Spanning-tree Protocol

Perform the STP configuration demonstrated in the study materials.

Try out the following show commands:

```
show spanning-tree
show spanning-tree detail
show spanning-tree summary
```

Spanning-tree portfast function

Portfast is configured on ports to which the switch is not connected and therefore it is unnecessary to send BPDU frames there (= access ports). The purpose is to speed up the convergence of the switch network.

Assume that the ports f0/5-20 are not connected to a switch, but are intended for regular computers.

```
interface range f0/5-20
        spanning-tree portfast
```

Or for all access (no trunk) ports default configuration:

```
spanning-tree portfast default
```

and then for all ports with a switch connected in, e.g. f0/1:

```
interface f0/1
        spanning-tree portfast disable
```

Verify that the feature is enabled on a specific port:

```
show spanning-tree interface f0/1 portfast
show run
```

Security

The BPDUGuard feature protects the switch network from a hacker connecting his switch to a non-switch port (with portfast enabled) and claiming it as the root switch. If someone connects a switch to a port with portfast set, the port will go into error-disabled mode and stop working.

For set of ports:

```
interface range f0/5-20
        spanning-tree bpduguard enable
```

For all portfast ports:

```
spanning-tree portfast bpduguard default
```

and then for all ports with a switch connected in, e.g. f0/1:

```
interface f0/1
        spanning-tree bpduguard disable
```

If a port is in an error-disabled state: we can check the port status:

```
show interface status
show interface f0/1 status
```

It is possible to configure the switch to automatically turn on the port after a certain period of time *(does not work in Packet Tracer)* = errordisable recovery function:

```
show errdisable recovery              ; check if errordisable recovery is turned on
conf t
        errordisable recovery cause bpduguard        ; turn on for a specific purpose
        errordisable recovery interval 30            ; after 30 s, recovery occurs
```

EtherChannel

Modes for port aggregation:

PAg-P	LACP
on	on
auto	passive
desirable	active

Configuration of ports f0/1-2 to etherchannel, for LACP:

```
interface range f0/1-2
      shutdown
      channel-group 1 mode active
interface port-channel 1
                  … setting the virtual port, e.g. if it should be trunk:
      switchport mode trunk
      switchport trunk encap dot1q
      switchport trunk native vlan 1
      switchport trunk allowed vlan 10,20,99
                  … or if should be access port:
      switchport mode access
      switchport access vlan 10
                  … in any case:
interface range f0/1-2
      no shutdown
```

L3 Etherchannel configuration:

```
interface range f0/1-2
      shutdown
      channel-group 1 mode active
interface port-channel 1
      no switchport
      ip address 10.0.0.8 255.0.0.0
interface range f0/1-2
      no shutdown
```

Show commands for Etherchannel:

```
show interface f0/1 etherchannel
show interface po1
show etherchannel 1 detail
show etherchannel protocol
show etherchannel summary
show etherchannel ?
show lacp ?
show interfaces f0/1 capabilities
show run
show interfaces trunk
```

Configure this simple network with Etherchannel: