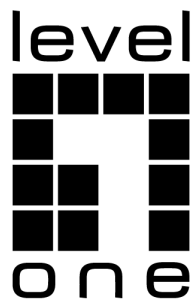# STP Configuration Commands

level
one

Table of Contents

Chapter 1 **STP Configuration Commands**

1.1 SSTP Configuration Commands

1.1.1 spanning-tree

Syntax

spanning-tree

no spanning-tree

To enable the default STP mode, run **spanning-tree**; to disable the STP, run **no spanning-tree**.

Enable or disable STP in interface configuration mode.

Parameter

None

Default

Enable RSTP mode by default.

Usage guidelines

None

Command Mode

Global configuration mode

Physical port or aggression port configuration mode.

Example

None

1.1.2 spanning-tree mode sstp

- 2 -

Syntax

spanning-tree mode sstp

no spanning-tree mode

To switch between RSTP and SSTP modes, use the **spanning-tree mode** command. To return to the default settings, use the no form of this command.

Parameter

None

Default

RSTP

Usage guidelines

None

Command Mode

Global configuration

Example

The following command shows how to enable SSTP mode:

Switch(config)# spanning-tree mode sstp
Switch(config)#

1.1.3 spanning-tree sstp priority

Syntax

To set the sstp bridge priority, use the spanning-tree sstp priority command. To return to the default settings, use the no form of this command.

spanning-tree sstp priority *value*

no spanning-tree sstp priority

Parameter

Parameter	Description
value	Value is from 0 to 61440.

Default

32768

Usage Guidelines

When setting the priority value, you can make the node as the root of the spanning tree. The configuration value takes 4096 as a step and its value is the multiple of 4096. The configurable values are 0, 4096, 8192, 3*4096, 4*4096, …and 15*4096.

Command mode

Global configuration

Example

This example shows how to set the SSTP priority to 4096:

Switch(config)# spanning-tree sstp priority 4096
Switch(config)#

1.1.4 spanning-tree sstp hello-time

Syntax

To set the hello-time delay timer, use the spanning-tree sstp hello-time command. To return to the default settings, use the no form of this command.

spanning-tree sstp hello-time *time*

no spanning-tree sstp hello-time

Parameter

Parameter	Description
time	Number of seconds to set the hello-time delay timer; valid values are from 1 to 10 seconds.

Default

2s

Usage Guidelines

The hello-time configured by the local OLT is valid only when the local OLT is the root OLT.

Command mode

Global configuration

Example

The following example sets the SSTP hello-time to 8 seconds:

```
Switch(config)# spanning-tree sstp hello-time 8
Switch(config)#
```

1.1.5 spanning-tree sstp max-age

Syntax

To set the SSTP max-age timer, use the spanning-tree sstp max-age command. To return to the default settings, use the no form of this command.

spanning-tree sstp max-age *time*

no spanning-tree sstp max-age

Parameter

Parameter	Description
seconds	Number of seconds to set the max-age timer; valid values are from 6 to 40 seconds.

Default

20s

Usage Guidelines

None

Command mode

Global configuration

Example

This example shows how to set the max-age timer to 24 seconds:

Switch(config)# spanning-tree sstp max-age 24

Switch(config)#

1.1.6 spanning-tree sstp forward-time

Syntax

To set the forward-delay timer, use the spanning-tree sstp forward-time command in global configuration mode. To return to the default settings, use the no form of this command.

spanning-tree sstp forward-time *time*

no spanning-tree sstp forward-time

Parameter

Parameter	Description
time	Number of seconds to set the forward-delay timer; valid values are from 4 to 30 seconds.

Default

15 seconds

Usage Guidelines

None

Command mode

Global configuration

Example

The following example shows how to set forward delay timer to 20 seconds:

Switch(config)# spanning-tree sstp forward-time 20

Switch(config)#

1.1.7 spanning-tree sstp cost

Syntax

To set the path cost of the interface for SSTP calculations, use the spanning-tree sstp cost command in interface configuration mode. To return to the default value, use the no form of this command.

spanning-tree sstp cost *value*

no spanning-tree sstp cost

Parameter

Parameter	Description
value	Path cost. Valid values are from 1 to 65535

Default

10M Ethernet:100 .

100M Ethernet: 19 .

1000M Ethernet: 4 .

2.5G Ethernet: 2.

10G Ethernet: 2.

40G Ethernet: 2.

Usage Guidelines

None

Command mode

Interface configuration

Example

This example shows how to set a path cost value of 100 for the spanning tree VLAN associated with the interface G0/0/1:

Switch (config-g0/0/1)#spanning-tree sstp cost 100
Switch(config-g0/0/1)#

1.1.8 spanning-tree cost

Syntax

To set the path cost of the interface for Spanning Tree Protocol (STP) calculations, use the spanning-tree cost command in interface configuration mode. To return to the default value, use the no form of this command.

spanning-tree cost *value*

no spanning-tree cost

Parameter

Parameter	Description
value	Path cost; valid values are from 1 to 200000000

Default

The default path cost is computed from the bandwidth setting of the interface.

Usage Guidelines

The configuration result of this command is valid to all spanning-tree modes. In STP mode, the path cost of all VLAN spanning-trees on the interface will be updated. In MSTP mode, the path cost of all spanning-tree examples will be updated.

But the configuration result of the command will not influence the independent configuration in various modes. For example, the OLT respectively configured with the spanning-tree sstp cost 100 and the spanning-tree cost 110 in SSTP mode, the port priority will be 100.

