

Objective

This tech note outlines the main differences in Spanning-Tree Protocol (STP) support between Cisco® NX-OS Software and Cisco IOS® Software. Sample configurations are included for Cisco NX-OS and Cisco IOS Software for some common features to demonstrate the similarities and differences. Please refer to the [NX-OS documentation on Cisco.com](#) for a complete list of supported features.

STP Overview

STP is a standards based link-layer protocol originally defined in IEEE 802.1d that runs on switches to prevent forwarding loops when using redundant layer-2 network topologies. Newer variants of STP have been developed called Rapid Spanning Tree protocol (RSTP) defined in IEEE 802.1w and Multiple Spanning Tree protocol (MST) defined in IEEE 802.1s that are enhanced for better scalability and converge faster than the original version.

Important Cisco NX-OS and Cisco IOS Software Differences

In Cisco NX-OS:

- STP supports stateful process restarts and In-Service-Software-Upgrades (ISSU) if two supervisors are present in a chassis.
- Rapid-PVST+ and the MST protocols are supported.
- Rapid-PVST+ is enabled by default.
- VLANs 3968-4047,4094 are reserved for internal use. Cisco IOS Software reserves VLANs 1002-1005,4095 for internal use by default.
- VLAN ranges can be configured in ascending or descending order (IE. vlan 10-20 or vlan 20-10), whereas Cisco IOS Software only supports configuring VLAN ranges in ascending order.
- The STP **spanning-tree** global configuration commands with VLAN ranges can be configured in ascending or descending order (IE. **spanning-tree vlan 10-20 root primary** or **spanning-tree vlan 20-10 root primary**), whereas the Cisco IOS software only supports configuring spanning-tree ranges in ascending order.
- The STP extended system-id is always enabled. Cisco IOS software requires the global **spanning-tree extend system-id** configuration command.
- The STP port types are identified with the **port type** designation as opposed to the **portfast** designation in Cisco IOS Software.

Things You Should Know

The following list provides some additional facts about the Cisco NX-OS that should be helpful when designing, configuring, and maintaining a network configured with the STP.

- Rapid-PVST+ is interoperable with the 802.1d STP.
- Rapid-PVST+ is interoperable with MST. (Enabled by default)
- Only one STP can be enabled per VDC.
- Bridge Assurance is enabled globally by default, but is disabled on an interface by default.
- Bridge Assurance can be enabled for an interface using the **spanning-tree port type network** interface command.

Cisco_NX-OS/IOS_STP_Comparison

- The **clear spanning-tree counters** command clears the counters for an STP interface or a VLAN.
- STP enhancements such as BPDU Guard, Loop Guard, Root Guard, and BPDU Filtering are supported.

Spanning-Tree best practices are applicable to both Cisco NX-OS and Cisco IOS Software

- Do not disable STP. Even if the layer-2 topology does not require STP, it should always be enabled as a safeguard for configuration and/or cabling errors.
- Changing the STP mode can disrupt traffic.
- Enabling Bridge Assurance is recommended. However, only enable Bridge Assurance on layer-2 links if both devices on each end of the link support it.
- Bridge Assurance should only be configured on the vPC peer-link (configured by default) and not on any other vPC interfaces in a vPC domain.
- Typically the core/backbone devices should be configured as the primary and secondary root bridges.
- The default bridge priority is 32,768 (plus the VLAN #). The lower the value, the more likely it will become the root bridge.
- Configure 802.1q trunk ports as **edge trunk** port type when connecting to layer-3 hosts such as firewalls, load-balancers, or servers for faster convergence.

Configuration Comparison

The following sample code shows configuration similarities and differences between the Cisco NX-OS and Cisco IOS Software CLIs. The CLI is identical with the exception of the port type terminology. The Cisco IOS uses the **portfast** designation, whereas Cisco NX-OS uses the **port type** designation.

Cisco IOS CLI

Cisco NX-OS CLI

Configuring VLANs

vlan 10,20

Configuring Rapid PVST+

Rapid-PVST is enabled by default.

spanning-tree mode rapid-pvst

Configuring the Rapid-PVST+ Bridge Priority

spanning-tree vlan 10 root primary

spanning-tree vlan 20 root secondary

Configuring MST

spanning-tree mode mst

Configuring a MST Instance

spanning-tree mst configuration

instance 1 vlan 10

instance 2 vlan 20

Configuring the MST Bridge Priority

spanning-tree mst 1 root primary

spanning-tree mst 2 root secondary

Configuring STP Port Types Globally

spanning-tree port type edge default

or

spanning-tree port type network default

Configuring STP Port Types per Interface

interface ethernet 1/1

switchport

spanning-tree port type edge

or

spanning-tree port type network

or

spanning-tree port type normal

Configuring a Trunk as an Edge Port Type

interface ethernet 1/1

switchport

spanning-tree port type edge trunk

Disabling PVST Simulation Globally

no spanning-tree mst simulate pvst global

Disabling PVST Simulation per Port

interface ethernet 1/1

switchport

spanning-tree mst simulate pvst disable

Verification Command Comparison

The following table lists some useful **show** commands for verifying and troubleshooting a STP network configuration. The show commands are almost identical for Cisco IOS and Cisco NX-OS Software.

| Cisco NX-OS STP | Cisco IOS Software STP | Command Description |
|-----------------|------------------------|---------------------|
|-----------------|------------------------|---------------------|

Cisco_NX-OS/IOS_STP_Comparison

| | | |
|--|--------------------------------------|---|
| show spanning-tree | show spanning-tree | Displays high level process information for all STP enabled VLANs |
| show spanning-tree active | show spanning-tree active | Displays all ports in an active state |
| show spanning-tree blockedports | show spanning-tree blockedports | Displays all ports in a blocked state |
| show spanning-tree detail | show spanning-tree detail | Displays detailed information per STP instance |
| show spanning-tree inconsistentports | show spanning-tree inconsistentports | Displays inconsistent port status |
| show spanning-tree interface <type> | show spanning-tree interface <type> | Displays detailed STP information for a specific interface (many sub-options) |
| show spanning-tree mst | show spanning-tree mst | Displays high-level MST configuration |
| show spanning-tree mst configuration | show spanning-tree mst configuration | Displays the MST instance configuration |
| show spanning-tree mst detail | show spanning-tree mst detail | Displays detailed MST information |
| show spanning-tree mst interface | show spanning-tree mst interface | Displays MST interface information |
| show spanning-tree pathcost method | - | Displays STP path cost method |
| show spanning-tree root | show spanning-tree root | Displays STP root information |
| show spanning-tree summary | show spanning-tree summary | Displays STP summary information |
| show spanning-tree vlan <#> | show spanning-tree vlan <#> | Displays per VLAN STP information |