

## **Example: Configuring Network Regions for VLANs with MSTP on EX-series Switches**

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Multiple Spanning Tree Protocol (MSTP) is used to create a loop-free topology in networks using multiple spanning tree regions, each region containing multiple spanning-tree instances (MSTIs). MSTIs provide different paths for different VLANs. This functionality facilitates better load sharing across redundant links.

Up to 64 MSTI instances can be created for an EX Series switch, and each MSTI can support up to 4094 VLANs.

This example describes how to configure MSTP on four EX-series switches:

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- Configuring MSTP on Switch 2 on page 7
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### **Requirements**

This example uses the following hardware and software components:

- JUNOS Release 9.0 or later for EX-series switches
- Four EX-series switches

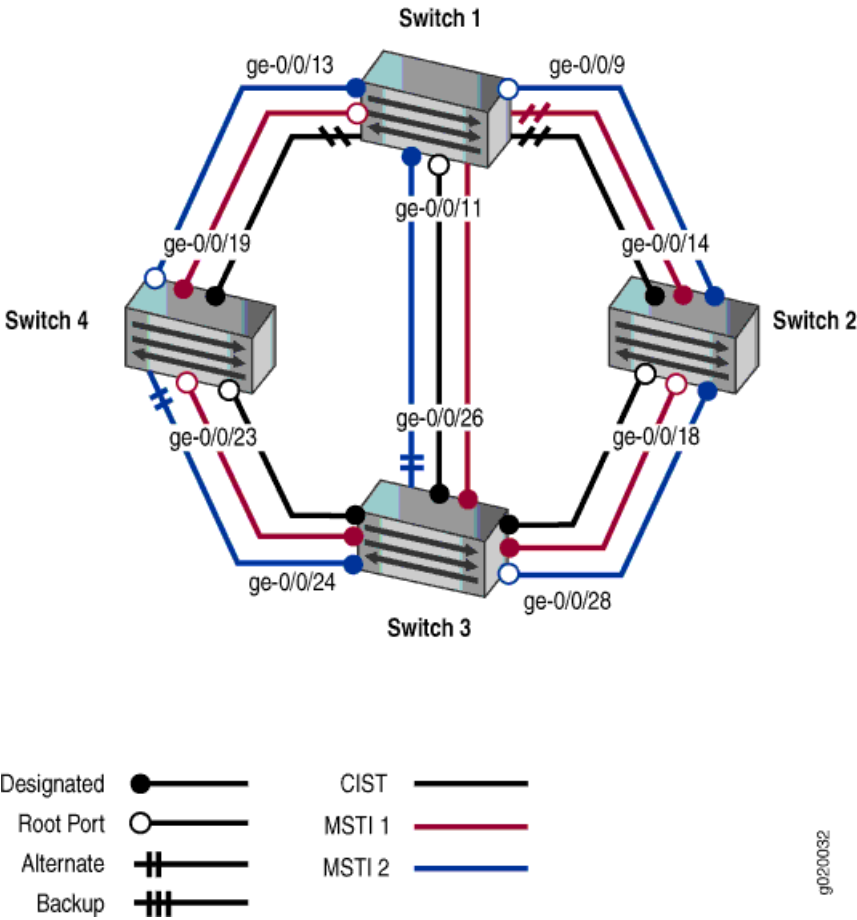
Before you configure the switches for MSTP, be sure you have:

- Installed the four switches. See [Connecting and Configuring an EX Series Switch \(J-Web Procedure\)](#).
- Performed the initial software configuration on all switches. See [Installing and Connecting an EX3200 or EX4200 Switch](#).

### **Overview and Topology**

When the number of VLANs grows in a network, MSTP provides a more efficient way of creating a loop-free topology using MSTIs. Each MSTI in the spanning tree domain maintains its own tree. Each tree can be mapped to different links, utilizing bandwidth that would be unavailable to a single tree. MSTIs reduce demand on system resources.

Figure 1: Network Topology for MSTP



The interfaces shown in Table 1 will be configured for MSTP.



**NOTE:** You can configure MSTP on logical or physical interfaces. This example shows MSTP configured on logical interfaces.

Table 1: Components of the Topology for Configuring MSTP on EX-series Switches

Property	Settings
Switch 1	<p>The following ports on Switch 1 are connected in this way:</p> <ul style="list-style-type: none"><li>■ ge-0/0/9 is connected to Switch 2</li><li>■ ge-0/0/13 is connected to Switch 4</li><li>■ ge-0/0/11 is connected to Switch 3</li></ul>
Switch 2	<p>The following ports on Switch 2 are connected in this way:</p> <ul style="list-style-type: none"><li>■ ge-0/0/14 is connected to Switch 1</li><li>■ ge-0/0/18 is connected to Switch 3</li></ul>

**Table 1: Components of the Topology for Configuring MSTP on EX-series Switches** *(continued)*

Property	Settings
Switch 3	The following ports on Switch 3 are connected in this way: <ul style="list-style-type: none"><li>■ ge-0/0/26 is connected to Switch 1</li><li>■ ge-0/0/28 is connected to Switch 2</li><li>■ ge-0/0/24 is connected to Switch 4</li></ul>
Switch 4	The following ports on Switch 4 are connected in this way: <ul style="list-style-type: none"><li>■ ge-0/0/19 is connected to Switch 1</li><li>■ ge-0/0/23 is connected to Switch 3</li></ul>
VLAN names and tag IDs	voice-vlan, tag 10 employee-vlan, tag 20 guest-vlan, tag 30 camera-vlan, tag 40
MSTIs	1 2

The topology in Figure 1 shows a Common Internal Spanning Tree (CIST). The CIST is a single spanning tree connecting all devices in the network. The switch with the highest priority is elected as the root bridge of the CIST.

Also in an MSTP topology are ports that have specific roles:

- The root port is responsible for forwarding data to the root bridge.
- The alternate port is a standby port for the root port. When a root port goes down, the alternate port becomes the active root port.
- The designated port forwards data to the downstream network segment or device.
- The backup port is a backup port for the designated port. When a designated port goes down, the backup port becomes the active designated port and starts forwarding data.

In this example, one MSTP region, **region1**, contains Switch 1, Switch 2, Switch 3, and Switch 4. Within the region, four VLANs are created:

- The **voice-vlan** supports voice traffic and has a VLAN tag identifier of 10.
- **employee-vlan** supports data traffic and has a VLAN tag identifier of 20.
- The **guest-vlan** supports guest VLAN traffic (for supplicants that fail 802-1X authentication) and has a VLAN tag identifier of 30.
- The **camera-vlan** supports video traffic and has a VLAN tag identifier of 40.

The VLANs are associated with specific interfaces on each of the four switches. Two MSTIs, 1 and 2, are then associated with the VLAN tag identifiers, and some MSTP parameters, such as cost, are configured on each switch.

## Configuring MSTP on Switch 1

To configure MSTP on Switch 1, perform these tasks:

**CLI Quick Configuration** To quickly configure interfaces and MSTP on Switch 1, copy the following commands and paste them into the switch terminal window:

```
[edit]
set vlans voice-vlan description "Voice VLAN"
set vlans voice-vlan vlan-id 10
set vlans employee-vlan description "Employee VLAN"
set vlans employee-vlan vlan-id 20
set vlans guest-vlan description "Guest VLAN"
set vlans guest-vlan vlan-id 30
set vlans camera-vlan description "Camera VLAN"
set vlans camera-vlan vlan-id 40
set interfaces ge-0/0/13 unit 0 family ethernet-switching vlan members [10 20 30 40]
set interfaces ge-0/0/9 unit 0 family ethernet-switching vlan members [10 20 30 40]
set interfaces ge-0/0/11 unit 0 family ethernet-switching vlan members [10 20 30 40]
set interfaces ge-0/0/13 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/9 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/11 unit 0 family ethernet-switching port-mode trunk
set protocols mstp configuration-name region1
set protocols mstp bridge-priority 16k
set protocols mstp interface ge-0/0/13.0 cost 1000
set protocols mstp interface ge-0/0/13.0 mode point-to-point
set protocols mstp interface ge-0/0/9.0 cost 1000
set protocols mstp interface ge-0/0/9.0 mode point-to-point
set protocols mstp interface ge-0/0/11.0 cost 1000
set protocols mstp interface ge-0/0/11.0 mode point-to-point
set protocols mstp msti 1 bridge-priority 16k
set protocols mstp msti 1 vlan [10 20]
set protocols mstp msti 1 interface ge-0/0/11.0 cost 4000
set protocols mstp msti 2 bridge-priority 8k
set protocols mstp msti 2 vlan [30 40]
```

**Step-by-Step Procedure** To configure interfaces and MSTP on Switch 1:

1. Configure the VLANs voice-vlan, employee-vlan, guest-vlan, and camera-vlan:

```
[edit vlans]
user@switch1# set voice-vlan description "Voice VLAN"
user@switch1# set voice-vlan vlan-id 10
user@switch1# set employee-vlan description "Employee VLAN"
user@switch1# set employee-vlan vlan-id 20
user@switch1# set guest-vlan description "Guest VLAN"
user@switch1# set guest-vlan vlan-id 30
user@switch1# set camera-vlan description "Camera VLAN"
user@switch1# set guest-vlan vlan-id 40
```

2. Configure the VLANs on the interfaces, including support for the Ethernet Switching protocol:

```
[edit interfaces]
user@switch1# set ge-0/0/13 unit 0 family ethernet-switching vlan members
[10 20 30 40]
user@switch1# set ge-0/0/9 unit 0 family ethernet-switching vlan members
[10 20 30 40]
user@switch1# set ge-0/0/11 unit 0 family ethernet-switching vlan members
[10 20 30 40]
```

