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# Spanning tree commands

## active region-configuration

Use **active region-configuration** to activate your MST region configuration.

### Syntax

**active region-configuration**

### Views

MST region view

### Predefined user roles

network-admin

### Usage guidelines

When you configure MST region parameters, MSTP launches a new spanning tree calculation process that might cause network topology instability. This is most likely to occur when you configure the VLAN-to-instance mapping table. The launch occurs after you execute the **active region-configuration** command or the **stp global enable** command.

As a best practice, use the **check region-configuration** command to determine whether the MST region configurations to be activated are correct. Run this command only when they are correct.

### Examples

# Map VLAN 2 to MSTI 1 and activate the MST region configuration.

```
<Sysname> system-view
[Sysname] stp region-configuration
[Sysname-mst-region] instance 1 vlan 2
[Sysname-mst-region] active region-configuration
```

### Related commands

**check region-configuration**

**instance**

**region-name**

**revision-level**

**stp global enable**

**vlan-mapping modulo**

## bpdu-drop any

Use **bpdu-drop any** to enable BPDU drop on a port.

Use **undo bpdu-drop any** to disable BPDU drop on a port.

### Syntax

**bpdu-drop any**

**undo bpdu-drop any**

### Default

BPDU drop is disabled on a port.

## Views

Layer 2 Ethernet interface view

## Predefined user roles

network-admin

## Examples

```
# Enable BPDU drop on port Ten-GigabitEthernet 1/0/1.
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] bpdu-drop any
```

# check region-configuration

Use **check region-configuration** to display MST region pre-configuration information.

## Syntax

**check region-configuration**

## Views

MST region view

## Predefined user roles

network-admin

## Usage guidelines

Spanning tree devices belong to the same MST region only when they are connected through a physical link and configured with the same details as follows:

- Format selector (0 by default and not configurable).
- MST region name.
- MST region revision level.
- VLAN-to-instance mapping entries in the MST region.

As a best practice, use this command to determine whether the MST region configurations to be activated are correct. Activate them only when they are correct.

## Examples

```
# Display MST region pre-configurations.
<Sysname> system-view
[Sysname] stp region-configuration
[Sysname-mst-region] check region-configuration
Admin Configuration
  Format selector      : 0
  Region name         : 001122334400
  Revision level      : 0
  Configuration digest : 0x3ab68794d602fdf43b21c0b37ac3bca8

Instance  VLANs Mapped
  0        1, 3 to 4094
  15       2
```

**Table 1 Command output**

Field	Description
Format selector	Format selector of the MST region, which is 0 (not configurable).
Region name	MST region name.
Revision level	Revision level of the MST region.
Instance VLANs Mapped	VLAN-to-instance mappings in the MST region.

### Related commands

**active region-configuration**

**instance**

**region-name**

**revision-level**

**vlan-mapping modulo**

## display stp

Use **display stp** to display spanning tree status and statistics.

### Syntax

**display stp** [ **instance** *instance-list* | **vlan** *vlan-id-list* ] [ **interface** *interface-list* | **slot** *slot-number* ] [ **brief** ]

### Views

Any view

### Predefined user roles

network-admin

network-operator

### Parameters

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

**interface** *interface-list*: Specifies a space-separated list of up to 10 interface items. Each item specifies an interface or a range of interfaces in the form of *interface-type interface-number 1* [ **to** *interface-type interface-number 2* ]. The interface number for *interface-number 2* must be equal to or greater than the interface number for *interface-number 1*.

**brief**: Displays brief spanning tree status and statistics. If this keyword is not specified, the command displays detailed spanning tree status and statistics.

**slot** *slot-number*: Specifies an IRF member device by its member ID. If you do not specify a member device, this command displays information for all member devices.

### Usage guidelines

In STP or RSTP mode, the command output is sorted by port name.

- If you do not specify a port, this command applies to all ports.
- If you specify a port list, this command applies to the specified ports.

In PVST mode, the command output is sorted by VLAN ID and by port name in each VLAN.

- If you do not specify a VLAN or port, this command applies to all ports in all VLANs.
- If you only specify a VLAN list but not a port, this command applies to all ports in the specified VLANs.
- If you only specify a port list but not a VLAN, this command applies to the specified ports in all VLANs.
- If you specify both a VLAN list and a port list, this command applies to the ports in the specified VLANs.

In MSTP mode, the command output is sorted by MSTI ID and by port name in each MSTI.

- If you do not specify an MSTI or port, this command applies to all MSTIs on all ports.
- If you specify an MSTI list but not a port, this command applies to all ports in the specified MSTIs.
- If you specify a port list but not an MSTI, this command applies to all MSTIs on the specified ports.
- If you specify both an MSTI list and a port list, this command applies to the specified ports in the specified MSTIs.

## Examples

# In MSTP mode, display the brief spanning tree status and statistics for MSTI 0 on port Ten-GigabitEthernet 1/0/1.

```
<Sysname> display stp instance 0 interface Ten-GigabitEthernet 1/0/1 brief
MST ID      Port                               Role  STP State  Protection
0           Ten-GigabitEthernet1/0/1         ALTE  DISCARDING LOOP
```

# In PVST mode, display the brief spanning tree status and statistics for VLAN 2 on port Ten-GigabitEthernet 1/0/1.

```
<Sysname> system-view
[Sysname] stp mode pvst
[Sysname] display stp vlan 2 interface ten-gigabitethernet 1/0/1 brief
VLAN ID     Port                               Role  STP State  Protection
2           Ten-GigabitEthernet1/0/1         ALTE  DISCARDING LOOP
```

**Table 2 Command output**

Field	Description
MST ID	MSTI ID in the MST region.
Port	Port name, corresponding to each MSTI or VLAN.
Role	Port role: <ul style="list-style-type: none"> <li>• <b>ALTE</b>—The port is an alternate port.</li> <li>• <b>BACK</b>—The port is a backup port.</li> <li>• <b>ROOT</b>—The port is a root port.</li> <li>• <b>DESI</b>—The port is a designated port.</li> <li>• <b>MAST</b>—The port is a master port.</li> <li>• <b>DISA</b>—The port is disabled.</li> </ul>
STP State	Spanning tree status on the port: <ul style="list-style-type: none"> <li>• <b>FORWARDING</b>—The port can receive and send BPDUs and also forward user traffic.</li> <li>• <b>DISCARDING</b>—The port can receive and send BPDUs but cannot</li> </ul>

Field	Description
	<p>forward user traffic.</p> <ul style="list-style-type: none"> <li>• <b>LEARNING</b>—The port is in a transitional state. It can receive and send BPDUs but cannot forward user traffic.</li> </ul>
Protection	<p>Effective spanning tree protection feature on the port:</p> <ul style="list-style-type: none"> <li>• <b>ROOT</b>—Root guard.</li> <li>• <b>LOOP</b>—Loop guard.</li> <li>• <b>BPDU</b>—BPDU guard.</li> </ul> <p>If no spanning tree protection feature is configured or spanning tree protection is not triggered, this field displays <b>NONE</b>.</p>

# In MSTP mode, display the detailed spanning tree status and statistics for all MSTIs on all ports.

```
<Sysname> display stp
```

```
-----[CIST Global Info][Mode MSTP]-----
```

```

Bridge ID          : 32768.0001-0000-0000
Bridge times       : Hello 2s MaxAge 20s FwdDelay 15s MaxHops 20
Root ID/ERPC      : 32768.0001-0000-0000, 0
RegRoot ID/IRPC   : 32768.0001-0000-0000, 0
RootPort ID       : 0.0
BPDU-Protection   : Disabled
Bridge Config-
Digest-Snooping   : Disabled
TC or TCN received : 2
Time since last TC : 0 days 0h:0m:58s

```

```
----[Port1(Ten-GigabitEthernet1/0/1)][FORWARDING]----
```

```

Port protocol      : Enabled
Port role          : Designated Port (Boundary)
Port ID            : 128.3
Port cost(Legacy)  : Config=auto, Active=200
Desg.bridge/port   : 32768.0001-0000-0000, 128.3
Port edged         : Config=disabled, Active=disabled
Point-to-Point    : Config=auto, Active=true
Transmit limit     : 10 packets/hello-time
TC-Restriction     : Disabled
Role-Restriction   : Disabled
Protection type    : Config=none, Active=none
MST BPDU format    : Config=auto, Active=802.1s
Port Config-
Digest-Snooping   : Disabled
Rapid transition   : True
Num of VLANs mapped : 0
Port times         : Hello 2s MaxAge 20s FwdDelay 15s MsgAge 0s RemHops 20
BPDU sent          : 32
                   TCN: 0, Config: 0, RST: 0, MST: 32
BPDU received      : 2
                   TCN: 0, Config: 0, RST: 0, MST: 2

```

-----[MSTI 1 Global Info]-----

Bridge ID : 32768.0001-0000-0000  
RegRoot ID/IRPC : 32768.0001-0000-0000, 0  
RootPort ID : 0.0  
Master bridge : 32768.0001-0000-0000  
Cost to master : 0  
TC received : 0

----[Port1(Ten-GigabitEthernet1/0/1)][FORWARDING]----

Port protocol : Enabled  
Port role : Designated Port (Boundary)  
Port ID : 128.3  
Port cost(Legacy) : Config=auto, Active=200  
Desg.bridge/port : 32768.0001-0000-0000, 128.3  
Protection type : Config=none, Active=none  
Rapid transition : True  
Num of VLANs mapped : 64  
Port times : RemHops 20

**# In PVST mode, display the spanning tree status and statistics for all ports in all VLANs.**

<Sysname> system-view

[Sysname] stp mode pvst

[Sysname] display stp

-----[VLAN 1 Global Info]-----

Protocol status : Enabled  
Bridge ID : 32768.000f-e200-2200  
Bridge times : Hello 2s MaxAge 20s FwdDelay 15s  
VlanRoot ID/RPC : 0.00e0-fc0e-6554, 200200  
RootPort ID : 128.48  
BPDU-Protection : Disabled  
TC or TCN received : 2  
Time since last TC : 0 days 0h:5m:42s

