ZebOS-XP®
Network Platform

Version 1.4
Extended Performance

Shortest Path Bridging
Command Reference

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Preface

This document describes the ZebOS-XP commands for Shortest Path Bridging (SPB).

Audience

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

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, *SPB Configuration Commands*
- Chapter 3, *SPB Show Commands*

Related Documents

The following guides are related to this document:

- *Shortest Path Bridging Configuration Guide*
- *Shortest Path Bridging Developer Guide*
- *Installation Guide*
- *Carrier Ethernet Command Reference*
- *Carrier Ethernet Developer Guide*
- *Carrier Ethernet Configuration 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 bridge spb backbone`
`lowercase`	Keywords that you enter exactly as shown in the command syntax.	`show bridge spb backbone`
`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.

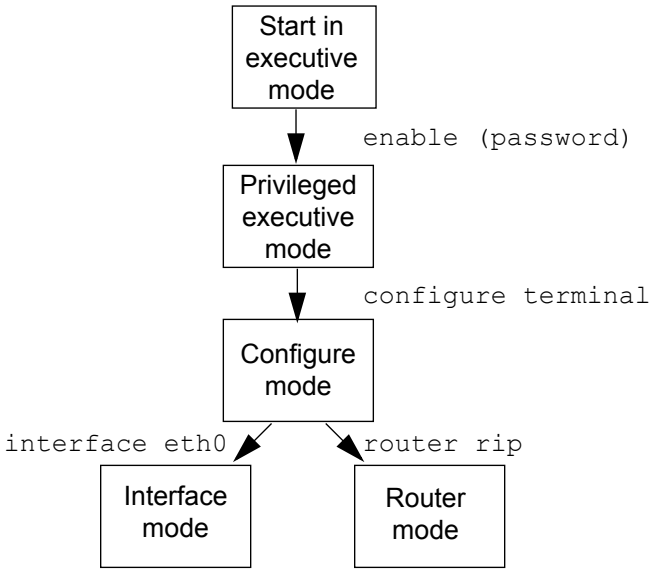

Figure 1-1: Common command modes

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 SPB Configuration Commands

This chapter provides a description, syntax, and examples for the Shortest Path Bridging configuration commands.

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- bridge instance vlan on page 20
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- isis-spb system-id on page 49
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- switchport beb customer-backbone on page 52

bridge agreement convention

Use this command to set the agreement protocol convention that specifies how to use a computed topology digest to determine whether:

- A neighboring switch is operating with identical network topology information
- Frames may be safely forwarded to the neighbor

Use the `no` form of this command to set the agreement protocol convention to its default (2).

Command Syntax

```
bridge (<1-32> | backbone) agreement convention id <1-3>
no bridge (<1-32> | backbone) agreement convention id
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`id`	Agreement protocol convention identifier:
`1`	No agreement matching: no action will be taken when the topology digest does not match.
`2`	Loop free both: the transmitter of the agreement digest does not forward traffic until the topology digest with the neighbor matches.
`3`	Loop free multicast only: the transmitter does not forward multicast traffic and allows all unicast traffic.

Default

The default agreement protocol convention is 2.

Command Mode

SPB mode

Example

```
(spb-config)#bridge 1 agreement convention id 1
```

bridge instance vlan

Use this command to map BVLANs (Backbone Virtual Local Area Networks) to an SPB area.

Note: The maximum number of BVLANs in the range that you can map is 16.

Use the `no` form of this command to remove a mapping.

Command Syntax

```
bridge (<1-32> | backbone) instance (spbm|spbv) vlan <1-4094> (to <1-4094>|) (((ect
  ECT-ID |) | (mtid MTID|)) | (ect ECT-ID  mtid MTID|))
no bridge (<1-32> | backbone) instance (spbm|spbv) vlan <1-4094> (to <1-4094> | )
  (ect ECT-ID | )(mtid MTID| )
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`instance`	Whether the instance is SPBM or SPBV:
`spbm`	Shortest Path Bridging MAC.
`spbv`	Shortest Path Bridging VID.
`vlan`	Starting VLAN.
`<1-4094>`	Backbone VLAN identifier.
`to`	Ending VLAN.
`<1-4094>`	Backbone VLAN identifier.
`ect`	Equal-cost tree algorithm.
`ECT-ID`	Equal-cost tree algorithm identifier. If not specified, the default is 1.
`1`	Low path ID: The selected path includes the bridge with the numerically lowest bridge identifier. When the bridge priority value is equal for two bridge identifiers, the lower system identifier determines the priority (0,1,2,3, ...).
`2`	High path ID: The selected path includes the bridge with the numerically lowest bridge identifier after masking 0xFF which reverses the bridge priority values. When the bridge priority value is equal for two bridge identifiers, the lower system identifier determines the priority (15,14,13, ...).
`mtid`	Multi-topology identifier.
`MTID`	Multi-topology identifier <3996-4095>. If not specified, the default is 0.