Command mode

Interface configuration

Example

This example shows how to set a path cost value of 24 for the spanning tree VLAN associated with the interface g0/0/1:

Switch (config-g0/0/1) # spanning-tree cost 24
Switch (config-g0/0/1) #

1.1.9 spanning-tree sstp port-priority

Syntax

To set the priority value in SSTP mode, use the spanning-tree sstp port-priority command. Use the no form of this command to restore the default value.

spanning-tree sstp port-priority *value*

no spanning-tree sstp port-priority

parameter

Parameter	Description
value	Port priority. Value is from 0 to 240.

Default

128 (0x80)

Usage Guidelines

The port priority must be set in increments of 16 only.

Command mode

Interface configuration

Example

The following example sets 32 as the priority value on interface g0/0/1:

Switch (config-g0/0/1) # spanning-tree sstp port-priority 32
Switch (config-g0/0/1) #

1.1.10   spanning-tree port-priority

Description

To prioritize an interface when two bridges compete for position as the root bridge, use the spanning-tree port-priority command. The priority you set breaks the tie. To return to the default value, use the no form of this command.

spanning-tree port-priority *value*

no spanning-tree port-priority

Parameter

Parameter	Description
value	Port priority. Value is from 0 to 240. Step: 16

default

Port priority value is 128

Usage Guidelines

The configuration result of this command is valid to all spanning-tree modes. In STP mode, the priority of all VLAN spanning-trees on the interface will be updated. In MSTP mode, the priority of all spanning-tree examples will be updated.

But the configuration result of the command will not influence the independent configuration in various modes. For example, the OLT respectively configured with the spanning-tree sstp port-priority 128 and the spanning-tree port-priority 48 in SSTP mode, the port priority will be 128.

Command mode

Interface configuration

example

The following example shows how to set the priority value to g0/0/1:

Switch (config-g0/0/1) #spanning-tree port-priority 16
Switch (config-g0/0/1) #

1.1.11   show spanning-tree

Syntax

To display spanning-tree information for the specified spanning-tree instances, use the show spanning-tree command.

show spanning-tree [**detail** | **interface** *intf-i*]

Parameter

Parameter	Description
intf-i	Interface name, for instance, G0/0/1.

Default

None

Usage Guidelines

Show spanning-tree state.

Command mode

EXEC/Global configuration/Interface configuration

Example

Switch (config) #show spanning-tree

Spanning tree enabled protocol SSTP

SSTP
  Root ID   Priority   32768
             Address   00E0.0FCC.F775
             This bridge is the root
             Hello Time 2 sec   Max Age 20 sec   Forward Delay 15 sec

  Bridge ID Priority   32768
             Address   00E0.0FCC.F775
             Hello Time 2 sec   Max Age 20 sec   Forward Delay 15 sec

Interface   Role Sts Cost   Pri.Nbr Type
---------------- ---- --- --------- ------- --------------------------------
G0/0/1   Desg FWD 19   128.16   P2p

      Switch (config) #

1.1.12   spanning-tree management trap

Syntax

To enable STP Trap, run command **spanning-tree management trap** [**newroot** | **topologychange**]. To return to the default value, use the no form of this command.

[no] spanning-tree management trap [**newroot** | **topologychange**]

Parameter

Parameter	Description
newroot	newRoot Trap type
topologychange	topologyChange Trap type

Default

STP Trap is not enabled.

Usage guidelines

None

Command mode

Global configuration

Example

None

1.2 VLAN STP Configuration Commands

1.2.1 spanning-tree mode pvst

Syntax

spanning-tree mode pvst

no spanning-tree mode

To enable STP modes, use the **spanning-tree mode pvst** command. To disable all STP modes, use the no form of this command.

Parameter

None

Default

RSTP mode

Usage guidelines

None

Example

The following command shows how to enable PVST in switch.

Switch (config) # spanning-tree mode pvst
Switch (config) #

1.2.2   spanning-tree vlan

Syntax

spanning-tree vlan *vlan-list*

no spanning-tree vlan *vlan-list*

To configure a STP instance for a specified VLAN, use **spanning-tree vlan** *vlan-list* command. To remove the specified spanning-tree vlan, use no form of the command.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.

Default

Switch can configure spanning-tree for a certain number of VLAN. In default mode, the exceeded VLAN will be prohibited.

Usage guidelines

None

Command Mode

Global configuration mode

Example

The following command shows how to remove the spanning-tree of VLAN10, 11, 15-19, and configure the spanning-tree for VLAN 40-50:

Switch (config) #no spanning-tree vlan 10,11,15-19
Switch (config) #spanning-tree vlan 40-50

Switch (config) #

1.2.3 spanning-tree vlan priority

Syntax

spanning-tree vlan *vlan-list* **priority** *value*

no spanning-tree vlan *vlan-list* **priority**

Use the command to configure the bridge priority value for the spanning-tree in specified VLAN.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.
value	Priority values, ranging from 0 to 61440, step: 4096

Default

In default mode, the bridge priority value of the spanning-tree VLAN is 32768 plus VLAN number.

Usage guidelines

None

Command Mode

Global configuration mode

Example

The following command shows how to configure the bridge priority value of VLAN1-3, 5-10 to 4096:

Switch (config) #spanning-tree vlan 1-3,5-10 priority 4096
Switch (config) #

1.2.4 spanning-tree vlan forward-time

Syntax

spanning-tree vlan *vlan-list* **forward-time** *value*

no spanning-tree vlan *vlan-list* **forward-time**

To set the Forward DelayParameter of the specified spanning-tree vlan, use **spanning-tree vlan** *vlan-list* **forward-time** *value* command. To return to the default settings, use the no form of this command.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.
value	Forward-Delay value, ranging from 4s to 30s. The default value is 15s.

Default

All VLAN Forward Delay is 15s.