3. Configure the port mode for the interfaces:

```
[edit interfaces]
user@switch1# set ge-0/0/13 unit 0 family ethernet-switching port-mode
trunk
user@switch1# set ge-0/0/9 unit 0 family ethernet-switching port-mode
trunk
user@switch1# set ge-0/0/11 unit 0 family ethernet-switching port-mode
trunk
```

4. Configure MSTP on the switch, including the two MSTIs:

```
[edit protocols]
user@switch1# mstp configuration-name region1
user@switch1# mstp bridge-priority 16k
user@switch1# mstp interface ge-0/0/13.0 cost 1000
user@switch1# mstp interface ge-0/0/13.0 mode point-to-point
user@switch1# mstp interface ge-0/0/9.0 cost 1000
user@switch1# mstp interface ge-0/0/9.0 mode point-to-point
user@switch1# mstp interface ge-0/0/11.0 cost 4000
user@switch1# mstp interface ge-0/0/11.0 mode point-to-point
user@switch1# mstp msti 1 bridge-priority 16k
user@switch1# mstp msti 1 vlan [10 20]
user@switch1# mstp msti 1 interface ge-0/0/11.0 cost 4000
user@switch1# mstp msti 2 bridge-priority 8k
user@switch1# mstp msti 2 vlan [30 40]
```

**Results** Check the results of the configuration:

```
user@switch1> show configuration
interfaces {
  ge-0/0/13 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan {
          members 10;
          members 20;
          members 30;
          members 40;
        }
      }
    }
  }
  ge-0/0/9 {
    unit 0 {
```

```

        family ethernet-switching {
            port-mode trunk;
            vlan {
                members 10;
                members 20;
                members 30;
                members 40;
            }
        }
    }
}
ge-0/0/11 {
    unit 0 {
        family ethernet-switching {
            port-mode trunk;
            vlan {
                members 10;
                members 20;
                members 30;
                members 40;
            }
        }
    }
}
}
protocols {
    mstp {
        configuration-name region1;
        bridge-priority 16k;
        interface ge-0/0/13.0 {
            cost 1000;
            mode point-to-point;
        }
        interface ge-0/0/9.0 {
            cost 1000;
            mode point-to-point;
        }
        interface ge-0/0/11.0 {
            cost 4000;
            mode point-to-point;
        }
    }
    msti 1 {
        bridge-priority 16k;
        vlan [ 10 20 ];
        interface ge-0/0/11.0 {
            cost 4000;
        }
    }
    msti 2 {
        bridge-priority 8k;
        vlan [ 30 40 ];
    }
}
vlangs {
    voice-vlan {
        vlan-id 10;
    }
}

```

```

    }
    employee-vlan {
        vlan-id 20;
    }
    guest-vlan {
        vlan-id 30;
    }
    camera-vlan {
        vlan-id 40;
    }
}

```

## Configuring MSTP on Switch 2

To configure on Switch 2, perform these tasks:

**CLI Quick Configuration** To quickly configure interfaces and MSTP on Switch 2, copy the following commands and paste them into the switch terminal window:

```

[edit]
set vlans voice-vlan description "Voice VLAN"
set vlans voice-vlan vlan-id 10
set vlans employee-vlan description "Employee VLAN"
set vlans employee-vlan vlan-id 20
set vlans guest-vlan description "Guest VLAN"
set vlans guest-vlan vlan-id 30
set vlans camera-vlan description "Camera VLAN"
set vlans camera-vlan vlan-id 40
set interfaces ge-0/0/14 unit 0 family ethernet-switching vlan members [10 20 30 40]
set interfaces ge-0/0/18 unit 0 family ethernet-switching vlan members [10 20 30 40]
set interfaces ge-0/0/14 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/18 unit 0 family ethernet-switching port-mode trunk
set protocols mstp configuration-name region1
set protocols mstp bridge-priority 32k
set protocols mstp interface ge-0/0/14.0 cost 1000
set protocols mstp interface ge-0/0/14.0 mode point-to-point
set protocols mstp interface ge-0/0/18.0 cost 1000
set protocols mstp interface ge-0/0/18.0 mode point-to-point
set protocols mstp msti 1 bridge-priority 32k
set protocols mstp msti 1 vlan [10 20]
set protocols mstp msti 2 bridge-priority 4k
set protocols mstp msti 2 vlan [30 40]

```

**Step-by-Step Procedure** To configure interfaces and MSTP on Switch 2:

1. Configure the VLANs voice-vlan, employee-vlan, guest-vlan, and camera-vlan:

```
[edit vlans]
user@switch2# set voice-vlan description "Voice VLAN"
user@switch2# set voice-vlan vlan-id 10
user@switch2# set employee-vlan description "Employee VLAN"
user@switch2# set employee-vlan vlan-id 20
user@switch2# set guest-vlan description "Guest VLAN"
user@switch2# set guest-vlan vlan-id 30
user@switch2# set camera-vlan vlan-description "Camera VLAN"
user@switch2# set guest-vlan vlan-id 40
```

