



## STP Edge Ports

« STP Bridge Assurance | Active Active NIC Teaming with vPC »

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### STP Edge Ports

#### Note:

Configure the task "VLANs & Trunking" prior to beginning this lab.

#### Objective

- Configure Spanning-Tree Edge Ports and verify their effect on STP convergence.

#### Task

- Per the previous task the network should be configured as follows:
  - The first server's link to the first 5K is in VLAN 10 with address 10.0.0.1X/24, where X is the server number.
  - The first server's link to the second 5K is in VLAN 20 with address 20.0.0.1X/24, where X is the server number.
  - The second server's link to the first 5K is in VLAN 20 with address 20.0.0.1X/24, where X is the server number.
  - The second server's link to the second 5K is in VLAN 10 with address 10.0.0.1X/24, where X is the server number.
  - 5Ks and 7Ks have SVIs for VLANs 10 & 20 with IP addressing 10.0.0.X/24 and 20.0.0.X/24 respectively, where X is the device number.
  - 5Ks have access ports to the servers and trunk ports to the 7Ks, and the 7Ks have trunks to the 5Ks.
  - The links between the 5Ks should be disabled.
- Configure your first 7K as the STP Root Bridge for both VLANs 10 & 20.
- Configure and verify STP Edge Ports as follows:
  - Run a continuous ping between your servers for both the VLAN 10 & 20 addresses. At this point you should have IP reachability between both subnets of the servers.
  - Disable and re-enable your first 5K's links to both servers, and note how this affects connectivity for both VLAN 10 & 20 subnets between the servers.
  - Once reachability is re-established, disable all links on your first 7K and note how this affects connectivity for both VLAN 10 & 20 subnets between the servers.
  - Configure the links from your 5Ks to the servers as STP Edge Ports, and repeat the above two test cases.
- Once complete ensure that a non-directly connected link flap northbound of the servers does not affect the connectivity between them for either subnet.

#### Configuration [Click to collapse](#)

```
N5K1:
feature interface-vlan
!
vlan 10,20
!
interface Ethernet1/1
switchport
switchport mode access
switchport access vlan 10
spanning-tree port type edge
no shutdown
!
interface Ethernet1/2
switchport
switchport mode access
switchport access vlan 20
spanning-tree port type edge
no shutdown
!
interface Ethernet1/3 - 4
shutdown
!
interface Ethernet1/5 - 6
switchport
switchport mode trunk
switchport trunk allowed vlan 10,20
no shutdown
!
interface Vlan10
ip address 10.0.0.51/24
no shutdown
!
interface Vlan20
ip address 20.0.0.51/24
no shutdown
```

```
N5K2:
feature interface-vlan
!
vlan 10,20
!
interface Ethernet1/1
switchport
switchport mode access
switchport access vlan 20
spanning-tree port type edge
no shutdown
!
interface Ethernet1/2
switchport
switchport mode access
switchport access vlan 10
spanning-tree port type edge
no shutdown
!
interface Ethernet1/3 - 4
```

```

!
interface Ethernet1/5 - 6
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 10,20
  no shutdown
!
interface Vlan10
  ip address 10.0.0.52/24
  no shutdown
!
interface Vlan20
  ip address 20.0.0.52/24
  no shutdown

N7K1:
feature interface-vlan
!
vlan 10,20
!
spanning-tree vlan 10,20 priority 0
!
interface Ethernet1/1 - 4
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 10,20
  no shutdown
!
interface Vlan10
  ip address 10.0.0.71/24
  no shutdown
!
interface Vlan20
  ip address 20.0.0.71/24
  no shutdown

N7K2:
feature interface-vlan
!
vlan 10,20
!
interface Ethernet1/1 - 4
  switchport
  switchport mode trunk
  switchport trunk allowed vlan 10,20
  no shutdown
!
interface Vlan10
  ip address 10.0.0.72/24
  no shutdown
!
interface Vlan20
  ip address 20.0.0.72/24
  no shutdown

```

## Verification

Before Edge Ports are configured, both servers have IP reachability to each other:

```

Server 1:
C:\>ping 10.0.0.12 -t

Pinging 10.0.0.12 with 32 bytes of data:
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
<snip>

C:\>ping 20.0.0.12 -t

Pinging 20.0.0.12 with 32 bytes of data:
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
<snip>

```

N5K1 flaps both links to Server 1 & 2:

```

N5K1# config t
Enter configuration commands, one per line. End with CNTL/Z.
N5K1(config)# int e1/1 - 2
N5K1(config-if-range)# shut
N5K1(config-if-range)# no shut
N5K1(config-if-range)#

```

Connectivity is temporarily lost between servers while STP reconverges:

```

Server 1:
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
General failure.
General failure.
General failure.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.