Usage guidelines

None

Command Mode

Global configuration mode

Example

The following command shows how to configure the Forward Delay of VLAN1-3, 5-10 to 19s:

Switch (config) #spanning-tree vlan 1-3,5-10 forward-time 19
Switch (config) #

1.2.5 spanning-tree vlan max-age

Syntax

spanning-tree vlan *vlan-list* **max-age** *value*

no spanning-tree vlan *vlan-list* **max-age**

To set the Max AgeParameter of the specified spanning-tree vlan, use **spanning-tree vlan** *vlan-list* **max-age** *value* command. To return to the default settings, use the no form of this command.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.
value	max-age value, ranging from 6s to 40s. Its default value is 20s.

Default

All VLAN Max Age is 20s.

Usage guidelines

None

Command Mode

Global configuration mode

Example

The following command shows how to configure the Max Age of VLAN1-3, 5-10 to 19s:

Switch (config) #spanning-tree vlan 1-3,5-10 max-age 19
Switch (config) #

1.2.6　spanning-tree vlan hello-time

Syntax

spanning-tree vlan *vlan-list* **hello-time** *value*

no spanning-tree vlan *vlan-list* **hello-time**

To set the hello-timeParameter of the specified spanning-tree vlan, use **spanning-tree vlan *vlan-list* hello-time *value*** command. To return to the default settings, use the no form of this command.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.
value	hello-time value, ranging from 1s to 10s. Its default value is 2s.

Default

All VLAN Hello-Time is 2s.

Usage guidelines

None

Command Mode

Global configuration mode

Example

The following command shows how to configure the Hello Time of VLAN1-3, 5-10 to 9s:

Switch (config) #spanning-tree vlan 1-3,5-10 hello-time 9
Switch (config) #

1.2.7   spanning-tree vlan cost

Syntax

spanning-tree vlan *vlan-list* **cost** *value*

no spanning-tree vlan *vlan-list* **cost**

To set the path cost of the interface for Spanning Tree Protocol (STP), use the **spanning-tree vlan *vlan-list* cost *value*** command. To return to the default value, use the no form of this command.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.
value	The path cost of the interface rangings from 1 to 65535.

Default

The path cost depends on the connection rate of the port.

The path cost value of 10M Ethernet is 100.

The path cost value of 100M Ethernet is 19.

The path cost value of 1000M Ethernet is 4.

The path cost value of 2.5G Ethernet is 2.

The path cost value of 10G Ethernet is 2.

The path cost value of 40G Ethernet is 2.

Usage guidelines

None

Command Mode

Interface configuration mode

Example

The following command shows how to configure the path cost of VLAN1-3, 5-10 in the interface G0/0/1 to 100:

Switch (config-g0/0/1) #spanning-tree vlan 1-3,5-10 cost 100

Switch (config-g0/0/1) #

1.2.8   spanning-tree vlan port-priority

Syntax

spanning-tree vlan *vlan-list* **port-priority** *value*

no spanning-tree vlan *vlan-list* **port-priority**

To set the interface priority for Spanning Tree Protocol (STP), use the **spanning-tree vlan *vlan-list* port-priority *value*** command. To return to the default value, use the no form of this command.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.
value	Interface priority, ranging from 0 to 240, step: 16.

Default

128

Usage guidelines

None

Command Mode

Interface configuration mode

Example

The following command shows how to configure the priority of VLAN1-3, 5-10 in the interface G0/0/1 to 32:

Switch (config-g0/0/1) #spanning-tree vlan 1-3,5-10 port-priority 32
Switch (config-g0/0/1) #

1.2.9   show spanning-tree vlan

Syntax

show spanning-tree vlan *vlan-list* [**detail**]

Use the command to check the spanning-tree status of the specified VLAN.

Parameter

Parameter	Description
vlan-list	VLAN number list, such as: 1,2,3-10,15.
detail	Displays the detailed information.

Default

None

Usage guidelines

None

Command Mode

EXEC, global configuration mode or interface configuration mode

Example

The following examples to check the spanning-tree of vlan 1-2:

Switch (config) #show spanning-tree vlan 1-2

Spanning tree enabled protocol PVST

VLAN0001
  Root ID   Priority   32769
             Address   00E0.0FCC.F775
             This bridge is the root
             Hello Time 2 sec   Max Age 20 sec   Forward Delay 15 sec

  Bridge ID   Priority   32769
             Address   00E0.0FCC.F775
             Hello Time 2 sec   Max Age 20 sec   Forward Delay 15 sec

Interface   Role Sts Cost   Pri.Nbr Type
--------------- ---- --- -------- ------- ------------------------------
G0/0/1   Desg FWD 19   128.1   P2p

VLAN0002
  Root ID   Priority   32770
             Address   00E0.0FCC.F775
             This bridge is the root
             Hello Time 2 sec   Max Age 20 sec   Forward Delay 15 sec

  Bridge ID   Priority   32770
             Address   00E0.0FCC.F775
             Hello Time 2 sec   Max Age 20 sec   Forward Delay 15 sec

Interface   Role Sts Cost   Pri.Nbr Type
--------------- ---- --- -------- ------- ------------------------------
G0/0/1   Desg FWD 19   128.1   P2p

Switch (config) #

1.2.10   show spanning-tree pvst instance-list

Syntax

show spanning-tree pvst instance-list

Use the command to check how the PVST instance corresponds to the VLAN.

Parameter

> None

Default

> None

Usage guidelines

> None

Command Mode

> EXEC, global configuration mode or interface configuration mode

Example

> None

Chapter 2 **RSTP Configuration Commands**

2.1 RSTP Configuration Commands

2.1.1   spanning-tree mode rstp

Syntax

spanning-tree mode rstp

no spanning-tree mode

To enable the RSTP function, run spanning-tree mode rstp. To disable the RSTP, run no spanning-tree mode.

Parameter

None

Default

RSTP is enabled.

Usage Guidelines

None

Example

The following command shows how to enable rstp on switch.

Switch (config) # spanning-tree mode rstp
    Switch (config) #

2.1.2   spanning-tree rstp forward-time

Syntax

spanning-tree rstp forward-time *time*

no spanning-tree rstp forward-time

To configure the forwarding delay of RSTP, run **spanning-tree rstp forward-time** *time*. To resume the default forwarding delay of RSTP, run **no spanning-tree rstp forward-time**.

Parameter

Parameter	Description
time	Time of the forwarding delay whose value ranges between 4 and 30 seconds.

Default

15s

Usage Guidelines

None

Example

The following example shows how to set the forwarding delay of RSTP to 20 seconds.

Switch (config) # spanning-tree rstp forward-time 20
    Switch (config) #

2.1.3 spanning-tree rstp hello-time

Syntax

spanning-tree rstp hello-time *time*

no spanning-tree rstp hello-time

To configure the update interval of RSTP, run **spanning-tree rstp hello-time** *time*. To resume the default update interval of RSTP, run **no spanning-tree rstp hello-time**.

Parameter

Parameter	Description
time	Update interval. The value ranges: 1-10s.

Default

2s

Usage Guidelines

The Hello-Time configured on the local switch validates only when the local switch runs as a root switch.

Example

The following example shows how to set the update interval of RSTP to 8 seconds.

Switch (config) # spanning-tree rstp hello-time 8
    Switch (config) #

2.1.4 spanning-tree rstp max-age

Syntax

spanning-tree rstp max-age *time*

no spanning-tree rstp max-age

To configure the maximum lifespan of the RSTP BPDU, run **spanning-tree rstp max-age time**. To resume the default interval time, run **no spanning-tree rstp max-age**.

Parameter

Parameter	Description
time	Maximum interval of the lifespan. Value ranges: 6-40s.

Default

20s

Usage Guidelines

None

Example

The following example shows how to set the maximum lifespan of RSTP to 24 seconds.

Switch (config) # spanning-tree rstp max-age 24
    Switch (config) #

2.1.5 spanning-tree rstp priority

Syntax

spanning-tree rstp priority *value*

no spanning-tree rstp priority

To configure the RSTP priority value, run **spanning-tree rstp priority *value***. To resume the default value of the RSTP priority value, run **no spanning-tree rstp priority**.

Parameter

Parameter	Description
value	Priority level of the bridge. The value ranges: 0-61440, step 4096.

Default

32768

Usage Guidelines

None

Example

The following example shows how to configure the priority level of the brigde of rstp to 4096.

Switch (config) # spanning-tree rstp priority 4096
Switch (config) #

2.1.6 spanning-tree rstp cost

Syntax

To configure the path cost of a port, run **spanning-tree rstp cost value**. To resume the default value, run **no spanning-tree rstp cost**.

spanning-tree rstp cost *value*

no spanning-tree rstp cost

Parameter

Parameter	Description
value	Value of the path cost. The value ranges: 1-200000000.

Default

The path cost depends on the connection rate of the port.

100 Mbps: 200000

1000 Mbps: 20000

2500Mbps:8000

10Gbps:2000

40Gbps:500

Usage Guidelines

None

Example

The following example shows how to set the path cost of port g0/0/1 to 24:

Switch (config-g0/0/1) # spanning-tree rstp cost 24
Switch (config-g0/0/1) #

2.1.7 spanning-tree rstp port-priority

Syntax

To configure the priority level of a port, run **spanning-tree rstp port-priority** *value*. To resume the default value, run **no spanning-tree rstp port-priority**.

spanning-tree rstp port-priority *value*

no spanning-tree rstp port-priority

Parameter

Parameter	Description
value	Priority level of a port. The value ranges: 0-240, step 16.

Default

128

Usage Guidelines

None

Example

The following example shows how to set the path cost of port g0/0/1 to 16:

Switch (config-g0/0/1) # spanning-tree rstp port-priority 16
    Switch (config-g0/0/1) #

2.1.8   spanning-tree rstp edge

Syntax

To configure the edge port, run **spanning-tree rstp edge**. To return to the default setting, run **no spanning-tree rstp edge**.

spanning-tree rstp edge

no spanning-tree rstp edge

Parameter

None

Default

Automatic check

Usage Guidelines

None

Command Mode

Interface configuration

Example

None

2.1.9 spanning-tree rstp point-to-point

Syntax

To set the point-to-point connection of a port to force-truce, force-false or auto, run this command.

spanning-tree rstp point-to-point [force-true | force-false | auto]

Parameter

Parameter	Description
force-true	To set the point-to-point connection of a port to force-truce.
force-false	To set the point-to-point connection of a port to force-false.
auto	Sets the point-to-point connection to be automatic check (default).

Default

Automatic check

Usage Guidelines

None

Command Mode

Interface Configuration

Example

None

2.1.10   spanning-tree rstp migration-check

Syntax

To restart checking protocol transfer of RSTP, run **spanning-tree rstp migration-check**.

spanning-tree rstp migration-check

Parameter

None

Default

> None

Usage Guidelines

> This command is used to restart the protocol transfer check on a port and to change the port in STP-compatible mode to the RSTP mode, enabling RSTP BPDU to be transmitted.

Command Mode

> Global and interface configuration

Example

> The following example shows how to run protocol transfer check on interface G0/0/1:

Switch (config-g0/0/1) #spanning-tree rstp migration-check

> Switch (config-g0/0/1) #

Chapter 3 **MSTP Configuration Commands**

3.1 MSTP Configuration Command

3.1.1 spanning-tree mode mstp

Syntax

To set the running mode of STP to **MSTP**, run **spanning-tree mode mstp**. To disable STP, Run **no spanning-tree mode**.

spanning-tree mode mstp

no spanning-tree mode

Parameter

None

Default

The MSTP mode is disabled, while the RSTP mode is running.