2. Configure the VLANs on the interfaces, including support for the Ethernet Switching protocol:

```
[edit interfaces]
user@switch2# set ge-0/0/14 unit 0 family ethernet-switching vlan members
[10 20 30 40]
user@switch2# set ge-0/0/18 unit 0 family ethernet-switching vlan members
[10 20 30 40]
```

3. Configure the port mode for the interfaces:

```
[edit interfaces]
user@switch2# set ge-0/0/14 unit 0 family ethernet-switching port-mode
trunk
user@switch2# set ge-0/0/18 unit 0 family ethernet-switching port-mode
trunk
```

4. Configure MSTP on the switch, including the two MSTIs:

```
[edit protocols]
user@switch2# mstp configuration-name region1
user@switch2# mstp bridge-priority 32k
user@switch2# mstp interface ge-0/0/14.0 cost 1000
user@switch2# mstp interface ge-0/0/14.0 mode point-to-point
user@switch2# mstp interface ge-0/0/18.0 cost 1000
user@switch2# mstp interface ge-0/0/18.0 mode point-to-point
user@switch2# mstp interface all cost 1000
user@switch2# mstp msti 1 bridge-priority 32k
user@switch2# mstp msti 1 vlan [10 20]
user@switch2# mstp msti 2 bridge-priority 4k
user@switch2# mstp msti 2 vlan [30 40]
```

**Results** Check the results of the configuration:

```
user@switch2> show configuration
interfaces {
  ge-0/0/14 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan {
```



```

        members 10;
        members 20;
        members 30;
        members 40;
    }
}
}
ge-0/0/18 {
    unit 0 {
        family ethernet-switching {
            port-mode trunk;
            vlan {
                members 10;
                members 20;
                members 30;
                members 40;
            }
        }
    }
}
}
protocols {
    mstp {
        configuration-name region1;
        bridge-priority 32k;
        interface ge-0/0/14.0 {
            cost 1000;
            mode point-to-point;
        }
        interface ge-0/0/18.0 {
            cost 1000;
            mode point-to-point;
        }
        msti 1 {
            bridge-priority 32k;
            vlan [ 10 20 ];
        }
        msti 2 {
            bridge-priority 4k;
            vlan [ 30 40 ];
        }
    }
}
vlands {
    voice-vlan {
        vlan-id 10;
    }
    employee-vlan {
        vlan-id 20;
    }
    guest-vlan {
        vlan-id 30;
    }
    camera-vlan {
        vlan-id 40;
    }
}

```

```
}  
}
```

## Configuring MSTP on Switch 3

To configure MSTP on Switch 3, perform these tasks:

**CLI Quick Configuration** To quickly configure interfaces and MSTP on Switch 3, copy the following commands and paste them into the switch terminal window:

```
[edit]  
set vlans voice-vlan description "Voice VLAN"  
set vlans voice-vlan vlan-id 10  
set vlans employee-vlan description "Employee VLAN"  
set vlans employee-vlan vlan-id 20  
set vlans guest-vlan description "Guest VLAN"  
set vlans guest-vlan vlan-id 30  
set vlans camera-vlan description "Camera VLAN"  
set vlans camera-vlan vlan-id 40  
set interfaces ge-0/0/26 unit 0 family ethernet-switching vlan members [10 20 30 40]  
set interfaces ge-0/0/28 unit 0 family ethernet-switching vlan members [10 20 30 40]  
set interfaces ge-0/0/24 unit 0 family ethernet-switching vlan members [10 20 30 40]  
set interfaces ge-0/0/26 unit 0 family ethernet-switching port-mode trunk  
set interfaces ge-0/0/28 unit 0 family ethernet-switching port-mode trunk  
set interfaces ge-0/0/24 unit 0 family ethernet-switching port-mode trunk  
set protocols mstp configuration-name region1  
set protocols mstp bridge-priority 8k  
set protocols mstp interface ge-0/0/26.0 cost 1000  
set protocols mstp interface ge-0/0/26.0 mode point-to-point  
set protocols mstp interface ge-0/0/28.0 cost 1000  
set protocols mstp interface ge-0/0/28.0 mode point-to-point  
set protocols mstp interface ge-0/0/24.0 cost 1000  
set protocols mstp interface ge-0/0/24.0 mode point-to-point  
set protocols mstp msti 1 bridge-priority 4k  
set protocols mstp msti 1 vlan [10 20]  
set protocols mstp msti 2 bridge-priority 16k  
set protocols mstp msti 2 vlan [30 40]
```

**Step-by-Step Procedure** To configure interfaces and MSTP on Switch 3:

1. Configure the VLANs voice-vlan, employee-vlan, guest-vlan, and camera-vlan:

```
[edit vlans]  
user@switch3# set voice-vlan description "Voice VLAN"  
user@switch3# set voice-vlan vlan-id 10  
user@switch3# set employee-vlan description "Employee VLAN"  
user@switch3# set employee-vlan vlan-id 20  
user@switch3# set guest-vlan description "Guest VLAN"  
user@switch3# set guest-vlan vlan-id 30  
user@switch3# set camera-vlan description "Camera VLAN"  
user@switch3# set guest-vlan vlan-id 40
```

2. Configure the VLANs on the interfaces, including support for the Ethernet Switching protocol:

```
[edit interfaces]
user@switch3# set ge-0/0/26 unit 0 family ethernet-switching vlan members
[10 20 30 40]
user@switch3# set ge-0/0/28 unit 0 family ethernet-switching vlan members
[10 20 30 40]
user@switch3# set ge-0/0/24 unit 0 family ethernet-switching vlan members
[10 20 30 40]
```

3. Configure the port mode for the interfaces:

```
[edit interfaces]
user@switch3# set ge-0/0/26 unit 0 family ethernet-switching port-mode
trunk
user@switch3# set ge-0/0/28 unit 0 family ethernet-switching port-mode
trunk
user@switch3# set ge-0/0/24 unit 0 family ethernet-switching port-mode
trunk
```

4. Configure MSTP on the switch, including the two MSTIs:

```
[edit protocols]
user@switch3# mstp configuration-name region1
user@switch3# mstp bridge-priority 8k
user@switch3# mstp interface ge-0/0/26.0 cost 1000
user@switch3# mstp interface ge-0/0/26.0 mode point-to-point
user@switch3# mstp interface ge-0/0/28.0 cost 1000
user@switch3# mstp interface ge-0/0/28.0 mode point-to-point
user@switch3# mstp interface ge-0/0/24.0 cost 1000
user@switch3# mstp interface ge-0/0/24.0 mode point-to-point
user@switch3# mstp interface all cost 1000
user@switch3# mstp msti 1 bridge-priority 4k
user@switch3# mstp msti 1 vlan [10 20]
user@switch3# mstp msti 2 bridge-priority 16k
user@switch3# mstp msti 2 vlan [30 40]
```

**Results** Check the results of the configuration:

```
user@switch3> show configuration
interfaces {
  ge-0/0/26 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan {
          members 10;
          members 20;
          members 30;
          members 40;
        }
      }
    }
  }
  ge-0/0/28 {
    unit 0 {
```



```

    employee-vlan {
        vlan-id 20;
    }
    guest-vlan {
        vlan-id 30;
    }
    camera-vlan {
        vlan-id 40;
    }
}

```

## Configuring MSTP on Switch 4

To configure MSTP on Switch 4, perform these tasks:

**CLI Quick Configuration** To quickly configure interfaces and MSTP on Switch 4, copy the following commands and paste them into the switch terminal window:

```

[edit]
set vlans voice-vlan description "Voice VLAN"
set vlans voice-vlan vlan-id 10
set vlans employee-vlan description "Employee VLAN"
set vlans employee-vlan vlan-id 20
set vlans guest-vlan description "Guest VLAN"
set vlans guest-vlan vlan-id 30
set vlans camera-vlan description "Camera VLAN"
set vlans camera-vlan vlan-id 40
set interfaces ge-0/0/23 unit 0 family ethernet-switching vlan members [10 20 30 40]
set interfaces ge-0/0/19 unit 0 family ethernet-switching vlan members [10 20 30 40]
set interfaces ge-0/0/23 unit 0 family ethernet-switching port-mode trunk
set interfaces ge-0/0/19 unit 0 family ethernet-switching port-mode trunk
set protocols mstp configuration-name region1
set protocols mstp bridge-priority 16k
set protocols mstp interface ge-0/0/23.0 cost 1000
set protocols mstp interface ge-0/0/23.0 mode point-to-point
set protocols mstp interface ge-0/0/19.0 cost 1000
set protocols mstp interface ge-0/0/19.0 mode point-to-point
set protocols mstp msti 1 bridge-priority 16k
set protocols mstp msti 1 vlan [10 20]
set protocols mstp msti 2 bridge-priority 32k
set protocols mstp msti 2 vlan [30 40]

```

**Step-by-Step Procedure** To configure interfaces and MSTP on Switch 4:

1. Configure the VLANs voice-vlan, employee-vlan, guest-vlan, and camera-vlan:

```
[edit vlans]
user@switch4# set voice-vlan description "Voice VLAN"
user@switch4# set voice-vlan vlan-id 10
user@switch4# set employee-vlan description "Employee VLAN"
user@switch4# set employee-vlan vlan-id 20
user@switch4# set guest-vlan description "Guest VLAN"
user@switch4# set guest-vlan vlan-id 30
user@switch4# set camera-vlan description "Camera VLAN"
user@switch4# set guest-vlan vlan-id 40
```

2. Configure the VLANs on the interfaces, including support for the Ethernet Switching protocol:

```
[edit interfaces]
user@switch4# set ge-0/0/23 unit 0 family ethernet-switching vlan members
[10 20 30 40]
user@switch4# set ge-0/0/19 unit 0 family ethernet-switching vlan members
[10 20 30 40]
```