```

```

Reply from 10.0.0.11: Destination host unreachable.
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Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
<snip>

Server 1:
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Reply from 20.0.0.11: Destination host unreachable.
Reply from 20.0.0.11: Destination host unreachable.
Reply from 20.0.0.12: bytes=32 time=1996ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
<snip>

```

N7K1 disables all links, forcing a new STP Root Bridge election:

```

N7K1# config t
Enter configuration commands, one per line. End with CNTL/Z.
N7K1(config)# int e1/1 - 4
N7K1(config-if-range)# shut
N7K1(config-if-range)#

```

Connectivity is temporarily lost between servers while STP reconverges:

```

Server 1:
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
General failure.
General failure.
General failure.
General failure.
General failure.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.11: Destination host unreachable.
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128

Server 1:
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Request timed out.
Request timed out.
Request timed out.
Reply from 20.0.0.11: Destination host unreachable.
Reply from 20.0.0.11: Destination host unreachable.
Reply from 20.0.0.11: Destination host unreachable.
Reply from 20.0.0.12: bytes=32 time=1994ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128

```

The reason for this loss in connectivity is that the 5Ks attempt to perform rapid STP convergence on the links to the servers, but since the servers are not running spanning-tree the RSTP synchronization process fails. The result is that the links go into legacy STP learning state when there is a convergence event, causing 30 seconds of connectivity loss. This can be seen per the debug output below:

```

N5K1# debug spanning-tree rstp interface e1/2

N7K1# conf t ; int e1/1 - 4 ; shut
Enter configuration commands, one per line. End with CNTL/Z.
N7K1(config-if-range)#

N5K1# 2017 Jan 18 15:29:18 N5K1 %ETHPORT-5-IF_DOWN_LINK_FAILURE: Interface Ethernet1/5 is down (Link failure)
2017 Jan 18 15:29:18.950861 stp: RSTP(20): syncing port Ethernet1/2
2017 Jan 18 15:29:18.950956 stp: RSTP(20): Port Ethernet1/2 instance VLAN0020 moving from FWD to BLK
2017 Jan 18 15:29:18.951093 stp: RSTP(20): Ethernet1/2 not in sync
2017 Jan 18 15:29:18.951204 stp: RSTP(20): Multi Port Ethernet1/2 flushed
2017 Jan 18 15:29:18.951370 stp: RSTP(20): Multi Port Ethernet1/2 flushed
2017 Jan 18 15:29:18.954314 stp: RSTP(20): Ethernet1/2 state change to BLK completed, current state is BLK
2017 Jan 18 15:29:19.952021 stp: RSTP(20): Multi Port Ethernet1/2 flushed
2017 Jan 18 15:29:33.842600 stp: RSTP(20): Ethernet1/2 fdwhile Expired
2017 Jan 18 15:29:33.842675 stp: RSTP(20): Port Ethernet1/2 instance VLAN0020 moving from BLK to LRN
2017 Jan 18 15:29:33.843189 stp: RSTP(20): Ethernet1/2 state change to LRN completed, current state is LRN

N5K1# show spanning-tree interface e1/2

```

```

Vlan          Role Sts Cost      Prio.Nbr Type
-----
VLAN0020     Desg  LRN  2000     128.130 P2n

```

```
2017 Jan 18 15:29:48.842581 stp: RSTP(20): Ethernet1/2 fdwhile Expired
2017 Jan 18 15:29:48.842655 stp: RSTP(20): Port Ethernet1/2 instance VLAN0020 moving from LRN to FwD
2017 Jan 18 15:29:48.844803 stp: RSTP(20): Ethernet1/2 state change to FwD completed, current state is FwD
```

```
N5K1# show spanning-tree interface e1/2
```

| Vlan     | Role | Sts | Cost | Prio | Nbr | Type |
|----------|------|-----|------|------|-----|------|
| VLAN0020 | Desg | FwD | 2000 | 128  | 130 | P2p  |

Links from the 5Ks to the servers are now configured as STP Edge Ports, and the Root Bridge's links are re-enabled:

```
N5K1# config t
Enter configuration commands, one per line. End with CNTL/Z.
N5K1(config)# interface e1/1 - 2
N5K1(config-if-range)# spanning-tree port type edge
Warning: edge port type (portfast) should only be enabled on ports connected to a single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when edge port type (portfast) is enabled, can cause temporary bridging loops.
Use with CAUTION

Edge Port Type (Portfast) will be configured in 2 interfaces due to the range command
but will only have effect when the interfaces are in a non-trunking
mode.
N5K1(config-if-range)# end
N5K1#

N5K2(config-if)# config t
N5K2(config)# interface e1/1 - 2
N5K2(config-if-range)# spanning-tree port type edge
Warning: edge port type (portfast) should only be enabled on ports connected to a single
host. Connecting hubs, concentrators, switches, bridges, etc... to this
interface when edge port type (portfast) is enabled, can cause temporary bridging loops.
Use with CAUTION

Edge Port Type (Portfast) will be configured in 2 interfaces due to the range command
but will only have effect when the interfaces are in a non-trunking
mode.
N5K2(config-if-range)# end
N5K2#
```

The Root Bridge now disables its links:

```
N7K1# conf t ; int e1/1 - 4 ; shut
Enter configuration commands, one per line. End with CNTL/Z.
N7K1(config-if-range)#
```

The servers now reconverge rapidly around the Root Bridge failure:

```
Server 1:
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Request timed out.
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128
Reply from 10.0.0.12: bytes=32 time<1ms TTL=128

Server 1:
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Request timed out.
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
Reply from 20.0.0.12: bytes=32 time<1ms TTL=128
```



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