----[Port1(Ten-GigabitEthernet1/0/1)][FORWARDING]----

Port protocol : Enabled  
Port role : Designated Port  
Port ID : 128.153  
Port cost(Legacy) : Config=auto, Active=200  
Desg. bridge/port : 32768.000f-e200-2200, 128.2  
Port edged : Config=disabled, Active=disabled  
Point-to-Point : Config=auto, Active=true  
Transmit limit : 10 packets/hello-time  
Protection type : Config=none, Active=none  
Rapid transition : False  
Port times : Hello 2s MaxAge 20s FwdDelay 15s MsgAge 2s

-----[VLAN 2 Global Info]-----

Protocol status : Enabled  
Bridge ID : 32768.000f-e200-2200

```

Bridge times          : Hello 2s MaxAge 20s FwDly 15s
VlanRoot ID/RPC     : 0.00e0-fc0e-6554, 200200
RootPort ID         : 128.48
BPDU-Protection     : Disabled
TC or TCN received  : 2
Time since last TC  : 0 days 0h:5m:42s

```

# In MSTP mode, display the spanning tree status and statistics when the spanning tree feature is disabled.

```

<Sysname> display stp
Protocol status      : Disabled
Protocol Std.       : IEEE 802.1s
Version             : 3
Bridge-Prio.        : 32768
MAC address         : 000f-e200-8048
Max age(s)          : 20
Forward delay(s)    : 15
Hello time(s)       : 2
Max hops            : 20
TC Snooping         : Disabled

```

# In PVST mode, display the spanning tree status and statistics when the spanning tree feature is disabled.

```

<Sysname> display stp
Protocol status      : Disabled
Protocol Std.       : IEEE 802.1w (pvst)
Version             : 2
Bridge-Prio.        : 32768
MAC address         : 3822-d69f-0800
Max age(s)          : 20
Forward delay(s)    : 15
Hello time(s)       : 2
TC Snooping         : Disabled

```

**Table 3 Command output**

Field	Description
Bridge ID	Bridge ID, which contains the device's priority and its MAC address. For example, in output 32768.000f-e200-2200, the value preceding the dot is the device's priority. The value following the dot is the device's MAC address.
Bridge times	Major parameters for the bridge: <ul style="list-style-type: none"> <li>• <b>Hello</b>—Hello timer.</li> <li>• <b>MaxAge</b>—Maximum age timer.</li> <li>• <b>FwdDelay</b>—Forward delay timer.</li> <li>• <b>MaxHops</b>—Maximum hops within the MST region.</li> </ul>
Root ID/ERPC	CIST root ID and external path cost (the path cost from the device to the CIST root).
RegRoot ID/IRPC	CIST regional root ID and internal path cost (the path cost from the device to the CIST regional root).
VlanRoot ID/RPC	VLAN root ID and root path cost (the path cost from the device to the VLAN root bridge).
RootPort ID	Root port ID. The value <b>0.0</b> indicates that the device is the root and there is no root

Field	Description
	port.
BPDU-Protection	Global status of the BPDU guard feature.
Bridge Config-Digest-Snooping	Global status of Digest Snooping.
TC or TCN received	Number of TC/TCN BPDUs received in the MSTI or VLAN.
Time since last TC	Time since the latest topology change in the MSTI or VLAN.
[FORWARDING]	The port is in forwarding state.
[DISCARDING]	The port is in discarding state.
[LEARNING]	The port is in learning state.
Port protocol	Status of the spanning tree feature on the port.
Port role	Port role: <ul style="list-style-type: none"> <li>• Alternate.</li> <li>• Backup.</li> <li>• Root.</li> <li>• Designated.</li> <li>• Master.</li> <li>• Disabled.</li> </ul>
(Boundary)	The port is a regional boundary port.
Port cost(Legacy)	Path cost of the port. The field in parentheses indicates the standard (legacy, dot1d-1998, or dot1t) used for port path cost calculation. <ul style="list-style-type: none"> <li>• <b>Config</b>—Configured value.</li> <li>• <b>Active</b>—Actual value.</li> </ul>
Desg.bridge/port	Designated bridge ID and port ID of the port. The port ID displayed is insignificant for a port which does not support port priority.
Port edged	The port is an edge port or non-edge port. <ul style="list-style-type: none"> <li>• <b>Config</b>—Configured value.</li> <li>• <b>Active</b>—Actual value.</li> </ul>
Point-to-Point	The port is connected to a point-to-point link or not. <ul style="list-style-type: none"> <li>• <b>Config</b>—Configured value.</li> <li>• <b>Active</b>—Actual value.</li> </ul>
Transmit limit	Maximum number of BPDUs sent by a port within each hello time.
Protection type	Whether spanning tree protection is configured on the port: <ul style="list-style-type: none"> <li>• <b>Config</b>—Configured spanning tree protection feature.</li> <li>• <b>Active</b>—Effective spanning tree protection feature.</li> </ul> Spanning tree protection features are as follows: <ul style="list-style-type: none"> <li>• <b>ROOT</b>—Root guard.</li> <li>• <b>LOOP</b>—Loop guard.</li> <li>• <b>BPDU</b>—BPDU guard.</li> <li>• <b>PVST BPDU</b>—PVST BPDU guard.</li> </ul> If no spanning tree protection feature is configured or spanning tree protection is not triggered, this field displays <b>NONE</b> .
TC-Restriction	Status of TC transmission restriction on the port.
Role-Restriction	Status of port role restriction on the port.

Field	Description
MST BPDU format	Format of the MST BPDUs that the port can send: <ul style="list-style-type: none"> <li>• <b>Config</b>—Configured value (legacy or 802.1s).</li> <li>• <b>Active</b>—Actual value (legacy or 802.1s).</li> </ul>
Port Config-Digest-Snooping	Status of Digest Snooping on the port.
Rapid transition	Indicates whether the port rapidly transits to the forwarding state in the MSTI or VLAN.
Num of VLANs mapped	Number of VLANs that are mapped to the MSTI.
Port times	Major parameters for the port: <ul style="list-style-type: none"> <li>• <b>Hello</b>—Hello timer.</li> <li>• <b>MaxAge</b>—Maximum age timer.</li> <li>• <b>FwdDelay</b>—Forward delay timer.</li> <li>• <b>MsgAge</b>—Message age timer.</li> <li>• <b>RemHops</b>—Remaining hops.</li> </ul>
BPDU sent	Statistics on sent BPDUs.
BPDU received	Statistics on received BPDUs.
RegRoot ID/IRPC	MSTI regional root/internal path cost.
Root Type	MSTI root type: <ul style="list-style-type: none"> <li>• <b>Primary root.</b></li> <li>• <b>Secondary root.</b></li> </ul>
Master bridge	MSTI root bridge ID.
Cost to master	Path cost from the MSTI to the master bridge.
TC received	Number of received TC BPDUs.
Protocol status	Spanning tree protocol status.
Protocol Std.	Spanning tree protocol standard.
Version	Spanning tree protocol version.
Bridge-Prio.	<ul style="list-style-type: none"> <li>• In MSTP mode: Device's priority in the CIST.</li> <li>• In PVST mode: Device's priority in VLAN 1.</li> </ul>
Max age(s)	Aging timer for BPDUs (in seconds, which is the same as the aging timer for VLAN 1 in PVST mode).
Forward delay(s)	Port state transition delay (in seconds, which is the same as the port state transition delay for VLAN 1 in PVST mode).
Hello time(s)	Interval for the root bridge to send BPDUs (in seconds, which is the same as the interval for VLAN 1 in PVST mode).
Max hops	Maximum hops in the MSTI.
TC Snooping	Status of TC Snooping: <b>Enabled</b> or <b>Disabled</b> .

## Related commands

**reset stp**

# display stp abnormal-port

Use **display stp abnormal-port** to display history about ports that are blocked by spanning tree protection features.

## Syntax

**display stp abnormal-port**

## Views

Any view

## Predefined user roles

network-admin

network-operator

## Usage guidelines

In an MSTI or VLAN, this command can display a maximum of three history records for a port that is blocked by spanning tree protection features.

## Examples

# In MSTP mode, display history about ports that are blocked by spanning tree protection features.

```
---[Ten-GigabitEthernet1/0/1]---
```

MST ID	BlockReason	Time
0	Root-Protected	14:39:04 04/15/2016
0	Root-Protected	14:39:02 04/15/2016
0	Root-Protected	14:39:00 04/15/2016

# In PVST mode, display history about ports that are blocked by spanning tree protection features.

```
---[Ten-GigabitEthernet1/0/1]---
```

VLAN ID	BlockReason	Time
1	Root-Protected	14:49:17 04/15/2016
1	Root-Protected	14:49:15 04/15/2016
1	Root-Protected	14:49:12 04/15/2016

**Table 4 Command output**

Field	Description
MST ID	MSTI of a blocked port.
VLAN ID	VLAN of a blocked port.
BlockReason	Reason that the port was blocked: <ul style="list-style-type: none"><li>• <b>Root-Protected</b>—Root guard feature.</li><li>• <b>Loop-Protected</b>—Loop guard feature.</li><li>• <b>Loopback-Protected</b>—Self-loop protection. A port in the MSTI receives a BPDU sent by itself.</li><li>• <b>Disputed</b>—Dispute protection. A port receives a low-priority BPDU from a non-blocked designated port in forwarding or learning state.</li><li>• <b>InconsistentPortType-Protected</b>—Inconsistent port type protection.</li><li>• <b>InconsistentPvid-Protected</b>—Inconsistent PVID protection.</li></ul>
Time	Protection feature trigger time.

# display stp bpdu-statistics

Use **display stp bpdu-statistics** to display the BPDU statistics for ports.

## Syntax

```
display stp bpdu-statistics [ interface interface-type interface-number [ instance instance-list ] ]
```

## Views

Any view

## Predefined user roles

network-admin  
network-operator

## Parameters

**interface** *interface-type interface-number*: Specifies an interface by its type and number.

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

## Usage guidelines

In MSTP mode, the command output is sorted by port name and by MSTI ID on each port.

- If you do not specify an MSTI or port, this command applies to all MSTIs on all ports.
- If you specify a port but not an MSTI, this command applies to all MSTIs on the port.
- If you specify both an MSTI ID and a port, this command applies to the specified MSTI on the port.

In STP, RSTP, or PVST mode, the command output is sorted by port name.

- If you do not specify a port, this command applies to all ports.
- If you specify a port, this command applies to the port.

