To configure STP:

1. Either delete default RSTP (on EX) on the entire switch or disable RSTP on specific interfaces:
   - To delete RSTP on the entire switch:
     ```
     [edit protocols]
     user@switch# delete rstp
     ```
   - To disable RSTP on a specific interface:
     ```
     [edit protocols]
     user@switch# set rstp interface interface-name disable
     ```
2. Enable STP either on all interfaces or on a specific interface:
   - To enable STP on all interfaces:
     ```
     [edit protocols]
     user@switch# set stp interface all
     ```
   - To enable STP on a specific interface:
     ```
     [edit protocols]
     user@switch# set stp interface interface-name
     ```

Configure the interfaces that participate in the **RSTP** instance.

a. Enable configuration of the interface:
```
[edit ... protocols rstp]
user@host# edit interface  interface-name
```
b. Configure the interface priority:
```
[edit ... protocols rstp interface  interface-name]
user@host# set priority interface-priority
```
c. (Optional) By default, the interface link cost is determined by the link speed. You can configure the interface link cost to control which bridge is the designated bridge and which port is the designated port:
```
[edit ... protocols rstp interface  interface-name]
user@host# set cost interface-link-cost
```
d. Configure the interface link mode to identify point-to-point links:
```
[edit ... protocols rstp interface  interface-name]
user@host# set mode (p2p | shared)
```
Specify p2p if the link is point to point. Specify shared if the link is a shared media.
e. (Optional) Configure the interface as an edge port:
```
[edit ... protocols rstp interface  interface-name]
user@host# set edge
```

Configure hello BPDU timers.

a. Configure the maximum expected arrival time of hello BPDUs:
```
[edit ... protocols rstp]
user@host# set max-age  seconds
```
b. Configure the time interval at which the root bridge transmits configuration BPDUs:
```
[edit ... protocols rstp]
user@host# set hello-time  seconds
```

(Optional) By default, the bridge port remains in the listening and learning states for 15 seconds before transitioning to the forwarding state. You can specify a delay from 4 through 20 seconds instead:
```
[edit ... protocols rstp]
user@host# set forward-delay  seconds
```

Configuring MSTP on Switches

Enable MSTP as the version of spanning-tree protocol to be configured:
```
[edit]
user@switch@ edit ... protocols mstp
```
Enable MSTP on all the interfaces at one time, for switches that support this option (most switches):
```
[edit ... protocols mstp]
user@switch# set interface all
```
a. Enable MSTP on the specified interface:

```
[edit ... protocols mstp]
user@switch# edit interface interface-name
```

b. Configure the interface priority:

```
[edit ... protocols mstp interface interface-name]
user@switch# set priority interface-priority
```

a. (Optional) By default, the interface link cost is determined by the link speed. You can configure the interface link cost to control which bridge is the designated bridge and which port is the designated port:

```
[edit ... protocols mstp interface interface-name]
user@switch# set cost interface-link-cost
```

b. Configure the interface link mode to identify point-to-point links:

```
[edit ... protocols mstp interface interface-name]
user@switch# set mode (p2p | shared)
```

Specify `p2p` if the link is point to point. Specify `shared` if the link is a shared media.

c. (Optional) Configure the interface as an edge port:

```
[edit ... protocols mstp interface interface-name]
user@switch# set edge
```

Edge ports do not expect to receive bridge protocol data unit (BPDU) packets. If a BPDU packet is received for an edge port, the port becomes a nonedge port

d. (Optional) Disable MSTP on a specific interface:

```
[edit protocols mstp interface interface-name]
user@switch# set disable
```

Configure the bridge priority

```
[edit ... protocols mstp]
user@switch# set bridge-priority bridge-priority
```

Configure hello BPDU timers.

a. Configure the maximum expected arrival time of hello BPDUs:

```
[edit ... protocols mstp]
user@switch# set max-age seconds
```

b. Configure the time interval at which the root bridge transmits configuration BPDUs:

```
[edit ... protocols mstp]
user@switch# set hello-time seconds
```

1. (Optional) By default, the bridge port remains in the listening and learning states for 15 seconds before transitioning to the forwarding state. You can specify a delay from 4 through 20 seconds instead:

```
[edit ... protocols mstp]
user@switch# set forward-delay seconds
```

