

Rapid PVST+ Configuration

802.1D, 802.1w, and 802.1s are spanning tree protocols that avoid the loop in Layer 2. You can configure the parameters of rapid-PVST+, including bridge-priority, forward-delay, max-age, and hello-time interval.

NOTE:

- On a chassis switch, a maximum of 64 VLANs can be enabled for rapid-PVST+ mode.
- Once the spanning tree protocol is enabled on the network, the port starts to perform spanning tree calculation. Parameters such as the device priority and port priority affect spanning tree calculation, and the change of these parameters may cause network flapping. To ensure fast and stable spanning tree calculation, configure parameters such as the device priority and port priority before enabling spanning tree protocols.
- For rapid-PVST+ in PICOS switches, the value of **Organization Code** field in the BPDUs is 00:00:00. The peer devices with a different value should ignore the compatibility check of this field, otherwise, it may cause device connection problems due to compatibility issues.
- Rapid PVST+ blocks traffic from the dynamic VLAN delivered from the RADIUS authentication server.

When using rapid-PVST+, pay attention to the following two points:

- For the trunk port
 - In VLAN 1 and the native VLAN, the rapid-PVST+ device sends standard RSTP and rapid-PVST+ packets (untagged, the destination MAC address is 01-80-C2-00-00-00) to negotiate with the peer.
 - In other VLANs, the rapid-PVST+ device sends rapid-PVST+ packets (the destination MAC address is 01-00-0C-CC-CC-CD) to negotiate with the peer.
- For the access port
 - In all VLANs, the rapid-PVST+ device sends only standard RSTP packets to negotiate with the peer.

Enabling Spanning Tree Mode in Rapid PVST+

```
admin@XorPlus# set protocols spanning-tree force-version 4
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus#
```

Configuring Basic VLAN Parameters of Rapid PVST+

When configuring basic VLAN parameters, set the forward delay to greater than $\text{Max-Age}/2 + 1$, or the commit will fail.

```

admin@XorPlus# set protocols spanning-tree pvst vlan 2 bridge-priority 4096
admin@XorPlus# set protocols spanning-tree pvst vlan 2 forward-delay 20
admin@XorPlus# set protocols spanning-tree pvst vlan 2 hello-time 4
admin@XorPlus# set protocols spanning-tree pvst vlan 2 max-age 30
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus#
admin@XorPlus# run show spanning-tree pvst bridge vlan 2
PVST Bridge Parameters for VLAN 2
Root Bridge: 4098.08:9e:01:61:65:71
Root Cost: 0
Root Port:
Hello Time: 4
Max Age: 30
Forward Delay: 20
Time Since Last Topology Change: 0 days 00:02:55
Local Parameters
Bridge ID: 4098.08:9e:01:61:65:71
Hello Time: 4
Maximum Age: 30
Forward Delay: 20

```

Configuring Rapid PVST+ Interface Parameters

```

admin@XorPlus# set protocols spanning-tree pvst vlan 2 interface ge-1/1/1 path-cost 555555
admin@XorPlus# set protocols spanning-tree pvst vlan 2 interface ge-1/1/1 port-priority 200
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus# run show spanning-tree pvst interface vlan 2
Rapid PVST+ Spanning Tree Interface Status for VLAN 2
Interface Port ID Designated Designated Bridge Port Cost State Role
Port ID ID
-----
ge-1/1/1 192.1 192.1 4098.08:9e:01:61:65:71 555555 FORWARDING EDGE

```

Configuring the Interface Mode

You can configure the interface mode as point-to-point or shared.

```

admin@XorPlus# set protocols spanning-tree pvst interface ge-1/1/1 mode point-to-point
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus# set protocols spanning-tree pvst interface ge-1/1/1 mode shared
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus#

```

Configuring Rapid PVST+ BPDU-guard

When a port is configured with `pvst bpdu-guard`, the port which should not receive bpdu receives bpdu messages, it will be set to `err-discard True` and down.

```
admin@XorPlus# set protocols spanning-tree pvst interface ge-1/1/1 bpdu-guard true
admin@XorPlus# co
Commit OK.
Save done.
```

If the port is down by pvst bpdu-guard, the port status as follows.

```
admin@XorPlus# run show interface gigabit-ethernet ge-1/1/1
Physical interface: ge-1/1/1, Enabled, error-discard True, Physical link is Down
Interface index: 1, Mac Learning Enabled
Description: User Port
Link-level type: Ethernet, MTU: 1514, Speed: Auto, Duplex: Full
Source filtering: Disabled, Flow control: Disabled, Auto-negotiation: Enabled
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Storm control ratio Broadcast: 1%
Interface rate limit ingress:0, egress:0
Current address: c4:39:3a:ff:2d:c1, Hardware address: c4:39:3a:ff:2d:c1
Traffic statistics:
 5 sec input rate 0 bits/sec, 0 packets/sec
 5 sec output rate 0 bits/sec, 0 packets/sec
Input Packets.....132
Output Packets.....4733
Input Octets.....11266
Output Octets.....1664371
```