3. Configure the port mode for the interfaces:

```
[edit interfaces]
user@switch4# set ge-0/0/23 unit 0 family ethernet-switching port-mode
trunk
user@switch4# set ge-0/0/19 unit 0 family ethernet-switching port-mode
trunk
```

4. Configure MSTP on the switch, including the two MSTIs:

```
[edit protocols]
user@switch4# mstp configuration-name region1
user@switch4# mstp bridge-priority 16k
user@switch4# mstp interface all cost 1000
user@switch4# mstp interface ge-0/0/23.0 cost 1000
user@switch4# mstp interface ge-0/0/23.0 mode point-to-point
user@switch4# mstp interface ge-0/0/19.0 cost 1000
user@switch4# mstp interface ge-0/0/19.0 mode point-to-point
user@switch4# mstp msti 1 bridge-priority 16k
user@switch4# mstp msti 1 vlan [10 20]
user@switch4# mstp msti 2 bridge-priority 32k
user@switch4# mstp msti 2 vlan [30 40]
```

**Results** Check the results of the configuration:

```
user@switch4> show configuration
interfaces {
  ge-0/0/23 {
    unit 0 {
      family ethernet-switching {
        port-mode trunk;
        vlan {
```

```

        members 10;
        members 20;
        members 30;
        members 40;
    }
}
}
ge-0/0/19 {
    unit 0 {
        family ethernet-switching {
            port-mode trunk;
            vlan {
                members 10;
                members 20;
                members 30;
                members 40;
            }
        }
    }
}
}
protocols {
    mstp {
        configuration-name region1;
        bridge-priority 16k;
        interface ge-0/0/23.0 {
            cost 1000;
            mode point-to-point;
        }
        interface ge-0/0/19.0 {
            cost 1000;
            mode point-to-point;
        }
        msti 1 {
            bridge-priority 16k;
            vlan [ 10 20 ];
        }
        msti 2 {
            bridge-priority 32k;
            vlan [ 30 40 ];
        }
    }
}
vpls {
    voice-vlan {
        vlan-id 10;
    }
    employee-vlan {
        vlan-id 20;
    }
    guest-vlan {
        vlan-id 30;
    }
    camera-vlan {
        vlan-id 40;
    }
}

```

```
}  
}
```

## Verification

To confirm that the configuration is working properly, perform these tasks:

- Verifying MSTP Configuration on Switch 1 on page 16
- Verifying MSTP Configuration on Switch 2 on page 17
- Verifying MSTP Configuration on Switch 3 on page 19
- Verifying MSTP Configuration on Switch 4 on page 20

### Verifying MSTP Configuration on Switch 1

**Purpose** Verify the MSTP configuration on Switch 1.

**Action** Use the operational mode commands:

```
user@switch1> show spanning-tree interface  
Spanning tree interface parameters for instance 0
```

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/13.0	128:527	128:525	16384.0019e25040e0	1000	FWD	ROOT
ge-0/0/9.0	128:529	128:513	32768.0019e2503d20	1000	BLK	ALT
ge-0/0/11.0	128:531	128:513	8192.0019e25051e0	4000	BLK	ALT

```
Spanning tree interface parameters for instance 1
```

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/13.0	128:527	128:525	16385.0019e25040e0	1000	FWD	ROOT
ge-0/0/9.0	128:529	128:513	32769.0019e2503d20	1000	BLK	ALT
ge-0/0/11.0	128:531	128:513	4097.0019e25051e0	4000	BLK	ALT

```
Spanning tree interface parameters for instance 2
```

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/13.0	128:527	128:527	8194.0019e25044e0	1000	FWD	DESG
ge-0/0/9.0	128:529	128:513	4098.0019e2503d20	1000	FWD	ROOT
ge-0/0/11.0	128:531	128:531	8194.0019e25044e0	1000	FWD	DESG

```
user@switch1> show spanning-tree bridge  
STP bridge parameters  
Context ID : 0  
Enabled protocol : MSTP
```

```
STP bridge parameters for CIST  
Root ID : 8192.00:19:e2:50:51:e0  
Root cost : 0  
Root port : ge-0/0/13.0  
CIST regional root : 8192.00:19:e2:50:51:e0  
CIST internal root cost : 2000  
Hello time : 2 seconds  
Maximum age : 20 seconds
```



```

Forward delay           : 15 seconds
Hop count               : 18
Message age             : 0
Number of topology changes : 3
Time since last topology change : 921 seconds
Local parameters
  Bridge ID             : 16384.00:19:e2:50:44:e0
  Extended system ID    : 0
  Internal instance ID   : 0

STP bridge parameters for MSTI 1
MSTI regional root     : 4097.00:19:e2:50:51:e0
Root cost               : 2000
Root port              : ge-0/0/13.0
Hello time             : 2 seconds
Maximum age            : 20 seconds
Forward delay          : 15 seconds
Hop count              : 18
Local parameters
  Bridge ID             : 16385.00:19:e2:50:44:e0
  Extended system ID    : 0
  Internal instance ID   : 1

STP bridge parameters for MSTI 2
MSTI regional root     : 4098.00:19:e2:50:3d:20
Root cost               : 1000
Root port              : ge-0/0/9.0
Hello time             : 2 seconds
Maximum age            : 20 seconds
Forward delay          : 15 seconds
Hop count              : 19
Local parameters
  Bridge ID             : 8194.00:19:e2:50:44:e0
  Extended system ID    : 0
  Internal instance ID   : 2