Usage Guidelines

None

Example

The following example shows how to enable MSTP protocol on the switch:

Switch(config)# spanning-tree mode mstp
Switch(config)#

3.1.2 spanning-tree mstp name

Syntax

spanning-tree mstp name *string*

no spanning-tree mstp name

To configure the regional name of the STP, run **spanning-tree mstp name** *string*. To resume the default name, run **no spanning-tree mstp**.

Parameter

Parameter	Description
String	Configures the character string of the name. The character string can have up to 32 characters, capital sensitive. The default value is in the form of character string like the MAC address of the switch.

Default

Character string form of the switch's MAC address

Usage Guidelines

None

Example

The following example shows how to set the configuration name of the switch's STP to **reg-01**.

Switch(config)# spanning-tree mstp name reg-01
Switch(config)#

3.1.3   spanning-tree mstp revision

Syntax

To generate the revision number of STP, run **spanning-tree mstp revision** *value*. To return to the default value, run **no spanning-tree mstp revision**.

spanning-tree mstp revision *value*

no spanning-tree mstp revision

Parameter

Parameter	Description
Value	Revision number: 0 ~65535. Its default value is 0.

Default

The default value of the revision number is **0**.

Usage Guidelines

None

Example

The following commands are used to set the regional revision number of STP to **100**.

Switch(config)# spanning-tree mstp revision 100
Switch(config)#

3.1.4 spanning-tree mstp instance

Syntax

To map the VLAN to the MSTI, run **spanning-tree mstp instance *instance-id* vlan *vlan-list***. To re-map the VLAN to the CIST, run **no spanning-tree mstp instance** *instance-id*.

spanning-tree mstp instance *instance-id* **vlan** *vlan-list*

no spanning-tree mstp instance *instance-id*

Parameter

Parameter	Description
instance-id	Instance number of the STP, meaning an MSTI which ranges from 1 to 31.
vlan-list	VLAN list which is mapped to the STP, ranging from 1 to 4094.

Default

All VLANs are mapped to the CIST (MST00).

Usage Guidelines

instance-id is an unique value representing an STP instance.

vlan-list represents a VLAN group, such as "1,2,3", "1-5" and "1,2,5-10".

Example

The following commands map VLAN1 to instance 1 of STP, and VLAN5,7,10-20 to instance 2 of STP, and then re-map these VLANs to MST00.

Switch(config)# spanning-tree mstp instance 1 vlan 2
Switch(config)# spanning-tree mstp instance 2 vlan 5,7,10-20

Switch(config)# no spanning-tree mstp instance 1

Switch(config)# no spanning-tree mstp instance 2

3.1.5   spanning-tree mstp root

Syntax

spanning-tree mstp *instance-id* **root** {**primary** | **secondary**}

[**diameter** *net-diameter* [**hello-time** *seconds*]]

no spanning-tree mstp *instance-id* **root**

To configure the specified MSTP instance to the primary/secondary root, run **spanning-tree mstp** *instance-id* **root** {**primary** | **secondary**}. To return to the default setting, run the negative form of the above command.

Both the **diameter** command and the **hello-time** command can modify the network diameter and the **HelloTime** parameter of the MSTP when they are setting the root.

Parameter

Parameter	Description
instance-id	MSTP instance, ranging from 0 to 31
primary	Sets the MSTP instance to the primary root.
secondary	Sets the MSTP instance to the secondary root.
net-diameter	Network diameter, which is optional When the **instance-id** parameter is **0**, it is effective. It ranges from 2 to 7.
seconds	Hello time, an optional parameter, which ranges from 1 to 10 seconds

Default

The priority value of all default roots of all MSTP instances are 32768, the network diameter is 7 and the HelloTime is 2 seconds.

Usage Guidelines

Both the **diameter** command and the **hello-time** command are valid only when **instanc-id** is **0**.

Generally, after you run the command to set the primary root, the protocol automatically checks the ID of the current network root and then sets the priority field of the root identifier to 24576 if this value gurantees the current OLT to be the root of the MSTP instance. If the priority value of the root is smaller than 24576, the protocol

will automatically set the MSTP priority of the current root to a value which is 4096 smaller than the root's priority. Here, 4069 is the step of the root priority.

Different from the configuration of the primary root, the protocol directly sets the MSTP priority of the OLT to **28672** after the command for configuring the secondary root is run. Thus, the current OLT can be the secondary root when the priorities of other OLTs are the default value **32768**.

Example

The following commands are used to set the OLT to the primary root in the CIST and recalculate the time parameter of the MSTP through network diameter 3 and HelloTime3, and at last set the OLT to the secondary root in the MST01.

Switch(config)# spanning-tree mstp 0 root primary diameter 3 hello-time 3

Switch(config)# spanning-tree mstp 1 root secondary

3.1.6   spanning-tree mstp priority

Syntax

To configure the bridge priority of the MSTP instance, run **spanning-tree mstp** *instance-id* **priority** *value.* To return to the default setting, run **no spanning-tree mstp** *instance-id* **priority**.

spanning-tree mstp *instance-id* **priority** *value*

no spanning-tree mstp *instance-id* **priority**

Parameter

Parameter	Description
instance-id	MSTP instance number, ranging from 0 to 31
value	Bridge priority, which can be one of the given values: 0, 4096, 8192, 12288, 16384, 20480, 24576, 28672, 32768, 36864, 40960, 45056, 49152, 53248, 57344, 61440.

Default

The default priority of the bridges of all MSTP instances is 32768.

Usage Guidelines

Each priority value in the MSTP instance is independent and can be configured independently.

Example

The following commands are used to set the priority of the switch in the CIST and MST01 to 4096 and 8192 respectively.