Command Mode

SPB mode

Example

```
#configure terminal
(config)#spb configuration
(config-spb)#bridge 16 instance spbm vlan 1000 to 1016 ect 2
```

bridge loop-mitigation

Use this command to enable or disable loop mitigation.

Command Syntax

```
bridge (<1-32> | backbone) loop-mitigation (enable|disable)
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`enable`	Enable loop mitigation.
`disable`	Disable loop mitigation.

Default

The default is that loop mitigation is disabled.

Command Mode

SPB mode

Example

```
(spb-config)#bridge 1 loop-mitigation enable
```

bridge loop-prevention

Use this command to enable or disable loop prevention.

Command Syntax

```
bridge (<1-32> | backbone) loop-prevention (enable|disable)
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`enable`	Enable loop prevention.
`disable`	Disable loop prevention.

Default

The default is that loop prevention is disabled.

Command Mode

SPB mode

Example

```
(spb-config)#bridge 1 loop-prevention enable
```

bridge protocol

Use this command to create a SPB bridge:

- Use the `bridge beb` form of this command to create a backbone edge bridge (BEB)
- Use the `bridge <1-32>` form of this command to create a backbone core bridge (BCB)

Use the `no` form of this command to delete a SPB bridge.

Command Syntax

```
bridge beb mac MAC backbone protocol (spb | spbm | spbv)
bridge <1-32> protocol (spb | spbm | spbv (((cvlan | svlan) (edge| )) | bcb))
no bridge (<1-32> | backbone)
```

Parameters

`MAC`	MAC address in `HHHH.HHHH.HHHH` format.
`<1-32>`	Bridge identifier.
`spb`	Shortest Path Bridging.
`spbm`	Shortest Path Bridging MAC.
`spbv`	Shortest Path Bridging VID.
`cvlan`	Customer VLAN.
`svlan`	Service VLAN.
`edge`	Edge bridge.
`bcb`	Backbone core bridge.

Command Mode

Configure mode

Example

```
(config)#bridge 1 protocol spbm
(config)#bridge beb mac 1111.1111.1111 backbone protocol spbm
(config)#bridge 1 protocol spbv cvlan
```

bridge spb enable

Use this command to enable or disable SPB on a bridge.

Command Syntax

```
bridge (<1-32> | backbone) spb enable
bridge (<1-32> | backbone) spb disable
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`enable`	Enable SPB on the bridge.
`disable`	Disable SPB on the bridge.

Command Mode

Configure mode

Example

```
(config)#bridge 1 spb enable
```

bridge spbv bvlan group-mac

Use this command to configure a group MAC address for a base VLAN.

Use the `no` form of this command to remove a group MAC address for a base VLAN.

Command Syntax

```
bridge (<1-32> | backbone) spbv bvlan <1-4094> group-mac G-MAC mode (rx|tx|rxtx) sr
  <0-2>
no bridge (<1-32> | backbone) spbv bvlan <1-4094> group-mac G-MAC
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`<1-4094>`	Base VLAN identifier.
`G-MAC`	Group MAC address in `HHHH.HHHH.HHHH` format.
`mode`	Whether to receive and/or transmit.
`rx`	Receive only.
`tx`	Transmit only.
`rxtx`	Both receive and transmit.
`<0-2>`	Service request value:
`0`	Not declared.
`1`	Forward all groups.
`2`	Forward all unregistered groups.

Command Mode

Configure mode

Example

```
(config)#bridge 1 spbv bvlan 47 group-mac 0180.C200.002E mode rxtx sr 1
```

bridge spbv bvlan spvid

Use this command to map a Shortest Path VLAN identifier (SPVID) to a base VLAN.

Use the `no` form of this command to unmap an SPVID from a base VLAN.