2. Configure MSTP-specific options.

a. Configure the MSTP region configuration name:

```
[edit ... protocols mstp]
user@switch# set configuration-name configuration-name
```

b. Configure the MSTP revision level:

```
[edit ... protocols mstp]
user@switch# set revision-level revision-level
```

c. Configure the maximum number of hops a BPDU can be forwarded in the MSTP region:

```
[edit ... protocols mstp]
user@switch# set max-hops hops
```

Protocol Destination MAC Addresses

Protocol	Ethernet Encapsulation	MAC Address
802.1X	Ether-II	01:80:C2:00:00:03
CDP	LLC/SNAP	01:00:0C:CC:CC:CC
LACP	Ether-II	01:80:C2:00:00:02
LLDP	Ether-II	01:80:C2:00:00:0E
STP, RSTP, MSTP	LLC/SNAP	01:80:C2:00:00:00
VTP	LLC/SNAP	01:00:0C:CC:CC:CC

Q-in-Q Tunneling

In Q-in-Q tunneling, as a packet travels from a customer VLAN (C-VLAN) to a service provider's VLAN, a customer-specific 802.1Q tag is added to the packet. This additional tag is used to segregate traffic into service-provider-defined service VLANs (S-VLANs). The original customer 802.1Q tag of the packet remains and is transmitted transparently, passing through the service provider's network. As the packet leaves the S-VLAN in the downstream direction, the extra 802.1Q tag is removed.

Q-in-Q VLANs—you can configure the IRB interface on the same interface as one used by an S-VLAN, and you can use the same VLAN ID for both the VLAN used by the IRB interface and for the VLAN used as an S-VLAN. Packets arriving on an IRB interface that is using Q-in-Q VLANs will get routed regardless of whether the packet is single tagged or double tagged. The outgoing routed packets contain an S-VLAN tag only when exiting a trunk interface; the packets exit the interface untagged when exiting an access interface.

The following configuration makes xe-0/0/0.10 a member of VLAN 10, enables Q-in-Q tunneling on interface xe-0/0/0, enables xe-0/0/0 to accept untagged packets, and binds the VLAN ID of S-VLAN v10 to a logical interface of xe-0/0/0.

```
set vlans v10 interface xe-0/0/0.10
set interfaces xe-0/0/0 flexible-vlan-tagging
set interfaces xe-0/0/0 native-vlan-id 10
set interfaces xe-0/0/0 encapsulation extended-vlan-bridge
set interfaces xe-0/0/0 unit 10 vlan-id 10
```

The following configuration makes xe-0/0/1.10 a member of S-VLAN v10, enables Q-in-Q tunneling, maps packets from C-VLANs 100 through 200 to S-VLAN 10, and enables xe-0/0/1 to accept untagged packets. If a packet originates in C-VLAN 100 and needs to be sent across the S-VLAN, a tag with VLAN ID 10 is added to the packet. When a packet is forwarded (internally) from the S-VLAN interface to interface xe-0/0/1, the tag with VLAN ID 10 is removed.

```
set vlans v10 interface xe-0/0/1.10
set interfaces xe-0/0/1 flexible-vlan-tagging
set interfaces xe-0/0/1 encapsulation extended-vlan-bridge
set interfaces xe-0/0/1 unit 10 vlan-id-list 100-200
set interfaces xe-0/0/1 native-vlan-id 150
set interfaces xe-0/0/1 unit 10 input-vlan-map push
set interfaces xe-0/0/1 unit 10 output-vlan-map pop
```

VPLS Routing Instances

To configure VPLS functionality, you must enable VPLS support on the PE router. You must also configure PE routers to distribute routing information to the other PE routers in the VPLS and configure the circuits between the PE routers and the CE devices.

```
set routing-instances green instance-type vpls
set routing-instances green protocols vpls site-range 10 site R3 site-identifier 2
set routing-instances green protocols vpls no-tunnel-services
set routing-instances green route-distinguisher 10.255.7.1:1
set routing-instances green vrf-target target:11111:1
set routing-instances green instance-type vpls interface ge-1/2/1.0
```

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