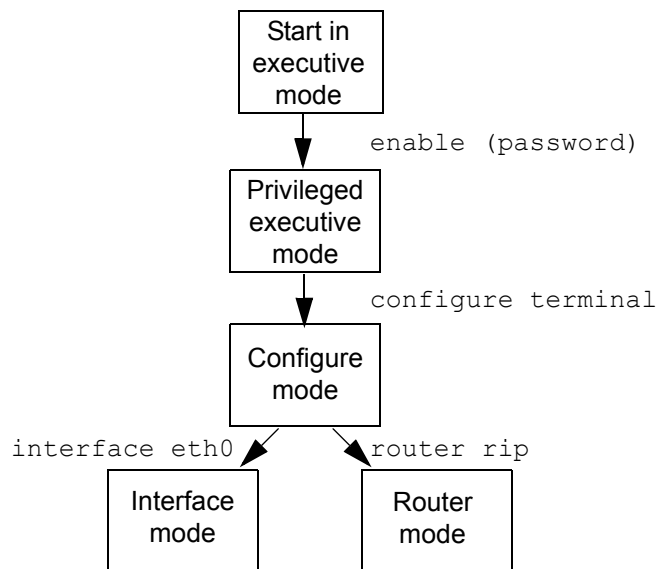


Figure 1-1: Common command modes

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 Edge Virtual Bridging Commands

This chapter describes the Edge Virtual Bridging (EVB) commands:

- [bridge protocol](#) on page 18
- [debug ecp](#) on page 19
- [evb bridge cdcp channel-capacity](#) on page 20
- [evb bridge cdcp svid-pool-range](#) on page 21
- [evb bridge ecp-acktimer](#) on page 22
- [evb bridge ecp-max-retry](#) on page 23
- [evb bridge resource-wait-delay](#) on page 24
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- [switchport mode sbp](#) on page 35
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bridge protocol

Use this command to make a bridge an Edge Virtual Bridge (EVB).

Command Syntax

```
bridge <1-32> protocol (svlan-evb | evb)
```

Parameters

<1-32>	Bridge identifier
svlan-evb	SVLAN-aware EVB
evb	EVB

Command Mode

Configure mode

Example

```
#configure terminal
(config)#bridge 16 svlan-evb
```

debug ecp

Use this command to display Edge Control Protocol (ECP) debugging information.

Use the `no` form of this command to stop debugging.

Command Syntax

```
debug ecp (events|packets|nsm|onm|vdp|all)
no debug ecp (events|packets|nsm|onm|vdp|all)
```

Parameters

events	Events
packets	Packets
nsm	NSM
onm	The <code>onmd</code> network management daemon
vdp	VDP (VSI Discovery and Configuration Protocol)
all	All

Command Mode

Configure mode

Example

```
#configure terminal
(config)#debug ecp all
```

evb bridge cdc channel-capacity

Use this command to set the number of CDCP (S-Channel Discovery and Configuration Protocol) channels.

Command Syntax

```
evb bridge <1-32> cdc channel-capacity <1-167>
```

Parameters

<1-32>	Bridge identifier
<1-167>	Number of CDCP channels

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#evb bridge 27 cdc channel-capacity 57
```

evb bridge cdcv svid-pool-range

Use this command to set the lowest and highest S-VIDs (Service VLAN identifiers) for assignment by CDCP (S-Channel Discovery and Configuration Protocol).

Command Syntax

```
evb bridge <1-32> cdcv svid-pool-range <2-4094> <2-4094>
```

Parameters

<1-32>	Bridge identifier
<2-4094>	Lowest and highest S-VIDs

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#evb bridge 14 cdcv svid-pool-range 256 512
```

evb bridge ecp-acktimer

Use this command to set the Edge Control Protocol (ECP) acknowledgment time.

Command Syntax

```
evb bridge <1-32> ecp-acktimer <10-20>
```

Parameters

<1-32>	Bridge identifier
<10-20>	Acknowledgment time

Command Mode

Configure mode

Examples

```
#configure terminal  
(config)#evb bridge 17 ecp-acktimer 15
```

evb bridge ecp-max-retry

Use this command to set the maximum number of Edge Control Protocol (ECP) retries.