Command Syntax

```
bridge (<1-32> | backbone) spbv bvlan <1-4094> spvid <1-4094>
no bridge (<1-32> | backbone) spbv bvlan <1-4094>
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`bvlan`	Base VLAN.
`<1-4094>`	Base VLAN identifier.
`spvid`	Shortest Path VLAN.
`<1-4094>`	Shortest Path VLAN identifier.

Command Mode

SPB mode

Example

```
#configure terminal
(config)#spb configuration
(config-spb)#bridge 1 bvlan 1 spvid 10
```

bridge spbv mode

Use this command to set the Shortest Path VLAN identifier (SPVID) allocation mode.

Command Syntax

```
bridge (<1-32> | backbone) spbv mode (auto|manual)
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`auto`	Automatically allocate SPVIDs (default setting).
`manual`	Manually allocate SPVIDs.

Command Mode

SPB mode

Example

```
#configure terminal
(config)#spb configuration
(config-spb)#bridge 3 spbv mode manual
```

bridge spvid (alloc|dealloc)

Use this command to allocate and deallocate SPVIDs for the base VLAN in automatic mode, without disassociating SPBV from the base VLAN. This supports ECT migration in automatic allocation mode

Command Syntax

```
bridge (<1-32> | backbone) spvid (alloc|dealloc) bvlan <1-4094> (to <1-4094> |)
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`alloc`	Allocate the given SPVIDs.
`dealloc`	Deallocate the given SPVIDs.
`<1-4094>`	Starting and ending SPVID.

Command Mode

SPB mode

Example

```
#configure terminal
(config)#spb configuration
(config-spb)#bridge 2 spvid alloc bvlan 100 to 200
```

bridge spvid-pool

Use this command to set the Shortest Path VLAN identifier (SPVID) pool range.

The default SPVID pool range is <3600-3999>.

Use the no form of this command to reset the SPVID pool range to its default.

Command Syntax

```
bridge (<1-32> | backbone) spvid-pool <1-4094> to <1-4094>
no bridge (<1-32> | backbone) spvid-pool
```

Parameters

<1-32>	Bridge identifier.
backbone	Backbone bridge.
<1-4094>	Starting and ending SPVID.

Command Mode

SPB mode

Example

```
#configure terminal
(config)#spb configuration
(config-spb)#bridge 2 spvid-pool 100 to 200
```

bridge spsourceid

Use this command to set the shortest path source identifier. This identifier must be unique within an SPB area.

Use the `no` form of this command to set the identifier to its default value (0).

Command Syntax

```
bridge (<1-32> | backbone) spsourceid (<1-1048575> | auto)
no bridge (<1-32> | backbone) spsourceid
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`<1-1048575>`	The shortest path source identifier.
`auto`	Generate shortest path source identifier automatically.

Default

The default identifier is zero (0).

Command Mode

SPB mode

Example

```
(spb-config)#bridge 16 spsourceid 165
```

bridge-group spb path-cost

Use this command to set the path cost for an interface.

Use the `no` form of this command to reset the path cost to its default which depends on the bandwidth of the interface.

Command Syntax

```
bridge-group (<1-32> | backbone) instance spb path-cost <1-16777215> (mtid MTID| )
no bridge-group (<1-32> | backbone) instance spb path-cost (mtid MTID| )
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`<1-16777215>`	Path cost.
`mtid`	Multi-topology identifier.
`MTID`	Multi-topology identifier <3996-4095>. If not specified, then the default is 0.

Default

The default path cost depends on the bandwidth of the interface as defined in IEEE 802.1D - 2004.

Command Mode

Interface mode

Example

```
(config)#interface eth0
(config-if)#bridge-group 16 spb path-cost 630 mtid 4000
```

debug isis-spb

Use this command to turn on debugging.

Use the `no` form of this command to turn off debugging

Command syntax

```
debug isis-spb (all|protocol|packet-rx|packet-tx)
no debug isis-spb (all|protocol|packet-rx|packet-tx)
```

Parameters

`all`	Logs all ISIS-SPB levels.
`protocol`	Logs ISIS-SPB protocol changes.
`packet-rx`	Logs ISIS-SPB packets received.
`packet-tx`	Logs ISIS-SPB packets transmitted.

Default

By default, all options are turned off.

Command Mode

Privileged Exec mode

Configure mode

Examples

```
#debug isis-spb all
#debug isis-spb packet-tx
```

debug spb

Use this command to turn on debugging.

Use the `no` from of this command to turn off debugging

Command syntax

```
debug spb (all|info|debug|warn|protocol|packet-rx|packet-tx)
no debug spb (all|info|debug|warn|protocol|packet-rx|packet-tx)
```

Parameters

`all`	Log all SPB levels.
`info`	Logs SPB information level flags.
`debug`	Logs SPB debug level flags.
`warn`	Logs SPB warning level flags.
`protocol`	Logs SPB protocol changes.
`packet-rx`	Logs SPB packets received.
`packet-tx`	Logs SPB packets transmitted.

Default

By default, all options are turned off.

Command Mode

Privileged Exec mode and Configure mode

Examples

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

#configure terminal
(config)#debug spb packet-tx
```

ip vrf isid

Use this command to create a VRF (VPN routing/forwarding) instance associated with an I-SID (service instance identifier) that needs to advertise its routes over an SPB network.

