

Configure STP Settings on a Switch through the CLI

Objective

Spanning Tree Protocol (STP) protects Layer 2 broadcast domains from broadcast storms by selectively setting links to standby mode to prevent loops. In standby mode, these links temporarily stop transferring user data. After the topology changes, so that the data transfer is made possible, the links are automatically re-activated.

Network Loops occur when there are alternate routes between hosts. These loops cause Layer 2 switches to forward traffic across the network infinitely, reducing network efficiency. STP provides a unique path between endpoints on a network. These paths eliminate the possibility of network loops. STP is typically configured when there are redundant links to a host to prevent network loop.

The device supports the following Spanning Tree Protocol versions:

- Classic STP — Provides a single path between any two end stations, avoiding and eliminating loops.
- Rapid STP (RSTP) — Detects network topologies to provide faster convergence of the spanning tree. This is most effective when the network topology is naturally tree-structured, and therefore faster convergence might be possible. RSTP is enabled by default.
- Multiple STP (MSTP) — MSTP is based on RSTP. It detects Layer 2 loops, and attempts to mitigate them by preventing the involved port from transmitting traffic. Since loops exist on a per-Layer 2-domain basis, a situation can occur when a port is blocked to eliminate an STP loop. Traffic will be forwarded to the port that is not blocked, and no traffic will be forwarded to the port that is blocked. This is not an efficient usage of bandwidth as the blocked port will always be unused.

MSTP solves this problem by enabling several STP instances, so that it is possible to detect and mitigate loops separately in each instance. This enables a port to be blocked for one or more STP instances but non-blocked for other STP instances. If different VLANs are associated with different STP instances, then their traffic will be relayed based on the STP port state of their associated MST instances. This results to better bandwidth utilization.

This article aims to show you how to configure STP on a switch through the CLI.

Applicable Devices

- Sx300 Series
- Sx350 Series
- SG350X Series
- Sx500 Series

- Sx550X Series

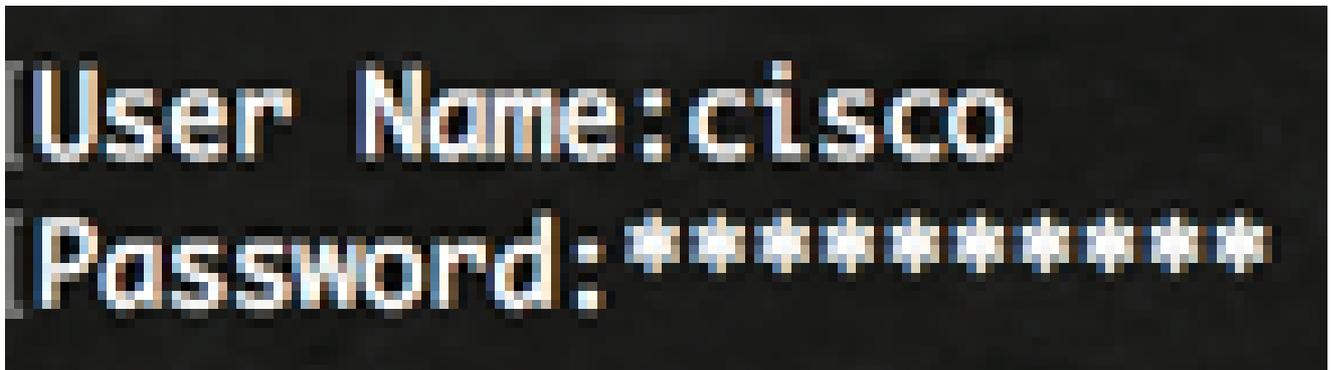
Software Version

- 1.4.7.06 — Sx300, Sx500
- 2.2.8.04 — Sx350, SG350X, Sx550X

Configure Spanning Tree Properties

Step 1. Log in to the switch console. The default username and password is cisco/cisco. If you have configured a new username or password, enter the credentials instead.

Note: To learn how to access an SMB switch CLI through SSH or Telnet, click [here](#).



Note: The commands may vary depending on the exact model of your switch. In this example, the SG350X-48MP switch is accessed through Telnet.

Step 2. From the Privileged EXEC mode of the switch, enter the Global Configuration mode by entering the following:

```
SG350X#configure
```

Step 3. To enable the STP functionality on the switch, enter the following:

```
SG350X(config)#spanning tree
```

```
[SG350X#configure
[SG350X(config)#spanning-tree
SG350X(config)#
```

Step 4. To configure the STP protocol to run on the switch, enter the following:

```
SG350X(config)#spanning-tree mode [stp | rstp | mst]
```

The options are:

- stp — Classic STP provides a single path between any two endpoints, eliminating and preventing networking loops.
- rstp — RSTP detects network topologies to provide faster convergence of the spanning tree. This option is enabled by default.
- mst — MSTP is based on RSTP. It detects Layer 2 loops, and attempts to mitigate them by preventing the involved port from transmitting traffic.

```
[SG350X#configure
[SG350X(config)#spanning-tree
[SG350X(config)#spanning-tree mode rstp
SG350X(config)#
```

Note: In this example, rstp is used.

Step 5. To set the default path cost method, enter the following:

```
SG350X(config)#spanning-tree pathcost method [long | short]
```

The options are:

- long — Specifies the value for port path costs. The range is from one up to 200000000.
- short — Specifies the value for port path costs. The range is from one to 65535.

```
[SG350X#configure
[SG350X(config)#spanning-tree
[SG350X(config)#spanning-tree mode rstp
[SG350X(config)#spanning-tree pathcost method long
[SG350X(config)#
```

Step 6. To configure the switch STP priority, which is used to determine which bridge is selected as the root bridge, enter the following:

```
SG350X(config)#spanning-tree priority [priority-number]
```

- priority-number — Specifies the bridge priority. The range is from 0 up to 61440.

```
[SG350X#configure
[SG350X(config)#spanning-tree
[SG350X(config)#spanning-tree mode rstp
[SG350X(config)#spanning-tree pathcost method long
[SG350X(config)#spanning-tree priority 32768
[SG350X(config)#
```

Note: In this example, 32768 is used.