```

**Meaning** The operational mode command `show spanning-tree interface` displays spanning-tree domain information such as the designated port and the port roles.

The operational mode command `show spanning-tree bridge` displays the spanning-tree domain information at either the bridge level or interface level. If the optional interface name is omitted, all interfaces in the spanning-tree domain are displayed.

## Verifying MSTP Configuration on Switch 2

**Purpose** Verify the MSTP configuration on Switch 2.

**Action** Use the operational mode commands:

```
user@switch2> show spanning-tree interface
```

Spanning tree interface parameters for instance 0

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/14.0	128:513	128:513	32768.0019e2503d20	1000	FWD	DESC

```
ge-0/0/18.0    128:519    128:515    8192.0019e25051e0    1000    FWD    ROOT
```

Spanning tree interface parameters for instance 1

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/14.0	128:513	128:513	32769.0019e2503d20	1000	FWD	DESC
ge-0/0/18.0	128:519	128:515	4097.0019e25051e0	1000	FWD	ROOT

Spanning tree interface parameters for instance 2

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/14.0	128:513	128:513	4098.0019e2503d20	1000	FWD	DESC
ge-0/0/18.0	128:519	128:519	4098.0019e2503d20	1000	FWD	DESC

```
user@switch2> show spanning-tree bridge
```

STP bridge parameters

```
Context ID           : 0
Enabled protocol     : MSTP
```

STP bridge parameters for CIST

```
Root ID              : 8192.00:19:e2:50:51:e0
Root cost            : 0
Root port            : ge-0/0/18.0
CIST regional root   : 8192.00:19:e2:50:51:e0
CIST internal root cost : 1000
Hello time           : 2 seconds
Maximum age          : 20 seconds
Forward delay        : 15 seconds
Hop count            : 19
Message age          : 0
Number of topology changes : 1
Time since last topology change : 782 seconds
Local parameters
  Bridge ID          : 32768.00:19:e2:50:3d:20
  Extended system ID : 0
  Internal instance ID : 0
```

STP bridge parameters for MSTI 1

```
MSTI regional root   : 4097.00:19:e2:50:51:e0
Root cost            : 1000
Root port            : ge-0/0/18.0
Hello time           : 2 seconds
Maximum age          : 20 seconds
Forward delay        : 15 seconds
Hop count            : 19
Local parameters
  Bridge ID          : 32769.00:19:e2:50:3d:20
  Extended system ID : 0
  Internal instance ID : 1
```

STP bridge parameters for MSTI 2

```
MSTI regional root   : 4098.00:19:e2:50:3d:20
Hello time           : 2 seconds
Maximum age          : 20 seconds
Forward delay        : 15 seconds
Local parameters
  Bridge ID          : 4098.00:19:e2:50:3d:20
```

```

Extended system ID      : 0
Internal instance ID    : 2

```

**Meaning** The operational mode command `show spanning-tree interface` displays spanning-tree domain information such as the designated port and the port roles.

The operational mode command `show spanning-tree bridge` displays the spanning-tree domain information at either the bridge level or interface level. If the optional interface name is omitted, all interfaces in the spanning-tree domain are displayed.

## Verifying MSTP Configuration on Switch 3

**Purpose** Verify the MSTP configuration on Switch 3.

**Action** Use the operational mode commands:

```
user@switch3> show spanning-tree interface
```

Spanning tree interface parameters for instance 0

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/26.0	128:513	128:513	8192.0019e25051e0	1000	FWD	DESC
ge-0/0/28.0	128:515	128:515	8192.0019e25051e0	1000	FWD	DESC
ge-0/0/24.0	128:517	128:517	8192.0019e25051e0	1000	FWD	DESC

Spanning tree interface parameters for instance 1

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/26.0	128:513	128:513	4097.0019e25051e0	1000	FWD	DESC
ge-0/0/28.0	128:515	128:515	4097.0019e25051e0	1000	FWD	DESC
ge-0/0/24.0	128:517	128:517	4097.0019e25051e0	1000	FWD	DESC

Spanning tree interface parameters for instance 2

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/26.0	128:513	128:531	8194.0019e25044e0	1000	BLK	ALT
ge-0/0/28.0	128:515	128:519	4098.0019e2503d20	1000	FWD	ROOT
ge-0/0/24.0	128:517	128:517	16386.0019e25051e0	1000	FWD	DESC

```
user@switch3> show spanning-tree bridge
```