Use the `no` form of this command to remove a VRF.

Command syntax

```
ip vrf WORD isid <1-16777214>
no ip vrf WORD
```

Parameters

`WORD`	VPN routing/forwarding instance name.
`<1-16777214>`	Service instance identifier.

Command Mode

Configure mode

Examples

```
#configure terminal
(config)#ip vrf vpn2 isid 2
```

ipvpn

Use this command to enable or disable IPVPN for SPB. When IPVPN is enabled, a VRF (VPN routing/forwarding instance) is identified by an I-SID (service instance identifier). IPVPN traffic within the SPB network uses the I-SID portion of the service instance tag (I-TAG) without a C-MAC header, called the short I-TAG.

Command syntax

```
ipvpn enable
ipvpn disable
```

Parameters

None

Default

By default, IPVPN is disabled.

Command Mode

SPB mode

Examples

```
#config terminal
#(config)spb configuration
#(config-spb)ipvpn enable
```

isis-spb configuration bridge

Use this command to enter ISIS-SPB mode to configure an ISIS-SPB bridge.

Command Syntax

```
isis-spb configuration bridge (<1-32> | backbone)
```

Parameters

`<1-32>`	Bridge identifier
`backbone`	Backbone bridge

Command Mode

Configure mode

Example

```
(config)#isis-spb configuration bridge 16
(isis-spb-config)#
```

isis-spb hello-interval

Use this command to set the time interval between hello transmissions.

Use the `no` form of this command to set the hello interval to its default (10 seconds).

Command Syntax

```
isis-spb hello-interval <1-65535> (level-1|level-2|)
isis-spb hello-interval minimal (level-1|level-2|)
no isis-spb hello-interval (level-1|level-2|)
no isis-spb hello-interval minimal (level-1|level-2|)
```

Parameters

`<1-65535>`	Specify the hello interval in seconds.
`minimal`	Specify the holding-time as 1 second; ZebOS-XP then calculates the hello interval by dividing by the hello-multiplier. For example, if the hello-multiplier is set to 4 and you specify this parameter, ZebOS-XP sends a hello PDU every 250 milliseconds. Set the hello multiplier with the isis-spb hello-multiplier command.
`level-1`	Specify the interval for level-1 IS-IS hellos.
`level-2`	Specify the interval for level-2 IS-IS hellos.

Default

By default, ZebOS-XP uses 10 seconds for the interval and the interval is applied to level-1.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#isis-spb hello-interval 5 level-1

(config)#interface eth0
(config-if)#isis-spb hello-interval minimal
```

isis-spb hello-multiplier

Use this command to set the multiplier for the hello holding time. The hello holding time is calculated by multiplying the hello interval by this value. Set the hello interval with the isis-spb hello-interval command.

Use the `no` form of this command to set the multiplier to its default (3).

Command Syntax

```
isis-spb hello-multiplier <2-100> (level-1|level-2|)
no isis-spb hello-multiplier (level-1|level-2|)
```

Parameters

`<2-100>`	Specify a hello multiplier value.
`level-1`	Specify the multiplier for level-1 IS-IS hellos.
`level-2`	Specify the multiplier for level-2 IS-IS hellos.

Default

By default, ZebOS-XP uses 3 for the multiplier and the multiplier is applied to level-1.

Command Mode

Interface mode

Example

```
#configure terminal
(config)#interface eth0
(config-if)#isis-spb hello-multiplier 4
```

isis-spb hostname

Use this command to set the name of the host for the SPB bridge.

Use the `no` form of this command to delete the host name.

Command Syntax

```
isis-spb hostname TAG_NAME
no isis-spb hostname
```

Parameters

`TAG_NAME`	The name of the host. The maximum length is 16 characters.

Command Mode

ISIS-SPB mode

Example

```
#config terminal
#(config)isis-spb configuration bridge backbone
#(isis-spb-config)isis-spb hostname BEB1
```

isis-spb ignore-lsp-errors

Use this command to ignore LSPs with checksum errors. By default, ZebOS-XP validates the checksum when it receives an LSP and if there is an error, the LSP is dropped.

Use the `no` form of this command to turn off this feature.

Command Syntax