Step 7. (Optional) To configure how often the switch broadcasts Hello messages to other devices, enter the following:

```
SG350X(config)#spanning-tree hello-time [seconds]
```

- seconds — Specifies the spanning tree Hello time in seconds. The range is from 1 up to 10 seconds. The default value is 2 seconds.

```
[SG350X#configure
[SG350X(config)#spanning-tree
[SG350X(config)#spanning-tree mode rstp
[SG350X(config)#spanning-tree pathcost method long
[SG350X(config)#spanning-tree priority 32768
[SG350X(config)#spanning-tree hello-time 2
[SG350X(config)#
```

Note: In this example, the default Hello time of 2 seconds is used.

Step 8. (Optional) To configure the STP maximum age, enter the following:

```
SG350X(config)#spanning-tree max-age [seconds]
```

- seconds — Specifies the spanning tree bridge maximum age in seconds. The range is from six up to 40 seconds. The default value is 20 seconds.

```
[SG350X#configure
[SG350X(config)#spanning-tree
[SG350X(config)#spanning-tree mode rstp
[SG350X(config)#spanning-tree pathcost method long
[SG350X(config)#spanning-tree priority 32768
[SG350X(config)#spanning-tree hello-time 2
[SG350X(config)#spanning-tree max-age 20
[SG350X(config)#
```

Note: In this example, the default value of 20 seconds is used.

Step 9. (Optional) To configure the STP bridge forward time, which is the amount of time a port remains in the listening and learning states before entering the forwarding state, enter the following:

```
SG350X(config)#spanning-tree forward-time [seconds]
```

- seconds — Specifies the spanning tree forward time in seconds. The range is from four up to 30 seconds. The default value is 15 seconds.

```
[SG350X#configure
[SG350X(config)#spanning-tree
[SG350X(config)#spanning-tree mode rstp
[SG350X(config)#spanning-tree pathcost method long
[SG350X(config)#spanning-tree priority 32768
[SG350X(config)#spanning-tree hello-time 2
[SG350X(config)#spanning-tree max-aae 20
[SG350X(config)#spanning-tree forward-time 15
SG350X(config)#
```

Note: In this example, the default value of 15 seconds is used.

Step 10. (Optional) To enable STP Loopback Guard, enter the following:

```
SG350X(config)#spanning-tree loopback-guard
```

Note: Enabling this feature checks if a root port or an alternate root port receives Bridge Protocol Data Units (BPDUs). In this example, STP Loopback Guard is enabled.

```
[SG350X(config)#spanning-tree forward-time 15
[SG350X(config)#spanning-tree loopback-guard
SG350X(config)#
```

Step 11. Enter the **exit** command to go back to the Privileged EXEC mode:

```
SG350X(config)#exit
```

```
[SG350X#configure
[SG350X(config)#spanning-tree
[SG350X(config)#spanning-tree mode rstp
[SG350X(config)#spanning-tree pathcost method long
[SG350X(config)#spanning-tree priority 32768
[SG350X(config)#spanning-tree hello-time 2
[SG350X(config)#spanning-tree max-age 20
[SG350X(config)#spanning-tree forward-time 15
[SG350X(config)#spanning-tree loopback-guard
[SG350X(config)#exit
SG350X#
```

Step 12. (Optional) To display the STP settings on the switch, enter the following:

```
SG350X#show spanning-tree
```

```

[SG350X(config)#exit
[SG350X]#show spanning-tree

Spanning tree enabled mode RSTP
Default port cost method: long
Loopback guard: Enabled

Root ID    Priority    32768
          Address    00:eb:d5:5e:09:40
          Cost      40000
          Port      gi1/0/2
          Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
Bridge ID  Priority    32768
          Address    40:a6:e8:e6:f4:d3
          Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Number of topology changes 5 last change occurred 00:49:25 ago
Times: hold 1, topology change 35, notification 2
       hello 2, max age 20, forward delay 15

Interfaces
-----
Name      State    Prio.Nbr   Cost     Sts     Role  PortFast     Type
-----
gi1/0/1   enabled  128.1      20000    Dscr    Altn   No            P2P (RSTP)
gi1/0/2   enabled  128.2      20000    Frw     Root   No            P2P (RSTP)
gi1/0/3   enabled  128.3      2000000  Dsbl    Dsbl   No            -
gi1/0/4   enabled  128.4      20000    Dscr    Altn   No            P2P (RSTP)
More: <space>, Quit: q or CTRL+Z, One line: <return>

```

Step 13. (Optional) In the Privileged EXEC mode of the switch, save the configured settings to the startup configuration file by entering the following:

```
SG350X#copy running-config startup-config
```

```

SG550XG#copy running-config startup-config
Overwrite file [startup-config]... (Y/N)[N] ?

```

Step 14. (Optional) Press **Y** for Yes or **N** for No on your keyboard once the Overwrite file [startup-config]... prompt appears.

```
SG550XG#copy running-config startup-config
Overwrite file [startup-config]... (Y/N)[N] ?Y
18-Sep-2017 08:00:45 %COPY-I-FILECPY: Files Copy - source URL running-config destination
URL flash://system/configuration/startup-config
18-Sep-2017 08:00:47 %COPY-N-TRAP: The copy operation was completed successfully
SG550XG#
```

You should now have successfully configured the STP settings on your switch through the CLI.