STP bridge parameters

```

Context ID              : 0
Enabled protocol        : MSTP

```

STP bridge parameters for CIST

```

Root ID                  : 8192.00:19:e2:50:51:e0
CIST regional root       : 8192.00:19:e2:50:51:e0
CIST internal root cost  : 0
Hello time               : 2 seconds
Maximum age              : 20 seconds
Forward delay            : 15 seconds
Number of topology changes : 3
Time since last topology change : 843 seconds
Local parameters

```

```

Bridge ID : 8192.00:19:e2:50:51:e0
Extended system ID : 0
Internal instance ID : 0

STP bridge parameters for MSTI 1
MSTI regional root : 4097.00:19:e2:50:51:e0
Hello time : 2 seconds
Maximum age : 20 seconds
Forward delay : 15 seconds
Local parameters
Bridge ID : 4097.00:19:e2:50:51:e0
Extended system ID : 0
Internal instance ID : 1

STP bridge parameters for MSTI 2
MSTI regional root : 4098.00:19:e2:50:3d:20
Root cost : 1000
Root port : ge-0/0/28.0
Hello time : 2 seconds
Maximum age : 20 seconds
Forward delay : 15 seconds
Hop count : 19
Local parameters
Bridge ID : 16386.00:19:e2:50:51:e0
Extended system ID : 0
Internal instance ID : 2

```

**Meaning** The operational mode command `show spanning-tree interface` displays spanning-tree domain information such as the designated port and the port roles.

The operational mode command `show spanning-tree bridge` displays the spanning-tree domain information at either the bridge level or interface level. If the optional interface name is omitted, all interfaces in the spanning-tree domain are displayed.

## Verifying MSTP Configuration on Switch 4

**Purpose** Verify the MSTP configuration on Switch 4.

**Action** Use the operational mode commands:

```

user@switch4> show spanning-tree interface
Spanning tree interface parameters for instance 0

```

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/23.0	128:523	128:517	8192.0019e25051e0	1000	FWD	ROOT
ge-0/0/19.0	128:525	128:525	16384.0019e25040e0	1000	FWD	DESG

Spanning tree interface parameters for instance 1

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/23.0	128:523	128:517	4097.0019e25051e0	1000	FWD	ROOT
ge-0/0/19.0	128:525	128:525	16385.0019e25040e0	1000	FWD	DESG

Spanning tree interface parameters for instance 2

Interface	Port ID	Designated port ID	Designated bridge ID	Port Cost	State	Role
ge-0/0/23.0	128:523	128:517	16386.0019e25051e0	1000	BLK	ALT
ge-0/0/19.0	128:525	128:527	8194.0019e25044e0	1000	FWD	ROOT

```
user@switch4> show spanning-tree bridge
```

```
STP bridge parameters
```

```
Context ID           : 0
Enabled protocol     : MSTP
```

```
STP bridge parameters for CIST
```

```
Root ID              : 8192.00:19:e2:50:51:e0
Root cost             : 0
Root port            : ge-0/0/23.0
CIST regional root    : 8192.00:19:e2:50:51:e0
CIST internal root cost : 1000
Hello time           : 2 seconds
Maximum age          : 20 seconds
Forward delay        : 15 seconds
Hop count            : 19
Message age          : 0
Number of topology changes : 4
Time since last topology change : 887 seconds
Local parameters
  Bridge ID           : 16384.00:19:e2:50:40:e0
  Extended system ID   : 0
  Internal instance ID : 0
```

```
STP bridge parameters for MSTI 1
```

```
MSTI regional root    : 4097.00:19:e2:50:51:e0
Root cost             : 1000
Root port            : ge-0/0/23.0
Hello time           : 2 seconds
Maximum age          : 20 seconds
Forward delay        : 15 seconds
Hop count            : 19
Local parameters
  Bridge ID           : 16385.00:19:e2:50:40:e0
  Extended system ID   : 0
  Internal instance ID : 1
```

```
STP bridge parameters for MSTI 2
```

```
MSTI regional root    : 4098.00:19:e2:50:3d:20
Root cost             : 2000
Root port            : ge-0/0/19.0
Hello time           : 2 seconds
Maximum age          : 20 seconds
Forward delay        : 15 seconds
Hop count            : 18
Local parameters
  Bridge ID           : 32770.00:19:e2:50:40:e0
  Extended system ID   : 0
  Internal instance ID : 2
```

**Meaning** The operational mode command `show spanning-tree interface` displays spanning-tree domain information such as the designated port and the port roles.

The operational mode command **show spanning-tree bridge** displays the spanning-tree domain information at either the bridge level or interface level. If the optional interface name is omitted, all interfaces in the spanning-tree domain are displayed.

- Related Topics**
- Example: Configuring Faster Convergence and Improving Network Stability with RSTP on EX Series Switches
  - Understanding MSTP for EX Series Switches

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