```
isis-spb ignore-lsp-errors
no isis-spb ignore-lsp-errors
```

Parameters

None

Default

By default, the LSP checksum is checked on receipt.

Command Mode

ISIS-SPB mode

Example

```
(isis-spb-config)#isis-spb ignore-lsp-errors
```

isis-spb lsp-gen-interval

Use this command to set the interval before regenerating the same LSP. The smaller the interval, the faster the convergence. However, this setting can cause more frequent flooding.

Use the `no` form of this command to set the interval to its default (30 seconds).

Command Syntax

```
isis-spb lsp-gen-interval <1-120>
no isis-spb lsp-gen-interval
```

Parameters

`<1-120>`	Specify an LSP generation interval in seconds.

Default

By default, ZebOS-XP uses 30 seconds for the interval and the interval is applied to level-1.

Command Mode

ISIS-SPB mode

Example

```
(isis-spb-config)#isis-spb lsp-gen-interval 5
```

isis-spb lsp-interval

Use this command to set the interval between LSP transmissions. When flooding or some other event triggers LSP transmission, the LSP is scheduled to transmit at this interval.

Use the `no` form of this command to set LSP transmission interval to its default (33 milliseconds).

Command Syntax

```
isis-spb lsp-interval <1-4294967295>
no isis-spb lsp-interval
```

Parameters

`<1-4294967295>` Specify an LSP transmission interval in milliseconds.

Default

By default, ZebOS-XP uses 33 milliseconds for the interval.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#isis-spb lsp-interval 100

(config-if)#no isis-spb lsp-interval
```

isis-spb lsp-refresh-interval

Use this command to set the LSP refresh interval.

IP Infusion Inc. recommends making the `lsp-refresh-interval` smaller than `max-lsp-lifetime` value.

Use the `no` form of this command to set the interval to its default value (900 seconds).

Command Syntax

```
isis-spb lsp-refresh-interval <1-65535>
no isis-spb lsp-refresh-interval
```

Parameters

`<1-65535>`	Specify an LSP refresh interval in seconds.

Default

By default, the interval is 900 seconds.

Command Mode

ISIS-SPB mode

Examples

```
(isis-spb-config)#isis-spb lsp-refresh-interval 600
(isis-spb-config)#no isis-spb lsp-refresh-interval
```

isis-spb max-lsp-lifetime

Use this command to set the maximum LSP lifetime. You must set the `max-lsp-lifetime` greater than `lsp-refresh-interval`. The `max-lsp-lifetime` should be same across the topology.

Use the `no` form of this command to set the lifetime to its default (1200 seconds).

Command Syntax

```
isis-spb max-lsp-lifetime <350-65535>
no isis-spb max-lsp-lifetime
```

Parameters

`<350-65535>`	Specify an maximum LSP lifetime in seconds.

Default

By default, `max-lsp-lifetime` is set to 1200 seconds.

Command Mode

ISIS-SPB mode

Examples

```
(isis-spb-config)#isis-spb max-lsp-lifetime 1500
(isis-spb-config)#no isis-spb max-lsp-lifetime
```

isis-spb multi-topology-id

Use this command to set a mutli-topology identifier.

The multi-topology feature allows the devices in an SPB area to maintain several parallel logical views of the network topology. The devices exchange topology-specific link state advertisements describing the properties of each link.

Use the `no` form of this command to delete a mutli-topology identifier.

Command Syntax

```
isis-spb multi-topology-id MTID
no isis-spb multi-topology-id MTID
```

Parameters

`MTID`	Multi-topology identifier <3996-4095>.

Command Mode

ISIS-SPB mode

Examples

```
(isis-spb-config)#isis-spb multi-topology-id 4022
(isis-spb-config)#no isis-spb multi-topology-id 4022
```

isis-spb retransmit-interval

Use this command to set the LSP retransmission interval.

Use the `no` form of this command to set the interval to its default (5 seconds).

Command Syntax

```
isis-spb retransmit-interval <0-65535>
no isis-spb retransmit-interval
```

Parameters

`<0-65535>`	Specify the retransmission interval in seconds.

Default

By default, ZebOS-XP uses an interval of 5 seconds.