Command Syntax

```
evb bridge <1-32> ecp-max-retry <0-7>
```

Parameters

<1-32>	Bridge identifier
<0-7>	Maximum number of retries

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#evb bridge 8 ecp-max-retry 3
```

evb bridge resource-wait-delay

Use this command to set the VDP (VSI Discovery and Configuration Protocol) resource wait delay.

Command Syntax

```
evb bridge <1-32> resource-wait-delay <0-31>
```

Parameters

<1-32>	Bridge identifier
<0-31>	Resource wait delay

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#evb bridge 3 resource-wait-delay 10
```

evb bridge tlv-mode

Use this command to set the TLV (type-length-value) transmission mode.

Command Syntax

```
evb bridge <1-32> tlv-mode (manual | auto)
```

Parameters

<1-32>	Bridge identifier
manual	Use the local configuration for EVB
auto	Determine the configuration by comparing the local and remote LLDP EVB objects

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#evb bridge 1 tlv-mode manual
```

evb bridge vdp-keep-alive

Use this command to set the VDP (VSI Discovery and Configuration Protocol) keep-alive time.

Command Syntax

```
evb bridge <1-32> vdp-keep-alive <0-31>
```

Parameters

<1-32>	Bridge identifier
<0-31>	Keep-alive time

Command Mode

Configure mode

Examples

```
#configure terminal  
(config)#evb bridge 14 vdp-keep-alive 16
```

evb cdcp

Use this command to enable or disable CDCP (S-Channel Discovery and Configuration Protocol).

Command Syntax

```
evb cdcp (enable|disable)
```

Parameters

enable	Enable CDCP
disable	Disable CDCP

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth1
(config-if)#evb cdcp disable
```

evb reflective-relay

Use this command to enable or disable reflective relay.

Command Syntax

```
evb reflective-relay (enable|disable)
```

Parameters

enable	Enable reflective relay
disable	Disable reflective relay

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#evb reflective-relay disable
```

evb-station

Use this command to configure an EVB station.

Command Syntax

```
evb-station max-retries <0-7> acktimer <10-20> rwd <0-31> rka <0-31> ref-relay  
(enable|disable)
```

Parameters

max-retries	Maximum number of Edge Control Protocol (ECP) retries
acktimer	ECP acknowledgment time
rwd	VDP (VSI Discovery and Configuration Protocol) resource wait delay
rka	VDP keep alive time
ref-relay	Whether to enable or disable reflective relay

Command Mode

Interface mode

Examples

```
#configure terminal  
(config)#interface eth3  
(config-if)#evb-station max-retries 5 acktimer 15 rwd 15 rka 15 ref-relay enable
```

set ecp

Use this command to enable or disable Edge Control Protocol (ECP).

Command Syntax

```
set ecp (enable|disable)
```

Parameters

enable	Enable ECP
disable	Disable ECP

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth3
(config-if)#set ecp disable
```

show evb ecp statistics

Use this command to display EVB Edge Control Protocol (ECP) statistics.

Command Syntax

```
show evb ecp statistics
```

Parameters

None

Command Mode

Privileged exec mode

Examples

```
#show evb ecp statistics
```

show evb interface

Use this command to display the EVB interface details.

Command Syntax

```
show evb interface IFNAME
```

Parameters

IFNAME	Interface name
--------	----------------

Command Mode

Privileged exec mode

Examples

```
#show evb interface eth1
```

show evb vdp vsi-info

Use this command to display run time information about the VSIs (Virtual Station Interfaces) learned on this station.

Command Syntax

```
show evb vdp vsi-info
```

Parameters

None

Command Mode

Privileged exec mode

Examples

```
#show evb vdp vsi-info
```

show evb-bridge

Use this command to display the EVB bridge details.

Command Syntax

```
show evb-bridge <1-32>
```

Parameters

<1-32>	Bridge identifier
--------	-------------------

Command Mode

Privileged exec mode

Examples

```
#show evb-bridge 14
```

switchport mode sbp

Use this command to make a switchport a Station-facing Bridge Port (SBP). Use SBP for the C-VLAN component that connects to an S-VLAN component. The bridge must be an `evb` type (see [bridge protocol](#)).

Command Syntax

```
switchport mode sbp
```

Parameters

None

Command Mode

Interface mode

Example

```
#configure terminal
(config)#interface eth0
(config-if)#switchport mode sbp
```

switchport mode uap

Use this command to make a switchport an Uplink Access Point (UAP). Use UAP for the port that connects to an EVB station. The bridge must be `svlan-evb` aware (see [bridge protocol](#)).

Command Syntax

```
switchport mode uap
```

Parameters

None

Command Mode

Interface mode

Example

```
#configure terminal
(config)#interface eth0
(config-if)#switchport mode uap
```

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