## Examples

# In MSTP mode, display the BPDU statistics for all MSTIs on Ten-GigabitEthernet 1/0/1.

```
<Sysname> display stp bpdu-statistics interface ten-gigabitethernet 1/0/1  
Port: Ten-GigabitEthernet1/0/1
```

Instance-Independent:

Type	Count	Last Updated
Invalid BPDUs	0	
Looped-back BPDUs	0	
Max-aged BPDUs	0	
TCN sent	0	
TCN received	0	
TCA sent	0	
TCA received	2	10:33:12 01/13/2011
Config sent	0	
Config received	0	
RST sent	0	

```

RST received          0
MST sent              4          10:33:11 01/13/2011
MST received         151          10:37:43 01/13/2011

```

Instance 0:

```

Type                  Count      Last Updated
-----
Timeout BPDUs        0
Max-hoped BPDUs      0
TC detected           1          10:32:40 01/13/2011
TC sent               3          10:33:11 01/13/2011
TC received           0

```

# In PVST mode, display the BPDU statistics for Ten-GigabitEthernet 1/0/1.

```

<Sysname> system-view
[Sysname] stp mode pvst
[Sysname] display stp bpdu-statistics interface ten-gigabitethernet 1/0/1
Port: Ten-GigabitEthernet1/0/1

```

```

Type                  Count      Last Updated
-----
Invalid BPDUs        0
Looped-back BPDUs    0
Max-aged BPDUs       0
TCN sent              0
TCN received          0
TCA sent              0
TCA received          2          10:33:12 01/13/2010
Config sent           0
Config received       0
RST sent              0
RST received          0
MST sent              4          10:33:11 01/13/2010
MST received         151          10:37:43 01/13/2010
Timeout BPDUs        0
Max-hoped BPDUs      0
TC detected           511          10:32:40 01/13/2010
TC sent               8844          10:33:11 01/13/2010
TC received           1426          10:33:32 01/13/2010
PVID inconsistency BPDUs 0

```

**Table 5 Command output**

Field	Description
Port	Port name.
Instance-Independent	Statistics not related to a specific MSTI.
Type	Statistical item.
Looped-back BPDUs	Number of BPDUs sent and then received by the same port.

Field	Description
Max-aged BPDUs	Number of BPDUs whose max age was exceeded.
TCN sent	Number of sent TCN BPDUs.
TCN received	Number of received TCN BPDUs.
TCA sent	Number of sent TCA BPDUs.
TCA received	Number of received TCA BPDUs.
Config sent	Number of sent configuration BPDUs.
Config received	Number of received configuration BPDUs.
RST sent	Number of sent RSTP BPDUs.
RST received	Number of received RSTP BPDUs.
MST sent	Number of sent MSTP BPDUs.
MST received	Number of received MSTP BPDUs.
Instance	Statistics for a specific MSTI.
Timeout BPDUs	Number of expired BPDUs.
Max-hoped BPDUs	Number of BPDUs whose maximum hops were exceeded.
TC detected	Number of detected topology changes.
TC sent	Number of sent TC BPDUs.
TC received	Number of received TC BPDUs.
PVID inconsistency BPDUs	Number of received PVST BPDUs with a PVID inconsistent with the incoming port.

## display stp down-port

Use **display stp down-port** to display information about ports that were shut down by spanning tree protection features.

### Syntax

```
display stp down-port
```

### Views

Any view

### Predefined user roles

network-admin

network-operator

### Examples

# Display information about ports that were shut down by spanning tree protection features.

```
<Sysname> display stp down-port
```

```
Down Port          Reason
Ten-GigabitEthernet1/0/1    BPDU protection
```

**Table 6 Command output**

Field	Description
Down Port	Name of a port that was shut down by the spanning tree protection features.
Reason	Reason that the port was shut down: <ul style="list-style-type: none"><li>• <b>BPDU protection</b>—Indicates the BPDU guard feature.</li><li>• <b>PVST BPDU protection</b>—Indicates the PVST BPDU guard feature.</li></ul>

## display stp history

Use **display stp history** to display port role calculation history.

### Syntax

```
display stp [ instance instance-list | vlan vlan-id-list ] history [ slot slot-number ]
```

### Views

Any view

### Predefined user roles

network-admin  
network-operator

### Parameters

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

**slot** *slot-number*: Specifies an IRF member device by its member ID. If you do not specify a member device, this command displays information for all member devices.

### Usage guidelines

In STP or RSTP mode, the command output is sorted by port role calculation time.

In PVST mode, the command output is sorted by VLAN ID and by port role calculation time in each VLAN.

- If you do not specify a VLAN, this command applies to all VLANs.
- If you specify a VLAN list, this command applies to the specified VLANs.

In MSTP mode, the command output is sorted by MSTI ID and by port role calculation time in each MSTI.

- If you do not specify an MSTI, this command applies to all MSTIs.
- If you specify an MSTI list, this command applies to the specified MSTIs.

### Examples

# In MSTP mode, display the port role calculation history on the specified slot in MSTI 2.

```
<Sysname> display stp instance 2 history slot 1
----- STP slot 1 history trace -----
----- Instance 2 -----
Port Ten-GigabitEthernet1/0/1
```

```

Role change          : ROOT->DESI (Aged)
Time                : 2009/02/08 00:22:56
Port priority       : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.1
Designated priority : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.1
Port Ten-GigabitEthernet1/0/2
Role change          : ALTER->ROOT
Time                : 2009/02/08 00:22:56
Port priority       : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.2
                    128.153
Designated priority : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.2
                    128.153

```

# In PVST mode, display the port role calculation history on the specified slot in VLAN 2.

```

<Sysname> display stp vlan 2 history slot 1
----- STP slot 1 history trace -----
----- VLAN 2 -----

Port Ten-GigabitEthernet1/0/1
Role change          : ROOT->DESI (Aged)
Time                : 2009/02/08 00:22:56
Port priority       : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.1
Designated priority : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.1
Port Ten-GigabitEthernet1/0/2
Role change          : ALTER->ROOT
Time                : 2009/02/08 00:22:56
Port priority       : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.2
Designated priority : 0.00e0-fc01-6510 0 0.00e0-fc01-6510 128.2

```

**Table 7 Command output**

Field	Description
Port	Port name.
Role change	Role change of the port ( <b>Aged</b> means that the change was caused by expiration of the received configuration BPDU).
Time	Time of port role calculation.
Port priority	Port priority formed by the root bridge ID, root path cost, designated bridge ID, and designated port ID which are separated by spaces.
Designated priority	Designated priority formed by the root bridge ID, root path cost, designated bridge ID, and designated port ID which are separated by spaces.

## display stp region-configuration

Use **display stp region-configuration** to display effective MST region configuration.

### Syntax

```
display stp region-configuration
```

### Views

Any view

## Predefined user roles

network-admin  
network-operator

## Examples

# In MSTP mode, display effective MST region configuration.

```
<Sysname> display stp region-configuration
Oper Configuration
  Format selector      : 0
  Region name         : hello
  Revision level      : 0
  Configuration digest : 0x5f762d9a46311effb7a488a3267fca9f

Instance  VLANs Mapped
0         21 to 4094
1         1 to 10
2         11 to 20
```

**Table 8 Command output**

Field	Description
Format selector	Format selector that is defined by the spanning tree protocol. The default value is 0, and the selector cannot be configured.
Region name	MST region name.
Revision level	Revision level of the MST region. The default value is 0, and the level can be configured by using the <b>revision-level</b> command.
VLANs Mapped	VLANs mapped to the MSTI.

## Related commands

**instance**  
**region-name**  
**revision-level**  
**vlan-mapping modulo**

## display stp root

Use **display stp root** to display the root bridge information of spanning trees.

### Syntax

**display stp root**

### Views

Any view

## Predefined user roles

network-admin  
network-operator

## Examples

# In MSTP mode, display the root bridge information of all spanning trees.

```
<Sysname> display stp root
MST ID  Root Bridge ID          ExtPathCost  IntPathCost  Root Port
0         0.00e0-fc0e-6554             200200       0             Ten-GigabitEthernet1/0/1
```

# In PVST mode, display the root bridge information of all spanning trees.

```
<Sysname> display stp root
VLAN ID  Root Bridge ID          ExtPathCost  IntPathCost  Root Port
1         0.00e0-fc0e-6554             200200       0             Ten-GigabitEthernet1/0/1
```

**Table 9 Command output**

Field	Description
ExtPathCost	External path cost. The path cost of a port is either automatically calculated by the device or manually configured by using the <b>stp cost</b> command.
IntPathCost	Internal path cost. The path cost of a port is either automatically calculated by the device or manually configured by using the <b>stp cost</b> command.
Root Port	Root port name (displayed only if a port of the device is the root port of the MSTI).

## display stp tc

Use **display stp tc** to display the incoming and outgoing TC/TCN BPDU statistics for ports.

### Syntax

```
display stp [ instance instance-list | vlan vlan-id-list ] tc [ slot slot-number ]
```

### Views

Any view

### Predefined user roles

network-admin  
network-operator

### Parameters

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

**slot** *slot-number*: Specifies an IRF member device by its member ID. If you do not specify a member device, this command displays information for all member devices.

### Usage guidelines

In STP or RSTP mode, the command output is sorted by port name.

In PVST mode, the command output is sorted by VLAN ID and by port name in each VLAN.

- If you do not specify a VLAN, this command applies to all VLANs.
- If you specify a VLAN list, this command applies to the specified VLANs.

In MSTP mode, the command output is sorted by MSTI ID and by port name in each MSTI.

- If you do not specify an MSTI, this command applies to all MSTIs.
- If you specify an MSTI list, this command applies to the specified MSTIs.

## Examples

# In MSTP mode, display the incoming and outgoing TC/TCN BPDU statistics for all ports on slot 1 in MSTI 0.

```
<Sysname> display stp instance 0 tc slot 1
----- STP slot 1 TC or TCN count -----
MST ID      Port                               Receive      Send
0           Ten-GigabitEthernet1/0/1          6             4
0           Ten-GigabitEthernet1/0/2          0             2
```

# In PVST mode, display the incoming and outgoing TC/TCN BPDU statistics for all ports on slot 1 in VLAN 2.

```
<Sysname> display stp vlan 2 tc slot 1
----- STP slot 1 TC or TCN count -----
VLAN ID     Port                               Receive      Send
2           Ten-GigabitEthernet1/0/1          6             4
2           Ten-GigabitEthernet1/0/2          0             2
```

**Table 10 Command output**

Field	Description
Port	Port name.
Receive	Number of TC/TCN BPDUs received on a port.
Send	Number of TC/TCN BPDUs sent by a port.