Command Mode

Interface mode

Examples

```
#configure terminal
(config)#interface eth0
(config-if)#isis-spb retransmit-interval 10

(config-if)#no isis-spb retransmit-interval
```

isis-spb set-overload-bit

Use this command to set the overload bit in self-LSPs to indicate that the originating device is overloaded. When the overload-bit is set, the device is not used as a transit or forwarding device during SPF calculation. The device continues to receive LSPs when the overload bit is set.

Use the `no` form of this command to clear the overload bit of self-LSPs.

Command Syntax

```
isis-spb set-overload-bit (mtid MTID | )
no isis-spb set-overload-bit (mtid MTID| )
```

Parameters

`mtid`	Multi-topology identifier.
`MTID`	Multi-topology identifier <3996-4095>. If not specified, the default is 0.

Default

By default, the overload-bit is not set.

Command Mode

ISIS-SPB mode

Example

```
(isis-spb-config)#isis-spb set-overload-bit mtid 3997
```

isis-spb spf-interval-exp

Use this command to set the minimum and maximum exponential backoff delay between receiving a topology change and calculating the Shortest Path First (SPF).

Use the `no` form of this command to set the minimum and maximum exponential backoff delays to their defaults.

Command Syntax

```
isis-spb spf-interval-exp <0-2147483647> <0-2147483647>
no isis-spb spf-interval-exp
```

Parameters

`<0-2147483647>`	Specify the minimum exponential backoff delay in milliseconds.
`<0-2147483647>`	Specify the maximum exponential backoff delay in milliseconds.

Default

By default, ZebOS-XP uses:

- 500 milliseconds for the minimum exponential backoff delay
- 50,000 milliseconds for the maximum exponential backoff delay

Command Mode

ISIS-SPB mode

Examples

```
(isis-spb-config)#isis-spb spf-interval-exp 600 60000
(isis-spb-config)#no isis-spb spf-interval-exp
```

isis-spb system-id

Use this command to set a network-wide unique identifier for the ISIS-SPB process.

Use the `no` form of this command to set the system identifier to its default value (zero).

Command Syntax

```
isis-spb system-id SYSTEM_ID
no isis-spb system-id
```

Parameters

`SYSTEM_ID`	Specify the system identifier in `XX.XX.XX.XX.XX.XX` format with 6 hexadecimal numbers separated by periods.

Default

By default, the system identifier is zero (0).

Command Mode

ISIS-SPB mode

Examples

```
(isis-spb-config)#isis-spb system-id 01.23.45.67.89.ab

(isis-spb-config)#no isis-spb system-id
```

spb configuration

Use this command to enter ISIS-SPB configuration mode.

Command Syntax

```
spb configuration
```

Parameters

None

Default

N/A

Command Mode

Configure mode

Examples

```
(config)#spb configuration
(spb-config)#
```

spb enable

Use this command to enable or disable SPB on an interface.

Command Syntax

```
spb enable
spb disable
```

Parameters

`enable`	Enable SPB on the interface.
`disable`	Disable SPB on the interface.

Command Mode

Interface mode

Example

```
#config terminal
(config)#interface eth1
(config-if)#spb enable
```

switchport beb customer-backbone

Use this command to map customer service instances (I-SIDs) to a backbone VLAN and set whether the I-SIDs can receive, transmit, or both transmit and receive.

See the *Carrier Ethernet Command Reference* for details about this command.

CHAPTER 3 SPB Show Commands

This chapter provides a description, syntax, and examples of the Shortest Path Bridging show commands.

- show bridge spb on page 54
- show isis-spb configuration on page 55
- show isis-spb fdb on page 56
- show isis-spb interface on page 57
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- show spb bridge vlan on page 62
- show spb service bridge on page 63
- show spbv bridge vid-translation-table on page 64

show bridge spb

Use this command to display the details of the SPB bridge. The output includes:

- B-MAC: the bridge MAC address
- Bridge_group_address: the address used as the B-DA (backbone destination address) for an incoming multicast frame
- System ID: unique identifier of a bridge in a given network
- Bridge_priority: the number that ranks this SPB bridge relative to others when breaking ties
- MCID: MST configuration identifier
- AUX-MCID: auxiliary MST configuration identifier
- SPSourceID: shortest path source ID; the number used as a part of each group address
- Agreement_digest_convention_id: the agreement rules being used (1-3)

Command Syntax

```
show bridge spb BRIDGE_NAME
```

Parameters

`BRIDGE_NAME` Bridge identifier: <1-32> or `backbone`.