Switch(config)# spanning-tree mstp 0 priority 4096

Switch(config)# spanning-tree mstp 1 priority 8192

3.1.7   spanning-tree mstp hello-time

Syntax

spanning-tree mstp hello-time *seconds*

no spanning-tree mstp hello-time

It is used to configure the hello-time of the MSTP, and its negative form is used to resume the default settings of the HelloTime.

Parameter

Parameter	Description
seconds	It ranges from 1 to 10 seconds. Its default value is 2 seconds.

Default

2 seconds

Usage Guidelines

None

Example

The following commands are used to set the HelloTime of the MSTP to **10**.

Switch(config)# spanning-tree mstp hello-time 10
Switch(config)# no spanning-tree mstp hello-time

3.1.8   spanning-tree mstp forward-time

Syntax

spanning-tree mstp forward-time *seconds*

no spanning-tree mstp forward-time

It is used to configure the Forward Delay of the MTSP. Its negative is used to resume the default settings.

Parameter

Parameter	Description
seconds	It ranges from 4 to 30 seconds. Its default value is 15 seconds.

Default

15 seconds

Usage Guidelines

None

Example

The following commands are used to set the **Forward Delay** parameter of the MTSP to **10**.

Switch(config)# spanning-tree mstp forward-time 10

Switch(config)# no spanning-tree mstp forward-time

3.1.9   spanning-tree mstp max-age

Syntax

To configure the Max Age parameter of the MSTP, run **spanning-tree mstp max-age** *seconds*. To return to the default setting, run the negative form of the command.

spanning-tree mstp max-age *seconds*

no spanning-tree mstp max-age

Parameter

Parameter	Description
Seconds	Range: 6-40 seconds
	The default value is 20 seconds.

Default

20 seconds

Usage Guidelines

None

Example

The following commands are used to set the **MaxAge** parameter of the MSTP to **10**.

Switch(config)# spanning-tree mstp max-age 10
   Switch(config)# no spanning-tree mstp max-age

3.1.10   spanning-tree mstp diameter

Syntax

To configure the network diameter of the MSTP, run **spanning-tree mstp diameter** *net-diameter*. To return to the default setting, run **no spanning-tree mstp diameter**.

spanning-tree mstp diameter *net-diameter*

no spanning-tree mstp diameter

Parameter	Description
net-diameter	Range: 2 - 7 Its default value is 7.

Default

The default network diameter is 7.

Usage Guidelines

The **net-diameter** parameter is not saved as an independent settings in the OLT. The time parameter that is modified through network diameter configuration can be saved. The **net-diameter** parameter is valid in the CIST. After settings, the three time parameters of the STP can be automatically updated to a relatively advantageous value.

It is recommended to set the time parameters of the STP through root configuration or network diameter configuration. In this way, the reasonability of the time parameters can be assured.

Example

The following first command is to set the bridge diameter of MSTP to 5. The second command is to resume the default value of the bridge diameter.

Switch(config)# spanning-tree mstp diameter 5
Switch(config)# no spanning-tree mstp diameter

3.1.11   spanning-tree mstp max-hops

Syntax

spanning-tree mstp max-hops *hop-count*

no spanning-tree mstp max-hops

The **spanning-tree mstp max-hops** *hop-count* command is used to set the maximum number of hops of the MSTP BPDU. Its negative is used to resume the default settings.

Parameter

Parameter	Description
hop-count	Ranges from: 6 -40 Its default value is 20.

Default

The default vaue of the maximum hop counts is 20.

Usage Guidelines

None

Example

The first command is to set the maximum hop counts of the MSTP BPDU to 6. The second command is to restore the default value of the maximum hop counts.

Switch(config)# spanning-tree mstp max-hops 6
Switch(config)# no spanning-tree mstp max-hops

3.1.12   spanning-tree mstp port-priority

Syntax

To designate the priority of the spanning-tree STP instance, run **spanning-tree mstp** *instance-id* **port-priority** *value*. To return to the default setting, run the no form of the command.

spanning-tree mstp *instance-id* **port-priority** *value*

no spanning-tree *instance-id* **port-priority**

Parameter

Parameter	Description
instance-id	Number of the STP instance, ranging from 0 to 31.
Value	Port priority, which is one of the following values: 0, 16, 32, 48, 64, 80, 96, 112 128, 144, 160, 176, 192, 208, 224, 240

Default

The default priority value of the port in all STP instances is 128.

Usage Guidelines

None

Example

The first command is to set the priority of port G0/0/1 in the CIST to 16. The second command is to resume the default value.

Switch (config-g0/0/1) # spanning-tree mstp 0 port-priority 16

Switch (config-g0/0/1) # no spanning-tree mstp 0 port-priority

3.1.13 spanning-tree mstp cost

Syntax

The command **spanning-tree mstp** *instance-id* **cost value** is used to set the path cost of the port in the specified STP instance. Its negative is used to resume the default settings.

spanning-tree mstp *instance-id* **cost** value

no spanning-tree mstp *instance-id* **cost**

Parameter

Parameter	Description
instance-id	Number of the STP instance, ranging from 0 to 31.
value	Path cost of the port, ranging from 1 to 200000000

Default

It depends on the connection rate of the port:

100 Mbps: 200000

1000 Mbps: 20000

2500Mbps:8000

10Gbps:2000

40Gbps:500

Usage Guidelines

None

Example

The following commands are used to set the path cost of port G0/0/1 in the MST01 to 200.

Switch (config-g0/0/1) # spanning-tree mstp 1 cost 200

Switch (config-g0/0/1) #

3.1.14　spanning-tree mstp edge

Syntax

spanning-tree mstp edge

no spanning-tree mstp edge

To configure the edge port, run **spanning-tree mstp edge**. To return to the default setting, run **no spanning-tree mstp edge**.