## instance

Use **instance** to map a list of VLANs to an MSTI.

Use **undo instance** to remap the specified VLAN or all VLANs to the CIST (MSTI 0).

### Syntax

**instance** *instance-id* **vlan** *vlan-id-list*

**undo instance** *instance-id* [ **vlan** *vlan-id-list* ]

### Default

All VLANs are mapped to the CIST.

### Views

MST region view

### Predefined user roles

network-admin

### Parameters

*instance-id*: Specifies an MSTI ID in the range of 0 to 4094. A value of 0 represents the CIST. The value range for the *instance-id* argument is 1 to 4094 for the **undo instance** command.

**vlan** *vlan-id-list*. Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

## Usage guidelines

---

### CAUTION:

Use caution with global Digest Snooping in the following situations:

- When you modify the VLAN-to-instance mappings.
- When you restore the default MST region configuration.

If the local device has different VLAN-to-instance mappings than its neighboring devices, loops or traffic interruption will occur.

---

If you do not specify any VLANs in the **undo instance** command, all VLANs mapped to the specified MSTI are remapped to the CIST.

You cannot map a VLAN to different MSTIs. If you map a VLAN that has been mapped to an MSTI to a new MSTI, the old mapping is automatically deleted.

You can configure VLAN-to-instance mapping for up to 65 MSTIs.

After configuring this command, run the **active region-configuration** command to activate the VLAN-to-instance mapping.

## Examples

```
# Map VLAN 2 to MSTI 1.
<Sysname> system-view
[Sysname] stp region-configuration
[Sysname-mst-region] instance 1 vlan 2
```

## Related commands

**active region-configuration**  
**check region-configuration**  
**display stp region-configuration**

## region-name

Use **region-name** to configure the MST region name.

Use **undo region-name** to restore the default MST region name.

## Syntax

**region-name** *name*  
**undo region-name**

## Default

The MST region name of the device is its MAC address.

## Views

MST region view

## Predefined user roles

network-admin

## Parameters

*name*: Specifies the MST region name, a string of 1 to 32 characters.

## Usage guidelines

The MST region name, the VLAN-to-instance mapping table, and the MSTP revision level of a device determine the device's MST region.

After configuring this command, execute the **active region-configuration** command to activate the configured MST region name.

## Examples

```
# Set the MST region name of the device to hello.
```

```
<Sysname> system-view
[Sysname] stp region-configuration
[Sysname-mst-region] region-name hello
```

## Related commands

- active region-configuration**
- check region-configuration**
- display stp region-configuration**
- instance**
- revision-level**
- vlan-mapping modulo**

## reset stp

Use **reset stp** to clear the spanning tree statistics.

### Syntax

```
reset stp [ interface interface-list ]
```

### Views

User view

### Predefined user roles

network-admin

### Parameters

**interface** *interface-list*: Specifies a space-separated list of up to 10 interface items. Each item specifies an interface or a range of interfaces in the form of *interface-type interface-number 1* [ **to** *interface-type interface-number 2* ]. The interface number for *interface-number 2* must be equal to or greater than the interface number for *interface-number 1*. If you do not specify this option, this command clears the spanning tree statistics on all ports.

### Examples

```
# Clear the spanning tree statistics on ports Ten-GigabitEthernet 1/0/1 through Ten-GigabitEthernet 1/0/3.
```

```
<Sysname> reset stp interface ten-gigabitethernet 1/0/1 to ten-gigabitethernet 1/0/3
```

### Related commands

- display stp**

## revision-level

Use **revision-level** to configure the MSTP revision level.

Use **undo revision-level** to restore the default MSTP revision level.

## Syntax

**revision-level** *level*  
**undo revision-level**

## Default

The MSTP revision level is 0.

## Views

MST region view

## Predefined user roles

network-admin

## Parameters

*level*: Specifies an MSTP revision level in the range of 0 to 65535.

## Usage guidelines

The MSTP revision level, the MST region name, and the VLAN-to-instance mapping table of a device determine the device's MST region.

After configuring this command, execute the **active region-configuration** command to activate the configured MST region level.

## Examples

```
# Set the MSTP revision level of the MST region to 5.  
<Sysname> system-view  
[Sysname] stp region-configuration  
[Sysname-mst-region] revision-level 5
```

## Related commands

**active region-configuration**  
**check region-configuration**  
**display stp region-configuration**  
**instance**  
**region-name**  
**vlan-mapping modulo**

# snmp-agent trap enable stp

Use **snmp-agent trap enable stp** to enable SNMP notifications for new-root election events or spanning tree topology changes.

Use **undo snmp-agent trap enable stp** to disable SNMP notifications for new-root election events or spanning tree topology changes.

## Syntax

**snmp-agent trap enable stp** [ **new-root** | **tc** ]  
**undo snmp-agent trap enable stp** [ **new-root** | **tc** ]

## Default

SNMP notifications are disabled for new-root election events.

In MSTP mode, SNMP notifications are enabled in MSTI 0 and disabled in other MSTIs for spanning tree topology changes.

In PVST mode, SNMP notifications are disabled for spanning tree topology changes in all VLANs.

## Views

System view

## Predefined user roles

network-admin

## Parameters

**new-root**: Enables the device to send notifications if the device is elected as a new root bridge. This keyword applies only to STP, MSTP, and RSTP modes.

**tc**: Enables the device to send notifications if the device receives TCN BPDUs. This keyword applies only to PVST mode.

## Usage guidelines

If no keyword is specified, the **snmp-agent trap enable stp** command applies to SNMP notifications for different events as follows:

- In STP, MSTP, and RSTP modes, the command applies to SNMP notifications for new-root election events.
- In PVST mode, the command applies to SNMP notifications for spanning tree topology changes.

## Examples

```
# Enable SNMP notifications for new-root election events.
```

```
<Sysname> system-view
```

```
[Sysname] snmp-agent trap enable stp new-root
```

# stp bpdu-protection

Use **stp bpdu-protection** to enable BPDU guard globally.

Use **undo stp bpdu-protection** to disable BPDU guard globally.

## Syntax

```
stp bpdu-protection
```

```
undo stp bpdu-protection
```

## Default

BPDU guard is globally disabled.

## Views

System view

## Predefined user roles

network-admin

## Examples

```
# Enable BPDU guard globally.
```

```
<Sysname> system-view
```

```
[Sysname] stp bpdu-protection
```

## Related commands

**stp edged-port**  
**stp port bpdu-protection**

# stp bridge-diameter

Use **stp bridge-diameter** to set the network diameter. The switched network diameter refers to the maximum number of devices on the path for an edge device to reach another through the root bridge.

Use **undo stp bridge-diameter** to restore the default.

## Syntax

```
stp [ vlan vlan-id-list ] bridge-diameter diameter  
undo stp [ vlan vlan-id-list ] bridge-diameter
```

## Default

The network diameter of the switched network is 7.

## Views

System view

## Predefined user roles

network-admin

## Parameters

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094. If you set the STP, RSTP, or MSTP switched network diameter, do not specify this option.

*diameter*: Specifies the switched network diameter in the range of 2 to 7.

## Usage guidelines

An appropriate setting of hello time, forward delay, and max age can speed up network convergence. The values of these timers are related to the network size, and you can set the timers by setting the network diameter. With the network diameter set to 7 (the default), the three timers are also set to their defaults.

In STP, RSTP, or MSTP mode, each MST region is considered as a device. The configured network diameter of the switched network takes effect only on the CIST (or the common root bridge).

In PVST mode, the configured network diameter takes effect only on the root bridges of the specified VLANs.

## Examples

# In MSTP mode, set the network diameter of the switched network to 5.

```
<Sysname> system-view  
[Sysname] stp bridge-diameter 5
```

# In PVST mode, set the network diameter of VLAN 2 in the switched network to 5.

```
<Sysname> system-view  
[Sysname] stp vlan 2 bridge-diameter 5
```

## Related commands

**stp timer forward-delay**  
**stp timer hello**

**stp timer max-age**

## stp compliance

Use **stp compliance** to configure the mode a port uses to recognize and send MSTP BPDUs.

Use **undo stp compliance** to restore the default.

### Syntax

**stp compliance { auto | dot1s | legacy }**

**undo stp compliance**

### Default

A port automatically recognizes the formats of received MSTP packets and determines the formats of MSTP packets to be sent based on the recognized formats.

### Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

### Predefined user roles

network-admin

### Parameters

**auto**: Configures the port to recognize the MSTP BPDU format automatically and determine the format of MSTP BPDUs to send.

**dot1s**: Configures the port to receive and send only standard-format (802.1s-compliant) MSTP BPDUs.

**legacy**: Configures the port to receive and send only compatible-format MSTP BPDUs.

### Usage guidelines

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

### Examples

# Configure Ten-GigabitEthernet 1/0/1 to send only standard-format (802.1s) MSTP packets.

```
<Sysname> system-view
```

```
[Sysname] interface ten-gigabitethernet 1/0/1
```

```
[Sysname-Ten-GigabitEthernet1/0/1] stp compliance dot1s
```

## stp config-digest-snooping

Use **stp config-digest-snooping** to enable Digest Snooping.

Use **undo stp config-digest-snooping** to disable Digest Snooping.

### Syntax

**stp config-digest-snooping**

**undo stp config-digest-snooping**

## Default

Digest Snooping is disabled.

## Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Usage guidelines

For Digest Snooping to take effect, you must enable Digest Snooping both globally and on associated ports. As a best practice, first enable Digest Snooping on ports connected to third-party vendor devices and then enable the feature globally. Digest Snooping takes effect on the ports simultaneously, which reduces impact on the network.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

# Enable Digest Snooping on Ten-GigabitEthernet 1/0/1 and then globally.

```
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp config-digest-snooping
[Sysname-Ten-GigabitEthernet1/0/1] quit
[Sysname] stp global config-digest-snooping
```

## Related commands

**display stp**

**stp global config-digest-snooping**

## stp cost

Use **stp cost** to set the path cost of a port.

Use **undo stp cost** to restore the default.