Command Mode

Privileged Exec mode

Example

```
#show bridge spb backbone

Bridge details
--------------------------------

B-MAC              - aa.aa.88.88.aa.aa

Bridge_group_address - 01.80.c2.00.00.00

System ID          - 88.88.88.88.88.88

Bridge_priority    - 32768

MCID               - b762d0ab8ef9b34f2b346fc592d3969c

AUX_MCID           - b762d0ab8ef9b34f2b346fc592d3969c

SPSourceID         - 8888

Agreement_digest_convention_id - 2
```

show isis-spb configuration

Use this command to display the ISIS-SPB configuration.

Command Syntax

```
show isis-spb configuration
```

Parameters

None

Command Mode

Privileged Exec mode

Example

```
#show isis-spb configuration

Bridge Name:  backbone
lsp ignore errors:  no
lsp general interval(sec):  30
lsp refresh interval(sec):   900
maximum lsp lifetime(sec): 1200
spf interval exp(Minimum Delay in Milli Seconds):  500
spf interval exp(Maximim Delay in Milli Seconds):  50000
overload bit set: no
System Id:  8888.8888.8888
interface: eth1
hello-multiplier: 3
hello-interval(sec): 10
lsp-interval(millisec): 33
retransmit-interval(sec): 5
```

show isis-spb fdb

Use this command to display the ISIS-SPB forwarding database.

Command Syntax

```
show isis-spb fdb (unicast|multicast|)
```

Parameters

`unicast`	ISIS-SPB unicast forwarding database.
`multicast`	ISIS-SPB multicast forwarding database.

Command Mode

Privileged Exec mode

Example

```
#show isis-spb lsp fdb

SPB Forwarding Database:
[U - Unicast, M - Multicast]

  I/P INTERFACE  DESTINATION-ADDRESS  B-VID  O/P INTERFACE
  -------------  -------------------  -----  ------------
U if/**          aa.aa.88.88.bb.bb    4      if/eth1
U if/**          aa.aa.88.88.bb.bb    3      if/eth1
U if/**          aa.aa.88.88.bb.bb    2      if/eth1
U if/**          aa.aa.88.88.bb.bb    8      if/eth1
U if/**          aa.aa.88.88.bb.bb    6      if/eth1
U if/**          aa.aa.88.88.bb.bb    5      if/eth1
U if/**          aa.aa.88.88.bb.bb    7      if/eth1
U if/**          aa.aa.88.88.bb.bb    10     if/eth1
U if/**          aa.aa.88.88.bb.bb    9      if/eth1
U if/**          aa.aa.88.88.bb.bb    11     if/eth1
M if/00          03.44.1d.00.00.35    8      if/eth1
M if/00          03.44.1d.00.00.2a    8      if/eth1
M if/00          03.44.1d.00.00.14    8      if/eth1
M if/00          03.44.1d.00.00.48    8      if/eth1
M if/00          03.44.1d.00.00.e0    8      if/eth1
M if/00          03.44.1d.00.00.b8    8      if/eth1
M if/00          03.44.1d.00.00.7c    8      if/eth1
M if/00          03.44.1d.00.00.cc    8      if/eth1
M if/00          03.44.1d.00.00.92    8      if/eth1
M if/00          03.44.1d.00.00.01    8      if/eth1
Number of Unicast Records: 10
Number of Multicast Records: 908
```

show isis-spb interface

Use this command to display the ISIS-SPB interface status and configuration.

Command Syntax

```
show isis-spb interface (IFNAME | )
```

Parameters

IFNAME	Interface name.

Command Mode

Privileged Exec mode

Example

```
#show isis-spb interface eth1

interface:                eth1
hello-multiplier:         3
hello-interval(sec):      10
lsp-interval(millisec):   33
retransmit-interval(sec): 5
```

show isis-spb lsp

Use this command to display the ISIS-SPB LSP database information.

Command Syntax

```
show isis-spb lsp (details|)
```

Parameters

`details`	Show LSP TLV and sub TLV.

Command Mode

Privileged Exec mode

Example

```
#show isis-spb lsp

ISIS Link State Database
------------------------
LSP ID                 LSP Seq Num   LSP Checksum     LSP Hold Time    OL Flag
------                 -----------   ------------     -------------    -------
Bridge Instance: 4092
8888.8888.8888.00-00*   0x00000018     0xA5A1           680              0
8888.8888.8888.00-01*   0x00000017     0x93CF           622              0
8989.8989.8989.00-00    0x00000012     0x9684           1096             0
8989.8989.8989.00-01    0x00000012     0x6F6A           1100             0
Total numer of LSP(s): 4
```

show isis-spb neighbors

Use this command to display ISIS-SPB neighbor adjacencies.