Parameter

None

Default

Automatic check edge port

Usage Guidelines

None

Example

None

3.1.15　spanning-tree mstp point-to-point

Syntax

spanning-tree mstp point-to-point { **force-true** | **force-false** | **auto** }

no spanning-tree mstp point-to-point

To configure the connection type of a port, run **spanning-tree mstp point-to-point { force-true | force-false | auto }**. To resume the connection type to auto-check, run **no spanning-tree mstp point-to-point**.

Parameter

Parameter	Description
force-true	Sets the port connection mode to point-to-point.
force-false	Sets the port connection mode to sharing.
auto	Sets the port connection mode to auto-chech (the default mode).

Default

MSTP will automatically check the port connection mode by default.

Usage Guidelines

None

Example

The following example shows how to set the connection mode of port G0/0/1 to sharing.

Switch (config-g0/0/1) # spanning-tree mstp point-to-point force-false
　　Switch (config-g0/0/1) #

3.1.16　spanning-tree mstp mst-compatible

Syntax

spanning-tree mstp mst-compatible

no spanning-tree mstp mst-compatible

Enable/disable the MST-compatible mode, the global configuration mode.

Parameter

None

Default

The compitable mode is not activated by default and OLT cannot establish an area with other switches which transmit BPDU in compatible mode.

Usage Guidelines

After the MST-compatible mode is enabled, configure other connected switches that are running other MSTP protocols to the roots of CIST, ensuring that the OLT can enter the MSTP-compatible mode by receiving the message.

Example

The following command is to activate the MST-compatible mode in global configuration mode:

Switch(config)#spanning-tree mstp mst-compatible

3.1.17   spanning-tree mstp migration-check

Syntax

spanning-tree mstp migration-check

Clear the STP information that is checked by the port, and restart the protocol conversion process.

Parameter

None

Default

None

Usage Guidelines

The command is valid in global configuration mode and in port configuration mode.

Example

The following commands are used to check the protocol conversion on all ports first, and then check the protocol conversion on port G0/0/1 again.

Switch(config)# spanning-tree mstp migration-check

Switch(config)# interface g0/0/1

Switch (config-g0/0/1) # spanning-tree mstp migration-check

3.1.18   spanning-tree mstp restricted-role

Syntax

[no] spanning-tree mstp restricted-role

Enable/disable the role restriction on the port.

Parameter

None

Default

Disable the port's role restriction.

Command Mode

Interface Configuration

Usage Guidelines

Enable the role restriction and the port will not be chosen as the root port.

Example

None

3.1.19   spanning-tree mstp restricted-tcn

Syntax

[no] spanning-tree mstp restricted-tcn

Enable/disable the TCN restriction on the port.

Parameter

None

Default

Disable the TCN restriction on the port.

Command Mode

Interface Configuration

Usage Guidelines

Enable the TCN restriction on the port and do not tranmit topology changes to other ports.

Example

None

3.1.20   show spanning-tree mstp

Syntax

show spanning-tree mstp [**instance** *instance-id*]

The command above is used to check the MSTP information. If you run the command **show spanning-tree mstp**, the information about all STP instances is displayed.

Parameter

Parameter	Description
instance-id	Number of the STP instance, ranging from 0 to 31

Default

None

Usage Guidelines

It is valid in monitoring mode, global configuration mode or port mode.

Example

The following shows how to view all STP instances through the command. Here, **MST00** stands for CIST, and the **Type** field stands for the port connection type.

Switch#show spanning-tree mstp

MST00   Vlans Mapped: 1,4-4094
Bridge   Address   00E0.0F64.8365   Priority   32768 (32768 mst-id 0)
Root   This bridge is the CIST and regional root
Configured   Hello Time 2, Forward Delay 15, Max Age 20, Max Hops 20
Root Times   Hello Time 2, Forward Delay 15, Max Age 20

Interface   Role Sts Cost   Pri.Nbr Type
---------------- ---- --- -------- ------- -------------------------------
G0/0/1   Desg FWD 200000   128.1   P2p
G0/0/2   Desg FWD 200000   128.2   Edge

MST01   Vlans Mapped: 2
Bridge   Address   00E0.0F64.8365   Priority   32769 (32768 mst-id 1)
Root   This bridge for MST01

Interface   Role Sts Cost   Pri.Nbr Type
---------------- ---- --- -------- ------- -------------------------------
G0/0/1   Desg FWD 200000   128.1   P2p

MST02   Vlans Mapped: 3
Bridge   Address   00E0.0F64.8365   Priority   32770 (32768 mst-id 2)
Root   This bridge for MST02

Interface   Role Sts Cost   Pri.Nbr Type
---------------- ---- --- -------- ------- -------------------------------
G0/0/1   Desg FWD 200000   128.1   P2p

3.1.21   show spanning-tree mstp region

Syntax

show spanning-tree mstp region

Check the regional configuration information about the MSTP.

Parameter

None

Default

    None

Usage Guidelines

    None

Example

    See the following information. **MST Config Table** shows the relation between VLAN and STP instance.

    Switch(config)# show spanning-tree mstp region

    MST Region:
      Name: [reg01]
      Revision:[0]

    MST Config Table:
      Instance   VLAN IDs
    ----------   ----------
            0   1,4-4094
            1   2
            2   3

3.1.22   show spanning-tree mstp detail

Syntax

    show spanning-tree mstp detail

    The command above is used to check the detailed information about MSTP.