## Syntax

**stp** [ **instance** *instance-list* | **vlan** *vlan-id-list* ] **cost** *cost-value*

**undo stp** [ **instance** *instance-list* | **vlan** *vlan-id-list* ] **cost**

## Default

The device automatically calculates the path costs of ports in each spanning tree based on the corresponding standard.

## Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Parameters

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

**cost-value**: Specifies the path cost of the port, with an effective range that varies by path cost calculation standard that is used.

- When the IEEE 802.1d-1998 standard is selected for path cost calculation, the value range for the *cost* argument is 1 to 65535.
- When the IEEE 802.1t standard is selected for path cost calculation, the value range for the *cost* argument is 1 to 200000000.
- When the private standard is selected for path cost calculation, the value range for the *cost* argument is 1 to 200000.

## Usage guidelines

Path cost is an important factor in spanning tree calculation. Setting different path costs for a port in MSTIs allows VLAN traffic flows to be forwarded along different physical links. This results in VLAN-based load balancing.

The path cost setting of a port can affect the role selection of the port. When the path cost of a port is changed, the system calculates the role of the port and initiates a state transition.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

If you do not specify an MSTI or VLAN, this command sets the path cost of a port in the MSTP CIST or in the STP or RSTP spanning tree.

## Examples

# In MSTP mode, set the path cost to 200 for Ten-GigabitEthernet 1/0/1 in MSTI 2.

```
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp instance 2 cost 200
```

# In PVST mode, set the path cost to 200 for Ten-GigabitEthernet 1/0/1 in VLAN 2.

```
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp vlan 2 cost 200
```

## Related commands

**display stp**

**stp pathcost-standard**

## stp dispute-protection

Use **stp dispute-protection** to enable dispute guard.

Use **undo stp dispute-protection** to disable dispute guard.

### Syntax

**stp dispute-protection**

**undo stp dispute-protection**

### Default

Dispute guard is enabled.

### Views

System view

### Predefined user roles

network-admin

### Usage guidelines

Dispute guard blocks a port to prevent loops when an unidirectional link is detected on the port by the spanning tree feature.

In some VLAN networks, an uplink port on a downstream device is configured to deny packets from the PVID. As a result, the downstream device cannot receive BPDUs of the PVID from the upstream device. However, the upstream device can receive BPDUs from the downstream device. In this case, dispute guard blocks the receiving port on the upstream device, which causes traffic interruption.

To ensure service continuity and prevent the link from being blocked, you can disable dispute guard by using the **undo stp dispute-protection** command.

### Examples

```
# Disable dispute guard.  
<Sysname> system-view  
[Sysname] undo stp dispute-protection
```

## stp edged-port

Use **stp edged-port** to configure a port as an edge port.

Use **undo stp edged-port** to restore the default.

### Syntax

**stp edged-port**

**undo stp edged-port**

### Default

All ports are non-edge ports.

### Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

### Predefined user roles

network-admin

## Usage guidelines

A port directly connecting to a user terminal rather than another device or a shared LAN segment can be configured as an edge port. In case the network topology changes, an edge port does not cause a temporary loop. You can enable the port to transit to the forwarding state rapidly by configuring it as an edge port. As a best practice, configure ports that directly connect to user terminals as edge ports.

Typically, configuration BPDUs from other devices cannot reach an edge port, because the edge port does not connect to any other device. When BPDU guard is disabled on a port configured as an edge port, the port acts as a non-edge port if it receives configuration BPDUs.

On a port, the loop guard feature and the edge port setting are mutually exclusive.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# Configure Ten-GigabitEthernet 1/0/1 as an edge port.
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp edged-port
```

## Related commands

- stp bpd protection**
- stp loop-protection**
- stp port bpd protection**
- stp root-protection**

## stp enable

Use **stp enable** to enable the spanning tree feature.

Use **undo stp enable** to disable the spanning tree feature.

## Syntax

- stp enable**
- undo stp enable**

## Default

The spanning tree feature is enabled on all ports.

## Views

- Layer 2 Ethernet interface view
- Layer 2 aggregate interface view

## Predefined user roles

- network-admin

## Usage guidelines

When you enable the spanning tree feature, the device operates in STP, RSTP, PVST, or MSTP mode, depending on the spanning tree mode setting.

When you enable the spanning tree feature, the device dynamically maintains the spanning tree status of VLANs, based on received configuration BPDUs. When you disable the spanning tree feature, the device stops maintaining the spanning tree status.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# In MSTP mode, disable the spanning tree feature on Ten-GigabitEthernet 1/0/1.
```

```
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] undo stp enable
```

## Related commands

**stp global enable**

**stp mode**

**stp vlan enable**

# stp global config-digest-snooping

Use **stp global config-digest-snooping** to enable Digest Snooping globally.

Use **undo stp global config-digest-snooping** to disable Digest Snooping globally.

## Syntax

**stp global config-digest-snooping**

**undo stp global config-digest-snooping**

## Default

Digest Snooping is disabled globally.

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

For Digest Snooping to take effect, you must enable Digest Snooping both globally and on associated ports. As a best practice, first enable Digest Snooping on ports connected to third-party vendor devices and then enable the feature globally. Digest Snooping takes effect on the ports simultaneously, which reduces impact on the network.

## Examples

```
# Enable Digest Snooping on Ten-GigabitEthernet 1/0/1 and then globally.
```

```
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp config-digest-snooping
[Sysname-Ten-GigabitEthernet1/0/1] quit
[Sysname] stp global config-digest-snooping
```

## Related commands

**display stp**  
**stp config-digest-snooping**

# stp global enable

Use **stp global enable** to enable the spanning tree feature globally.

Use **undo stp global enable** to disable the spanning tree feature globally.

## Syntax

**stp global enable**  
**undo stp global enable**

## Default

When the device starts up with initial settings, the spanning tree feature is globally disabled.

When the device starts up with factory defaults, the spanning tree feature is globally enabled.

For more information about the initial settings and factory defaults, see *Fundamentals Configuration Guide*.

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

When you enable the spanning tree feature, the device operates in STP, RSTP, PVST, or MSTP mode, depending on the spanning tree mode setting.

When the spanning tree feature is enabled, the device dynamically maintains the spanning tree status of VLANs based on received configuration BPDUs. When the spanning tree feature is disabled, the device stops maintaining the spanning tree status.

## Examples

```
# Enable the spanning tree feature globally.  
<Sysname> system-view  
[Sysname] stp global enable
```

## Related commands

**stp enable**  
**stp mode**

# stp global mcheck

Use **stp global mcheck** to perform mCheck globally.

## Syntax

**stp global mcheck**

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

When a port on an MSTP, RSTP, or PVST device connects to an STP device and receives STP BPDUs, the port automatically transits to the STP mode. However, the port cannot automatically transit back to the original mode when the following conditions exist:

- The peer STP device is shut down or removed.
- The port cannot detect the change.

In this case, you can perform an mCheck operation to forcibly transit the port to operate in the original mode.

The device operates in STP, RSTP, PVST, or MSTP mode, depending on the spanning tree mode setting.

The **stp global mcheck** command takes effect only when the device operates in MSTP, RSTP, or PVST mode.

## Examples

```
# Perform mCheck globally.  
<Sysname> system-view  
[Sysname] stp global mcheck
```

## Related commands

**stp mcheck**

**stp mode**

# stp ignore-pvid-inconsistency

Use **stp ignore-pvid-inconsistency** to disable inconsistent PVID protection.

Use **undo stp ignore-pvid-inconsistency** to enable inconsistent PVID protection.

## Syntax

**stp ignore-pvid-inconsistency**

**undo stp ignore-pvid-inconsistency**

## Default

Inconsistent PVID protection is enabled.

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

This command takes effect only when the device is operating in PVST mode.

Disabling inconsistent PVID protection might cause spanning tree calculation errors. To avoid such errors, make sure the following requirements are met:

- Make sure the VLANs on one device do not use the same ID as the PVID of its peer port (except the default VLAN) on another device.
- If the local port or its peer is a hybrid port, do not configure the local and peer ports as untagged members of the same VLAN.

- Disable inconsistent PVID protection on both the local device and the peer device.

## Examples

# In PVST mode, disable the inconsistent PVID protection feature.

```
<Sysname> system-view
[Sysname] stp mode pvst
[Sysname] stp ignore-pvid-inconsistency
```

## stp log enable tc

Use **stp log enable tc** to enable the device to log events of detecting or receiving TC BPDUs.

Use **undo stp log enable tc** to restore the default.

### Syntax

```
stp log enable tc
undo stp log enable tc
```

### Default

In PVST mode, the device does not generate logs when it detects or receives TC BPDUs.

### Views

System view

### Predefined user roles

network-admin

### Usage guidelines

This command applies only to PVST mode.

## Examples

# In PVST mode, enable the device to log events of detecting or receiving TC BPDUs.

```
<Sysname> system-view
[Sysname] stp log enable tc
```

## stp loop-protection

Use **stp loop-protection** to enable loop guard on a port.

Use **undo stp loop-protection** to disable loop guard on a port.

### Syntax

```
stp loop-protection
undo stp loop-protection
```

### Default

Loop guard is disabled.

### Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

### Predefined user roles

network-admin

## Usage guidelines

On a port, the loop guard feature is mutually exclusive with the root guard feature or the edge port setting.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# Enable loop guard on Ten-GigabitEthernet 1/0/1.
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp loop-protection
```

## Related commands

**stp edged-port**

**stp root-protection**

## stp max-hops

Use **stp max-hops** to set the maximum number of hops for an MST region.

Use **undo stp max-hops** to restore the default.

## Syntax

**stp max-hops** *hops*

**undo stp max-hops**

## Default

The maximum number of hops for an MST region is 20.

## Views

System view

## Predefined user roles

network-admin

## Parameters

*hops*: Specifies the maximum hops in the range of 1 to 40.

## Examples

```
# Set the maximum hops of the MST region to 35.
<Sysname> system-view
[Sysname] stp max-hops 35
```

## Related commands

**display stp**

## stp mcheck

Use **stp mcheck** to perform mCheck on a port.

## Syntax

**stp mcheck**

## Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Usage guidelines

When a port on an MSTP, RSTP, or PVST device connects to an STP device and receives STP BPDUs, the port automatically transits to the STP mode. However, the port cannot automatically transit back to the original mode when the following conditions exist:

- The peer STP device is shut down or removed.
- The port cannot detect the change.

In this case, you can perform an mCheck operation to forcibly transit the port to operation in the original mode.

For example, Device A, Device B, and Device C are connected in sequence. Device A runs STP, Device B does not run any spanning tree protocol, and Device C runs RSTP, MSTP, or PVST. When Device C receives an STP BPDU transparently transmitted by Device B, the receiving port transits to the STP mode. If you configure Device B to run RSTP, MSTP, or PVST with Device C, perform mCheck operations on the ports that connect Device B and Device C.

The device operates in STP, RSTP, PVST, or MSTP mode, depending on the spanning tree mode setting.

The **stp mcheck** command takes effect only when the device operates in MSTP, RSTP, or PVST mode.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# Perform mCheck on Ten-GigabitEthernet 1/0/1.  
<Sysname> system-view  
[Sysname] interface ten-gigabitethernet 1/0/1  
[Sysname-Ten-GigabitEthernet1/0/1] stp mcheck
```

## Related commands

**stp global mcheck**

**stp mode**

## stp mode

Use **stp mode** to configure the spanning tree operating mode.

Use **undo stp mode** to restore the default.

## Syntax

**stp mode { mstp | pvst | rstp | stp }**

## **undo stp mode**

### **Default**

A spanning tree device operates in MSTP mode.

### **Views**

System view

### **Predefined user roles**

network-admin

### **Parameters**

**mstp**: Configures the spanning tree device to operate in MSTP mode.

**pvst**: Configures the spanning tree device to operate in PVST mode.

**rstp**: Configures the spanning tree device to operate in RSTP mode.

**stp**: Configures the spanning tree device to operate in STP mode.

### **Usage guidelines**

The MSTP mode is compatible with the RSTP mode, and the RSTP mode is compatible with the STP mode.

The PVST mode's compatibility with other modes is as follows:

- **Access port**—The PVST mode is compatible with other modes in any VLAN.
- **Trunk or hybrid port**—The PVST mode is compatible with other modes only in the default VLAN.

### **Examples**

```
# Configure the spanning tree device to operate in STP mode.  
<Sysname> system-view  
[Sysname] stp mode stp
```

### **Related commands**

**stp enable**

**stp global enable**

**stp global mcheck**

**stp mcheck**

**stp vlan enable.**

## **stp no-agreement-check**

Use **stp no-agreement-check** to enable No Agreement Check on a port.

Use **undo stp no-agreement-check** to disable No Agreement Check on a port.

### **Syntax**

**stp no-agreement-check**

**undo stp no-agreement-check**

### **Default**

No Agreement Check is disabled.

### **Views**

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

### Predefined user roles

network-admin

### Usage guidelines

This command takes effect only after you enable it on the root port.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

### Examples

```
# Enable No Agreement Check on Ten-GigabitEthernet 1/0/1.
```

```
<Sysname> system-view
```

```
[Sysname] interface ten-gigabitethernet 1/0/1
```

```
[Sysname-Ten-GigabitEthernet1/0/1] stp no-agreement-check
```

## stp pathcost-standard

Use **stp pathcost-standard** to specify a standard for the device to use when calculating the default path costs for ports.

Use **undo stp pathcost-standard** to restore the default.

### Syntax

```
stp pathcost-standard { dot1d-1998 | dot1t | legacy }
```

```
undo stp pathcost-standard
```

### Default

The default standard used by the device is **legacy**.

### Views

System view

### Predefined user roles

network-admin

### Parameters

**dot1d-1998**: Configures the device to calculate the default path cost for ports based on IEEE 802.1d-1998.

**dot1t**: Configures the device to calculate the default path cost for ports based on IEEE 802.1t.

**legacy**: Configures the device to calculate the default path cost for ports based on a private standard.

### Usage guidelines

If you change the standard that the device uses in calculating the default path costs, you restore the path costs to the default.

### Examples

```
# Configure the device to calculate the default path cost for ports based on IEEE 802.1d-1998.
```

```
<Sysname> system-view
```

```
[Sysname] stp pathcost-standard dot1d-1998
```

## Related commands

**display stp**

**stp cost**

## stp point-to-point

Use **stp point-to-point** to configure the link type of a port.

Use **undo stp point-to-point** to restore the default.

### Syntax

```
stp point-to-point { auto | force-false | force-true }
```

```
undo stp point-to-point
```

### Default

The default setting is **auto**, and the spanning tree device automatically detects whether a port connects to a point-to-point link.

### Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

### Predefined user roles

network-admin

### Parameters

**auto**: Specifies automatic detection of the link type.

**force-false**: Specifies the non-point-to-point link type.

**force-true**: Specifies the point-to-point link type.

### Usage guidelines

When connecting to a non-point-to-point link, a port is incapable of rapid state transition.

You can configure the link type as point-to-point for a Layer 2 aggregate interface or a port that operates in full duplex mode. As a best practice, use the default setting to let the device automatically detect the port link type.

In MSTP or PVST mode, the **stp point-to-point force-false** or **stp point-to-point force-true** command configured on a port takes effect on all MSTIs or VLANs.

Before you set the link type of a port to point-to-point, make sure the port is connected to a point-to-point link. Otherwise, a temporary loop might occur.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

### Examples

```
# Configure the link type of Ten-GigabitEthernet 1/0/1 as point-to-point.
```

```
<Sysname> system-view
```

```
[Sysname] interface ten-gigabitethernet 1/0/1
```

```
[Sysname-Ten-GigabitEthernet1/0/1] stp point-to-point force-true
```

## Related commands

**display stp**

# stp port bpdu-protection

Use **stp port bpdu-protection** to configure BPDU guard on an interface.

Use **undo port stp bpdu-protection** to restore the default.

## Syntax

**stp port bpdu-protection { enable | disable }**

**undo port stp bpdu-protection**

## Default

BPDU guard is not configured on a per-edge port basis. The status of BPDU guard on an interface is the same as the global BPDU guard status.

## Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Parameters

**enable:** Enables BPDU guard.

**disable:** Disables BPDU guard.

## Usage guidelines

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# Enable BPDU guard on Ten-GigabitEthernet 1/0/1.
```

```
<Sysname> system-view
```

```
[Sysname] interface ten-gigabitethernet 1/0/1
```

```
[Sysname-Ten-GigabitEthernet1/0/1] stp port bpdu-protection enable
```

## Related commands

**stp bpdu-protection**

**stp edged-port**

# stp port priority

Use **stp port priority** to set the priority of a port. The port priority affects the role of a port in a spanning tree.

Use **undo stp port priority** to restore the default.

## Syntax

```
stp [ instance instance-list | vlan vlan-id-list ] port priority priority  
undo stp [ instance instance-list | vlan vlan-id-list ] port priority
```

## Default

The port priority is 128.

## Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Parameters

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

**priority**: Specifies the port priority in the range of 0 to 240 in increments of 16 (as in 0, 16, 32).

## Usage guidelines

The smaller the value, the higher the port priority. If all ports on your device use the same priority value, the port priority depends on the port index. The smaller the index, the higher the priority.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

If you do not specify an MSTI or VLAN, this command configures the priority of the ports in the MSTP CIST or in the STP or RSTP spanning tree.

## Examples

```
# In MSTP mode, set the port priority of Ten-GigabitEthernet 1/0/1 to 16 in MSTI 2.
```

```
<Sysname> system-view  
[Sysname] interface ten-gigabitethernet 1/0/1  
[Sysname-Ten-GigabitEthernet1/0/1] stp instance 2 port priority 16
```

```
# In PVST mode, set the port priority of Ten-GigabitEthernet 1/0/1 to 16 in VLAN 2.
```

```
<Sysname> system-view  
[Sysname] interface ten-gigabitethernet 1/0/1  
[Sysname-Ten-GigabitEthernet1/0/1] stp vlan 2 port priority 16
```

## Related commands

```
display stp
```

## stp port shutdown permanent

Use **stp port shutdown permanent** to disable the device to reactivate the shutdown edge ports.

Use **undo stp port shutdown permanent** to restore the default.

## Syntax

**stp port shutdown permanent**

**undo stp port shutdown permanent**

## Default

The device reactivates the shutdown edge ports after a port status detection interval.

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

This command applies to edge ports that are shut down by BPDU guard after the command is executed. To bring up these ports, use the **undo shutdown** command.

You can use the **shutdown-interval** time command to set the port status detection interval after which the device reactivates the shutdown ports. For information about the **shutdown-interval** time command, see Fundamentals Command Reference.

## Examples

# Disable the device to reactivate shutdown edge ports.

```
<Sysname> system-view
```

```
[Sysname] stp port shutdown permanent
```

# stp port-log

Use **stp port-log** to enable outputting port state transition information.

Use **undo stp port-log** to disable outputting port state transition information.

## Syntax

**stp port-log** { **all** | **instance** *instance-list* | **vlan** *vlan-id-list* }

**undo stp port-log** { **all** | **instance** *instance-list* | **vlan** *vlan-id-list* }

## Default

Outputting port state transition information is disabled.

## Views

System view

## Predefined user roles

network-admin

## Parameters

**all**: Specifies all MSTIs or VLANs.

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*. Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

## Examples

# In MSTP mode, enable outputting port state transition information for MSTI 2.

```
<Sysname> system-view
[Sysname] stp port-log instance 2
%Aug 16 00:49:41:856 2011 Sysname STP/3/STP_DISCARDING: Instance 2's port
Ten-GigabitEthernet1/0/1 has been set to discarding state.
%Aug 16 00:49:41:856 2011 Sysname STP/3/STP_FORWARDING: Instance 2's port
Ten-GigabitEthernet1/0/2 has been set to forwarding state.
```

The output shows that Ten-GigabitEthernet 1/0/1 in MSTI 2 transited to the discarding state and Ten-GigabitEthernet 1/0/2 in MSTI 2 transited to the forwarding state.

# In PVST mode, enable outputting port state transition information for VLAN 1 through VLAN 4094.

```
<Sysname> system-view
[Sysname] stp port-log vlan 1 to 4094
%Aug 16 00:49:41:856 2006 Sysname STP/3/STP_DISCARDING: VLAN 2's Ten-GigabitEthernet1/0/1
has been set to discarding state.
%Aug 16 00:49:41:856 2006 Sysname STP/3/STP_FORWARDING: VLAN 2's Ten-GigabitEthernet1/0/2
has been set to forwarding state.
```

The output shows that Ten-GigabitEthernet 1/0/1 in VLAN 2 transited to the discarding state and Ten-GigabitEthernet 1/0/2 in VLAN 2 transited to the forwarding state.

## stp priority

Use **stp priority** to set the priority of the device.

Use **undo stp priority** to restore the default.

### Syntax

**stp** [ **instance** *instance-list* | **vlan** *vlan-id-list* ] **priority** *priority*

**undo stp** [ **instance** *instance-list* | **vlan** *vlan-id-list* ] **priority**

### Default

The device priority is 32768.

### Views

System view

### Predefined user roles

network-admin

### Parameters

**instance** *instance-list*. Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*. Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

*priority*. Specifies the device priority in the range of 0 to 61440 in increments of 4096 (as in 0, 4096, 8192). You can set up to 16 priority values on the device. The smaller the value, the higher the device priority.

### Usage guidelines

If you do not specify an MSTI or VLAN, this command configures the priority of the device in the MSTP CIST or in the STP or RSTP spanning tree.

### Examples

```
# In MSTP mode, set the device priority to 4096 in MSTI 1.
```

```
<Sysname> system-view  
[Sysname] stp instance 1 priority 4096
```

```
# In PVST mode, set the device priority to 4096 in VLAN 1.
```

```
<Sysname> system-view  
[Sysname] stp vlan 1 priority 4096
```

## stp pvst-bpdu-protection

Use **stp pvst-bpdu-protection** to enable PVST BPDU guard.

Use **undo stp pvst-bpdu-protection** to disable PVST BPDU guard.

### Syntax

```
stp pvst-bpdu-protection  
undo stp pvst-bpdu-protection
```

### Default

PVST BPDU guard is disabled.

### Views

System view

### Predefined user roles

network-admin

### Usage guidelines

PVST BPDU guard enables an MSTP-enabled device to shut down a port if the port receives PVST BPDUs. The shutdown port is brought up after a detection timer expires. To set the detection timer, use the **shutdown-interval** command.

### Examples

```
# In MSTP mode, enable PVST BPDU guard.
```

```
<Sysname> system-view  
[Sysname] stp pvst-bpdu-protection
```

### Related commands

**shutdown-interval** (For more information, see *Fundamentals Command Reference*.)

## stp region-configuration

Use **stp region-configuration** to enter MST region view.

Use **undo stp region-configuration** to restore the default MST region configurations.

## Syntax

```
stp region-configuration
undo stp region-configuration
```

## Default

The default settings for an MST region are as follows:

- The MST region name of the device is its MAC address.
- All VLANs are mapped to the CIST.
- The MSTP revision level is 0.

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

After you enter MST region view, you can configure MST region parameters, including the region name, VLAN-to-instance mappings, and revision level.

## Examples

```
# Enter MST region view.
<Sysname> system-view
[Sysname] stp region-configuration
[Sysname-mst-region]
```

# stp role-restriction

Use **stp role-restriction** to enable port role restriction.

Use **undo stp role-restriction** to disable port role restriction.

## Syntax

```
stp role-restriction
undo stp role-restriction
```

## Default

Port role restriction is disabled.

## Views

Layer 2 Ethernet interface view  
Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Usage guidelines

When port role restriction is enabled on a port, the port cannot become a root port.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# Enable port role restriction on Ten-GigabitEthernet 1/0/1.
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp role-restriction
```

## stp root primary

Use **stp root primary** to configure the device as the root bridge.

Use **undo stp root** to restore the default.

### Syntax

```
stp [ instance instance-list | vlan vlan-id-list ] root primary
undo stp [ instance instance-list | vlan vlan-id-list ] root
```

### Default

The device is not a root bridge.

### Views

System view

### Predefined user roles

network-admin

### Parameters

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

### Usage guidelines

Once you specify the device as the root bridge, you cannot change the priority of the device.

If you do not specify an MSTI or VLAN, this command configures the device as the root bridge of the MSTP CIST or of the STP or RSTP spanning tree.

## Examples

```
# In MSTP mode, specify the device as the root bridge of MSTI 1.
<Sysname> system-view
[Sysname] stp instance 1 root primary

# In PVST mode, specify the device as the root bridge of VLAN 1.
<Sysname> system-view
[Sysname] stp vlan 1 root primary
```

### Related commands

**stp priority**

**stp root secondary**

## stp root secondary

Use **stp root secondary** to configure the device as a secondary root bridge.

Use **undo stp root** to restore the default.

### Syntax

```
stp [ instance instance-list | vlan vlan-id-list ] root secondary
```

```
undo stp [ instance instance-list | vlan vlan-id-list ] root
```

### Default

The device is not a secondary root bridge.

### Views

System view

### Predefined user roles

network-admin

### Parameters

**instance** *instance-list*: Specifies a space-separated list of up to 10 MSTI items. Each item specifies an MSTI or a range of MSTIs in the form of *instance-id1* [ **to** *instance-id2* ]. The value for *instance-id2* must be equal to or greater than the value for *instance-id1*. The value range for the *instance-id* argument is 0 to 4094, and the value 0 represents the CIST.

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094.

### Usage guidelines

Once you specify the device as a secondary root bridge, you cannot change the priority of the device.

If you do not specify an MSTI or VLAN, this command configures a secondary root bridge for the MSTP CIST or the STP or RSTP spanning tree.

### Examples

```
# In MSTP mode, specify the device as a secondary root bridge in MSTI 1.
```

```
<Sysname> system-view
```

```
[Sysname] stp instance 1 root secondary
```

```
# In PVST mode, specify the device as a secondary root bridge in VLAN 1.
```

```
<Sysname> system-view
```

```
[Sysname] stp vlan 1 root secondary
```

### Related commands

**stp priority**

**stp root primary**

## stp root-protection

Use **stp root-protection** to enable root guard on a port.

Use **undo stp root-protection** to disable root guard on a port.

### Syntax

```
stp root-protection
```

## **undo stp root-protection**

### **Default**

Root guard is disabled.

### **Views**

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

### **Predefined user roles**

network-admin

### **Usage guidelines**

On a port, the loop guard feature and the root guard feature are mutually exclusive.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

### **Examples**

```
# Enable root guard on Ten-GigabitEthernet 1/0/1.  
<Sysname> system-view  
[Sysname] interface ten-gigabitethernet 1/0/1  
[Sysname-Ten-GigabitEthernet1/0/1] stp root-protection
```

### **Related commands**

**stp edged-port**

**stp loop-protection**

## **stp tc-protection**

Use **stp tc-protection** to enable TC-BPDU attack guard for the device.

Use **undo stp tc-protection** to disable TC-BPDU attack guard for the device.

### **Syntax**

**stp tc-protection**

**undo stp tc-protection**

### **Default**

TC-BPDU attack guard is enabled.

### **Views**

System view

### **Predefined user roles**

network-admin

### **Usage guidelines**

With TC-BPDU guard, you can set the maximum number of immediate forwarding address entry flushes that the device can perform every 10 seconds. For TC-BPDUs received that exceed the limit, the device performs a forwarding address entry flush when the interval elapses. This prevents frequent flushing of forwarding address entries.

## Examples

```
# Disable TC-BPDU attack guard for the device.
<Sysname> system-view
[Sysname] undo stp tc-protection
```

## Related commands

**stp tc-protection threshold**

# stp tc-protection threshold

Use **stp tc-protection threshold** to set the maximum number of forwarding address entry flushes that the device can perform every 10 seconds.

Use **undo stp tc-protection threshold** to restore the default.

## Syntax

```
stp tc-protection threshold number
undo stp tc-protection threshold
```

## Default

By default, the device can perform a maximum of 6 forwarding address entry flushes every 10 seconds.

## Views

System view

## Predefined user roles

network-admin

## Parameters

*number*: Specifies the maximum number of immediate forwarding address entry flushes that the device can perform every 10 seconds. The value is in the range of 1 to 255.

## Examples

```
# Configure the device to perform up to 10 forwarding address entry flushes every 10 seconds.
<Sysname> system-view
[Sysname] stp tc-protection threshold 10
```

## Related commands

**stp tc-protection**

# stp tc-restriction

Use **stp tc-restriction** to enable TC-BPDU transmission restriction.

Use **undo stp tc-restriction** to disable TC-BPDU transmission restriction.

## Syntax

```
stp tc-restriction
undo stp tc-restriction
```

## Default

TC-BPDU transmission restriction is disabled.

## Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Usage guidelines

When TC-BPDU transmission restriction is enabled on a port, the port does not send TC-BPDUs to other ports. It also does not delete MAC address entries.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# Enable TC-BPDU transmission restriction on Ten-GigabitEthernet 1/0/1.
```

```
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp tc-restriction
```

# stp tc-snooping

Use **stp tc-snooping** to enable TC Snooping.

Use **undo stp tc-snooping** to disable TC Snooping.

## Syntax

**stp tc-snooping**

**undo stp tc-snooping**

## Default

TC Snooping is disabled.

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

TC Snooping and the spanning tree feature are mutually exclusive. You must globally disable the spanning tree feature before enabling TC Snooping.

## Examples

```
# Globally disable the spanning tree feature and enable TC Snooping.
```

```
<Sysname> system-view
[Sysname] undo stp global enable
[Sysname] stp tc-snooping
```

## Related commands

**stp global enable**

# stp timer forward-delay

Use **stp timer forward-delay** to set the forward delay timer.

Use **undo stp timer forward-delay** to restore the default.

## Syntax

```
stp [ vlan vlan-id-list ] timer forward-delay time
```

```
undo stp [ vlan vlan-id-list ] timer forward-delay
```

## Default

The forward delay timer is 1500 centiseconds.

## Views

System view

## Predefined user roles

network-admin

## Parameters

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094. If you set the STP, RSTP, or MSTP forward delay, do not specify this option.

**time**: Specifies the forward delay in centiseconds, in the range of 400 to 3000 in increments of 100 (as in 400, 500, 600).

## Usage guidelines

The forward delay timer determines the time interval of state transition. To prevent temporary loops, a spanning tree port goes through the learning (intermediate) state before it transits from the discarding state to the forwarding state. To stay synchronized with the remote device, the port has a wait period that is determined by the forward delay timer between transition states.

As a best practice, do not set the forward delay with this command. Instead, you can specify the network diameter of the switched network by using the **stp bridge-diameter** command. This command makes the spanning tree protocols automatically calculate the optimal settings for the forward delay timer. If the network diameter uses the default value, the forward delay timer also uses the default value.

## Examples