Command Syntax

```
show isis-spb neighbors
```

Parameters

None

Command Mode

Privileged Exec mode

Example

```
#show isis-spb neighbors

System Id      Interface   SNPA            State  Holdtime  Type Protocol
---------      ---------   ----            -----  --------  ---- --------
8989.8989.8989 eth1        0800.2796.611c  Up     16         L1  IS-IS

Total Number of Neighbor(s): 1
```

show isis-spb topology

Use this command to display ISIS-SPB paths to intermediate systems.

Command Syntax

```
show isis-spb topology
```

Parameters

None

Command Mode

Privileged Exec mode

Example

```
#show isis-spb topology

IS-IS paths to level-1 bridges

System Id           Metric     Next-Hop             Interface   SNPA
8888.8888.8888      --
8989.8989.8989      20000      8989.8989.8989       eth1        0800.2796.611c
```

show spb adjacency

Use this command to display adjacencies established with other bridges.

Command Syntax

```
show spb adjacency interface IF_NAME (static|dynamic| ) (mtid (0|MTID)| )
```

Parameters

IF_NAME	Interface name.
static	Static parameters: path cost and administrative state.
dynamic	Dynamic parameters: system identifier, agreement digest, MST configuration identifier (MCID), and auxiliary MCID.
mtid	Multi-topology identifier. If this parameter is not specified, the default is 0.
0	Multi-topology identifier 0.
MTID	Multi-topology identifier <3996-4095>.

Command Mode

Privileged Exec mode

Example

```
#show spb adjacency interface eth1 dynamic

NEIGHBOUR DETAILS
---------------------
Sys_id            - 89.89.89.89.89.89

Agreement digest  - 000000000019b78e10b609f96d2b7c9c36527f65

MCID
Conf Digest       - b762d0ab8ef9b34f2b346fc592d3969c

AUX_MCID
Conf Digest       - b762d0ab8ef9b34f2b346fc592d3969c

#show spb adjacency interface eth1 static

Path_cost    - 20000
Admin_state  - UP
```

show spb bridge vlan

Use this command to display details of the VLANs associated with the SPB area.

Command Syntax

```
show spb bridge (<1-32> | backbone) instance (spbm|spbv) vlan (<1-4094> | ) (mtid (0
  | MTID) |)
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`instance`	Whether the instance is SPBM or SPBV:
`spbm`	Shortest Path Bridging MAC.
`spbv`	Shortest Path Bridging VID.
`<1-4094>`	VLAN identifier. If you do not specify this parameter, the command displays information for all VLANs related to the SPB area.
`mtid`	Multi-topology identifier. If this parameter is not specified, the default is 0.
`0`	Multi-topology identifier 0.
`MTID`	Multi-topology identifier <3996-4095>.

Command Mode

Privileged Exec mode

Example

```
#show spb bridge 16 instance spbm vlan 32

vid     Spb_mode    ISID  Assigned_ISID  Used_ISID  Ingress_chk_failure_cnt
4       SPBM        168        Yes         Used               0
                    80         Yes         Used               0
                    36         Yes         Used               0

2       SPBM        166        Yes         Used               0
                    78         Yes         Used               0
```

show spb service bridge

Use this command to display information for I-SIDs or MTIDs associated to the SPB area.

Command Syntax

```
show spb service bridge (<1-32> | backbone) (isid <1-16777214>|mtid (0|MTID)| )
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`<1-16777214>`	Instance service identifier. If you do not specify this parameter, the command displays information for all I-SIDs related to the SPB area.
`mtid`	Multi-topology identifier. If this parameter is not specified, the default is 0.
`0`	Multi-topology identifier 0.
`MTID`	Multi-topology identifier <3996-4095>.

Command Mode

Privileged Exec mode

Example

```
#show spb service bridge backbone

ISID  B-vid     ISID_MODE
-------------------------------------------------

168   4         Transreciever
80    4         Transreciever
36    4         Transreciever
14    4         Transreciever
```

show spbv bridge vid-translation-table

Use this command to display the ingress and egress VID translation table.

Command Syntax

```
show spbv bridge (<1-32> | backbone) vid-translation-table (ingress|egress|)
```

Parameters

`<1-32>`	Bridge identifier.
`backbone`	Backbone bridge.
`ingress`	Ingress VID translation table.
`egress`	Egress VID translation table.

Command Mode

Privileged Exec mode

Example

```
#show spbv bridge 5 vid-translation-table ingress
```

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