When the port is down by pvst bpdu-guard, the port will be up after you delete bpdu-guard and disable, enable the port.

```
admin@XorPlus# delete protocols spanning-tree pvst interface ge-1/1/1 bpdu-guard
admin@XorPlus# commit
Commit OK.
Save done.
admin@XorPlus# set interface gigabit-ethernet ge-1/1/1 disable true
admin@XorPlus# commit
Commit OK.
Save done.
admin@XorPlus# set interface gigabit-ethernet ge-1/1/1 disable false
admin@XorPlus# commit
Commit OK.
Save done.
admin@XorPlus# run show interface gigabit-ethernet ge-1/1/1
Physical interface: ge-1/1/1, Enabled, error-discard False, Physical link is Up
Interface index: 1, Mac Learning Enabled
Description: User Port
Link-level type: Ethernet, MTU: 1514, Speed: 1Gb/s, Duplex: Full
Source filtering: Disabled, Flow control: Disabled, Auto-negotiation: Disabled
Interface flags: Hardware-Down SNMP-Traps Internal: 0x0
Storm control ratio Broadcast: 1%
Interface rate limit ingress:0, egress:0
Current address: c4:39:3a:ff:2d:c1, Hardware address: c4:39:3a:ff:2d:c1
Traffic statistics:
 5 sec input rate 0 bits/sec, 0 packets/sec
 5 sec output rate 688 bits/sec, 0 packets/sec
Input Packets.....132
Output Packets.....4736
Input Octets.....11266
Output Octets.....1664755
```

Disabling/Enabling Rapid PVST+ on One VLAN

You can disable or enable the spanning tree protocol PVST on a single designated VLAN.

```
admin@XorPlus# set protocols spanning-tree pvst vlan 2 enable false
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus#
admin@XorPlus# run show spanning-tree pvst bridge vlan 2
PVST Bridge Parameters for VLAN 2
Root Bridge: 32769.08:9e:01:61:65:71
Root Cost: 0
Root Port:
Hello Time: 2
Max Age: 20
Forward Delay: 15
Time Since Last Topology Change: 15804 days 23:00:11
Local Parameters
Bridge ID: 32769.08:9e:01:61:65:71
Hello Time: 2
Maximum Age: 20
Forward Delay: 15
admin@XorPlus# set protocols spanning-tree pvst vlan 2 enable true
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus#
admin@XorPlus# run show spanning-tree pvst bridge vlan 2
PVST Bridge Parameters for VLAN 2
Root Bridge: 4098.08:9e:01:61:65:71
Root Cost: 0
Root Port:
Hello Time: 4
Max Age: 30
Forward Delay: 20
Time Since Last Topology Change: 0 days 00:00:21
Local Parameters
Bridge ID: 4098.08:9e:01:61:65:71
Hello Time: 4
Maximum Age: 30
Forward Delay: 20
admin@XorPlus#
```

Disabling/Enabling Rapid PVST+

You cannot disable the spanning tree protocol rapid-PVST+ with just the **enable false** command. To disable PVST, *first* configure the spanning tree mode in MSTP/RSTP/STP. Then, disable the spanning tree. After the spanning tree is disabled, the port will stay in "forwarding" status and cease to send BPDUs.

```

admin@XorPlus# set protocols spanning-tree enable false
admin@XorPlus# commit
Waiting for merging configuration.
Commit Failed
102 Command failed Cannot disable spanning tree under PVST mode[
admin@XorPlus#
admin@XorPlus# exit discard
admin@XorPlus> configure
Entering configuration mode.
There are no other users in configuration mode.
admin@XorPlus#
admin@XorPlus# set protocols spanning-tree force-version 2
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus# set protocols spanning-tree enable false
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus#
admin@XorPlus# set protocols spanning-tree force-version 4
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus# set protocols spanning-tree enable true
admin@XorPlus# commit
Waiting for merging configuration.
Commit OK.
Save done.
admin@XorPlus#
admin@XorPlus# run show spanning-tree
Bridge Spanning Tree Parameters
Enabled Protocol: PVST
Root ID: 32769.08:9e:01:61:65:71
Root Path Cost: 0
Designated Bridge ID: 32769.08:9e:01:61:65:71
Root Port:
Hello Time: 2
Maximum Age: 20
Forward Delay: 15
Number of Topology Changes: 1
Time Since Last Topology Change: 0 days 00:00:09
Local Parameters
Bridge ID: 32769.08:9e:01:61:65:71
Hello Time: 2
Maximum Age: 20
Forward Delay: 15

```

Configuring Root Guard

Configure Root Guard to protect devices or links. If a port is enabled with the root guard function, its port role on all instances can only be the designated port. Once the port that is enabled with root guard receives BPDUs with a higher priority, the port enters the Discarding state and does not forward packets. If the port does not receive any BPDUs with a higher priority for a long time, the port automatically returns to the Forwarding state.

```

admin@XorPlus# set protocols spanning-tree pvst interface te-1/1/3 root-guard true
admin@XorPlus# commit

```