```
# In MSTP mode, set the forward delay timer to 2000 centiseconds.
```

```
<Sysname> system-view  
[Sysname] stp timer forward-delay 2000
```

```
# In PVST mode, set the forward delay timer for VLAN 2 to 2000 centiseconds.
```

```
<Sysname> system-view  
[Sysname] stp vlan 2 timer forward-delay 2000
```

## Related commands

**stp bridge-diameter**

**stp timer hello**

**stp timer max-age**

# stp timer hello

Use **stp timer hello** to set the hello time.

Use **undo stp timer hello** to restore the default.

## Syntax

**stp [ vlan *vlan-id-list* ] timer hello *time***

**undo stp [ vlan *vlan-id-list* ] timer hello**

## Default

The hello time is 200 centiseconds.

## Views

System view

## Predefined user roles

network-admin

## Parameters

**vlan *vlan-id-list***: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094. If you set the STP, RSTP, or MSTP hello time, do not specify this option.

***time***: Specifies the hello time in centiseconds, in the range of 100 to 1000 in increments of 100 (as in 100, 200, 300).

## Usage guidelines

Hello time is the interval at which spanning tree devices send configuration BPDUs to maintain the spanning tree. If a device fails to receive configuration BPDUs within the set period of time, a new spanning tree calculation process is triggered.

As a best practice, do not set the hello time with this command. Instead, you can specify the network diameter of the switched network by using the **stp bridge-diameter** command. This command makes the spanning tree protocols automatically calculate the optimal settings for the hello timer. If the network diameter uses the default value, the hello timer also uses the default value.

## Examples

# In MSTP mode, set the hello time to 400 centiseconds.

```
<Sysname> system-view  
[Sysname] stp timer hello 400
```

# In PVST mode, set the hello time for VLAN 2 to 400 centiseconds.

```
<Sysname> system-view  
[Sysname] stp vlan 2 timer hello 400
```

## Related commands

**stp bridge-diameter**

**stp timer forward-delay**

**stp timer max-age**

# stp timer max-age

Use **stp timer max-age** to set the max age timer.

Use **undo stp timer max-age** to restore the default.

## Syntax

```
stp [ vlan vlan-id-list ] timer max-age time  
undo stp [ vlan vlan-id-list ] timer max-age
```

## Default

The max age is 2000 centiseconds.

## Views

System view

## Predefined user roles

network-admin

## Parameters

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094. If you set the STP, RSTP, or MSTP max age, do not specify this option.

**time**: Specifies the max age in centiseconds, in the range of 600 to 4000 in increments of 100 (as in 600, 700, 800).

## Usage guidelines

In the CIST of an MSTP network, the device determines whether a configuration BPDU received on a port has expired based on the max age timer. If the configuration BPDU has expired, a new spanning tree calculation process starts. The max age timer takes effect only on the CIST (or MSTI 0).

As a best practice, do not set the max age timer with this command. Instead, you can specify the network diameter of the switched network by using the **stp bridge-diameter** command. This command makes the spanning tree protocols automatically calculate the optimal settings for the max age timer. If the network diameter uses the default value, the max age timer also uses the default value.

## Examples

```
# In MSTP mode, set the max age timer to 1000 centiseconds.  
<Sysname> system-view  
[Sysname] stp timer max-age 1000  
  
# In PVST mode, set the max age timer for VLAN 2 to 1000 centiseconds.  
<Sysname> system-view  
[Sysname] stp vlan 2 timer max-age 1000
```

## Related commands

```
stp bridge-diameter  
stp timer forward-delay  
stp timer hello
```

## stp timer-factor

Use **stp timer-factor** to configure the timeout period by setting the timeout factor.

Timeout period = timeout factor × 3 × hello time.

Use **undo stp timer-factor** to restore the default.

## Syntax

```
stp timer-factor factor  
undo stp timer-factor
```

## Default

The timeout factor of the device is set to 3.

## Views

System view

## Predefined user roles

network-admin

## Parameters

*factor*: Specifies the timeout factor in the range of 1 to 20.

## Usage guidelines

In a stable network, each non-root-bridge forwards configuration BPDUs to surrounding devices at the interval of hello time to determine whether any link fails. If a device does not receive a BPDU from the upstream device within nine times of the hello time, it assumes that the upstream device has failed. Then it will start a new spanning tree calculation process.

As a best practice, set the timeout factor to 5, 6, or 7 in the following situations:

- To prevent undesired spanning tree calculations. An upstream device might be too busy to forward configuration BPDUs in time, for example, many Layer 2 interfaces are configured on the upstream device. In this case, the downstream device fails to receive a BPDU within the timeout period and then starts an undesired spanning tree calculation.
- To save network resources on a stable network.

## Examples

```
# Set the timeout factor of the device to 7.  
<Sysname> system-view  
[Sysname] stp timer-factor 7
```

## Related commands

```
stp timer hello
```

# stp transmit-limit

Use **stp transmit-limit** to set the BPDU transmission rate of a port.

Use **undo stp transmit-limit** to restore the default.

## Syntax

```
stp transmit-limit limit  
undo stp transmit-limit
```

## Default

The BPDU transmission rate of all ports is 10.

## Views

Layer 2 Ethernet interface view  
Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Parameters

*limit*: Specifies the BPDU transmission rate in the range of 1 to 255.

## Usage guidelines

The maximum number of BPDUs a port can send within each hello time equals the BPDU transmission rate plus the hello timer value.

A larger BPDU transmission rate value requires more system resources. An appropriate BPDU transmission rate setting can prevent spanning tree protocols from using excessive bandwidth resources during network topology changes. As a best practice, use the default value.

If this command is configured in Layer 2 Ethernet interface view, it takes effect only on that interface.

If this command is configured in Layer 2 aggregate interface view, it takes effect only on the aggregate interface.

If this command is configured on a member port in an aggregation group, it takes effect only after the port leaves the aggregation group.

## Examples

```
# Set the BPDU transmission rate of Ten-GigabitEthernet 1/0/1 to 5.
```

```
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp transmit-limit 5
```

# stp transparent enable

Use **stp transparent enable** to enable BPDU transparent transmission on a port.

Use **undo stp transparent enable** to disable BPDU transparent transmission on a port.

## Syntax

**stp transparent enable**

**undo stp transparent enable**

## Default

The BPDU transparent transmission feature is disabled on a port.

## Views

Layer 2 Ethernet interface view

Layer 2 aggregate interface view

## Predefined user roles

network-admin

## Usage guidelines

Whether the spanning tree protocols are enabled on a port does not affect the BPDU transparent transmission feature.

If this feature and the spanning tree protocol are enabled on a port which is inferior to its downstream port, the downstream port can receive BPDUs from that port. To prevent network flapping caused by this problem, disable the spanning tree protocol before you enable BPDU transparent transmission on the port.

## Examples

```
# Enable BPDU transparent transmission on Ten-GigabitEthernet 1/0/1.
<Sysname> system-view
[Sysname] interface ten-gigabitethernet 1/0/1
[Sysname-Ten-GigabitEthernet1/0/1] stp transparent enable
```

## stp vlan enable

Use **stp vlan enable** to enable the spanning tree feature for VLANs.

Use **undo stp enable** to disable the spanning tree feature for VLANs.

### Syntax

```
stp vlan vlan-id-list enable
undo stp vlan vlan-id-list enable
```

### Default

The spanning tree feature is enabled in VLANs.

### Views

System view

### Predefined user roles

network-admin

### Parameters

**vlan** *vlan-id-list*: Specifies a space-separated list of up to 10 VLAN items. Each item specifies a VLAN or a range of VLANs in the form of *vlan-id1* [ **to** *vlan-id2* ]. The value for *vlan-id2* must be equal to or greater than the value for *vlan-id1*. The value range for the *vlan-id* argument is 1 to 4094. If you do not specify this option, this command globally enables or disables the spanning tree feature (VLANs are not included).

### Usage guidelines

When you enable the spanning tree feature, the device operates in STP, RSTP, PVST, or MSTP mode, depending on the spanning tree mode setting.

When you enable the spanning tree feature, the device dynamically maintains the spanning tree status of VLANs, based on received configuration BPDUs. When you disable the spanning tree feature, the device stops maintaining the spanning tree status.

## Examples

```
# In PVST mode, globally enable the spanning tree feature and then enable the spanning tree
feature for VLAN 2.
<Sysname> system-view
[Sysname] stp mode pvst
[Sysname] stp global enable
[Sysname] stp vlan 2 enable
```

### Related commands

```
stp enable
stp global enable
stp mode
```

# vlan-mapping modulo

Use **vlan-mapping modulo** to map VLANs in an MST region to MSTIs according to the specified modulo value and quickly create a VLAN-to-instance mapping table.

## Syntax

**vlan-mapping modulo** *modulo*

## Default

All VLANs are mapped to the CIST (MSTI 0).

## Views

MST region view

## Predefined user roles

network-admin

## Parameters

*modulo*: Specifies the modulo value. The value range for the *modulo* argument is 1 to 64.

## Usage guidelines

You cannot map a VLAN to different MSTIs. If you map a VLAN that has been mapped to an MSTI to a new MSTI, the old mapping is automatically deleted.

This command maps each VLAN to the MSTI with ID  $(\text{VLAN ID} - 1) \% \text{modulo} + 1$ .  $(\text{VLAN ID} - 1) \% \text{modulo}$  is the modulo operation for  $(\text{VLAN ID} - 1)$ . If the modulo value is 15, then VLAN 1 is mapped to MSTI 1, VLAN 2 to MSTI 2, ..., VLAN 15 to MSTI 15, VLAN 16 to MSTI 16, and so on.

## Examples

# Map VLANs to MSTIs as per modulo 8.

```
<Sysname> system-view
[Sysname] stp region-configuration
[Sysname-mst-region] vlan-mapping modulo 8
```

## Related commands

**active region-configuration**

**check region-configuration**

**display stp region-configuration**

**region-name**

**revision-level**