Parameter

    None

Default

    None

Usage Guidelines

    None

Example

The following example shows the detailed STP information after the command is run, including the port connection type and optional characteristics:

Switch#show spanning-tree mstp detail

MST00   Vlans Mapped: 1,4-4094
Bridge   Address   00E0.0F64.8365   Priority   32768 (32768 mst-id 0)
Root   This bridge is the CIST and regional root
Configured   Hello Time 2, Forward Delay 15, Max Age 20, Max Hops 20
Root Times   Hello Time 2, Forward Delay 15, Max Age 20

GigaEthernet0/0/1 of MST00 is designated forwarding
Port Info   Port ID 128.1   Priority 128   Cost 200000
Designated Root   Address 00E0.0F64.8365   Priority 32768   Cost 0
CIST Regional Root   Address 00E0.0F64.8365   Priority 32768   Cost 0
Designated Bridge   Address 00E0.0F64.8365   Priority 32768   Port ID 128.1
Edge Port: disabled   Link Type: point-to-point (auto)
Bpdu Guard: disabled (default)   Root Guard: disabled (default)
Loop Guard: disabled (default)
Timers: message expires in 0 sec, forward delay 0 sec, up time 662 sec
Number of transitions to forwarding state: 1
Bpdu sent 335, received 5

GigaEthernet0/0/2 of MST00 is designated forwarding
Port Info   Port ID 128.47   Priority 128   Cost 200000
Designated Root   Address 00E0.0F64.8365   Priority 32768   Cost 0
CIST Regional Root   Address 00E0.0F64.8365   Priority 32768   Cost 0
Designated Bridge   Address 00E0.0F64.8365   Priority 32768   Port ID 128.2
Edge Port: enabled (auto)   Link Type: point-to-point (auto)
Bpdu Guard: disabled (default)   Root Guard: disabled (default)
Loop Guard: disabled (default)
Timers: message expires in 0 sec, forward delay 0 sec, up time 1485 sec
Number of transitions to forwarding state: 1
Bpdu sent 744, received 0

MST01   Vlans Mapped: 2
Bridge   Address   00E0.0F64.8365   Priority   32769 (32768 mst-id 1)
Root   This bridge for MST01

GigaEthernet0/0/1 of MST01 is designated forwarding
Port Info   Port ID 128.1   Priority 128   Cost 200000
Designated Root   Address 00E0.0F64.8365   Priority 32769   Cost 0
Desingated Bridge   Address 00E0.0F64.8365   Priority 32769   Port ID 128.1
Timers: message expires in 0 sec, forward delay 0 sec, up time 662 sec
Number of transitions to forwarding state: 1

MST Config Message transmitted 335, received 0

MST02   Vlans Mapped: 3

Bridge   Address   00E0.0F64.8365   Priority   32770 (32768 mst-id 2)

Root   This bridge for MST02

GigaEthernet0/0/1 of MST02 is designated forwarding

Port Info   Port ID 128.1   Priority 128   Cost 200000

Designated Root   Address 00E0.0F64.8365   Priority 32770   Cost 0

Desingated Bridge   Address 00E0.0F64.8365   Priority 32770   Port ID 128.1

Timers: message expires in 0 sec, forward delay 0 sec, up time 662 sec

Number of transitions to forwarding state: 1

MST Config Message transmitted 335, received 0

3.1.23   show spanning-tree mstp interface

Syntax

show spanning-tree mstp interface *interface-id*

The command above is used to check the information about the port which is run under MSTP.

Parameter

Parameter	Description
interface-id	Port name, such as "G0/0/1", "GigaEthernet0/0/2"

Default

None

Usage Guidelines

None

Example

The following example shows the information about port G0/0/1 after you run the command
Switch#show spanning-tree mstp interface g0/0/1

GigaEthernet0/0/1 of MST00 is designated forwarding

Port Info   Port ID 128.1   Priority 128   Cost 200000

Designated Root   Address 00E0.0F64.8365   Priority 32768   Cost 0

CIST Regional Root   Address 00E0.0F64.8365   Priority 32768   Cost 0

Designated Bridge   Address 00E0.0F64.8365   Priority 32768   Port ID 128.1

Edge Port: disabled   Link Type: point-to-point (auto)

Bpdu Guard: disabled (default)   Root Guard: disabled (default)

Loop Guard: disabled (default)

Timers: message expires in 0 sec, forward delay 0 sec, up time 851 sec

Number of transitions to forwarding state: 1

Bpdu sent 430, received 5

GigaEthernet0/0/1 of MST01 is designated forwarding

Port Info   Port ID 128.1   Priority 128   Cost 200000

Designated Root   Address 00E0.0F64.8365   Priority 32769   Cost 0

Desingated Bridge   Address 00E0.0F64.8365   Priority 32769   Port ID 128.1

Timers: message expires in 0 sec, forward delay 0 sec, up time 851 sec

Number of transitions to forwarding state: 1

MST Config Message transmitted 430, received 0

GigaEthernet0/0/1 of MST02 is designated forwarding

Port Info   Port ID 128.1   Priority 128   Cost 200000

Designated Root   Address 00E0.0F64.8365   Priority 32770   Cost 0

Desingated Bridge   Address 00E0.0F64.8365   Priority 32770   Port ID 128.1

Timers: message expires in 0 sec, forward delay 0 sec, up time 851 sec

Number of transitions to forwarding state: 1

MST Config Message transmitted 430, received 0

Instance Role Sts Cost   Pri.Nbr Vlans Mapped

-------- ---- --- --------- ------- --------------------

0   Desg FWD 200000   128.1   1,4-4094

1   Desg FWD 200000   128.1   2

2   Desg FWD 200000   128.1   3

3.1.24   show spanning-tree mstp protocol-migration

Syntax

The command above is used to check the protocol conversion information when the port is running under MSTP.

show spanning-tree mstp protocol-migration

Parameter

None

Default

None

Usage Guidelines

None

Example

The following example shows the information about protocol conversion after the command **show spanning-tree mstp protocol-migration** is run. Note that port G0/0/1 has transferred to the 802.1D STP mode.

Switch#show spanning-tree mstp protocol-migration

MSTP Port Protocol Migration

Interface   Protocol
---------------- ---------- ------------
G0/0/1   802.1D