Spanning Tree Protocol (STP)

* Layer 2 protocol

**Problem: Routing Loop In Layer 3**

* Dynamic Routing protocols have built-in loop prevention
* TTL acts as a final failsafe

Ethernet Path Selection

* Without **STP** 
  + Layer 2 loops
  + Ethernet does not have TTL
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  + Broadcast Storm
  + Must be avoided at all costs
* With **STP**
  + We block some ports for preventing the Broadcast Storm
  + It’s the necessary evil
  + There are problems with the bandwidth but it’s necessary sometimes

STP Terminology

* **The BRIDGE**
  + Layer 2 Device
  + Learns MAC addresses from the 2 sides
  + They are early switches
  + A switch is a multi-port bridge
  + **STP** was invented back when bridges were in use (‘The root bridge’)

How Spanning Tree Works?

* Enabled by default on all vendors’ switches
* Switches send Bridge Protocol Data Units when they come online
* BDPU contsins the switch’s Bridge ID
* Bridge priority 0-65535, with 32768 default
* Lower Bridge Priority is preferred
* If a tie, lowest MAC address will be selected
* Short-Mode vs Long-Mode
* Root is the best BRIGdE id
* Lowest cost paths are preferred (in funcite de viteza interfetelor)
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* the **Root bridge** is elected and then the other switches chooses one Root port for arriving to the root bridge
* **designated ports** – the facing ports of the root ports
* **blocked port**
* BDPU will continue to be sent but

Spanning Tree Versions

A close-up of a tree

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Cisco Versions

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Spanning Tree Ports Roles

A screenshot of a computer

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A computer screen shot of a computer

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The Root Bridge Election

* Default value priority 32768
* Lowest MAC Address is the one chosen

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Spanning Tree and HSRP Relationship

A diagram of a network

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Spanning Tree **Portfast**

- when port becomes active, it takes Spanning Tree 30 seconds to ensure that it’s not a loop

- on brigdge port it broadcasts on all ports

- for not waiting for 30 seconds (if you are sure that port is not gonna create loop) PORTFAST should be enabled

- Postfast Ports are typically access ports to end hosts

- Trunk ports should not be Postfast Ports

- to prevent any loops for Postfast Ports **UDPU GUARD** is used

- if a port is shut by UDPU GUARD, then ensure it’s shutdown and no shutdown after

Spanning Tree Root Guard

* in cazul in care se introduce un switch in network, acesta s-ar putea sa fie noul root bridge, dar nu vrem asta
* de aceea se folosesti Spanning Tree root guard

A computer network diagram with text

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Spanning tree BDPU Filter

* switches send BDPUs, end hosts do not
* works differently depending on global or interface level config

COMMANDS

**#show spanning-tree pathcost method**

**#spanning-tree pathcost method long**

A screenshot of a computer

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#show spanning-tree vlan 1

#show mac address-table

**Seteaza un switch ca fiind root sau secundar**

#spanning-tree vlan 1 root primary

#spanning-tree vlan 1 root secondary

#spanning-tree vlan <id> priority (priority:0-61440, increment of 4096)

Portfast

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BDPU Guard

A close-up of a computer screen

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Spanning Tree Root Guard

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Spanning Tree Root Guard

A screenshot of a computer code

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Spanning Tree BDPU Filter

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