Advanced Program On Technology Enhanced Learning

Program sponsored

by

ITOS

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Rapid Spanning Tree Protocol

Spanning tree protocol version

STP	Legacy Spanning Tree Protocol. Slow convergence speed (~1 min)
RSTP	Rapid Spanning Tree Protocol. Fast convergence speed (<1 sec). Most commonly used.
MSTP	Multiple Spanning Tree Protocol. Used when more than once instance of Spanning Tree is required.

Main differences

- Standard STP (IEEE 802.1D)
- Rapid STP (IEEE 802.1W)

RSTP

- Rapid spanning tree protocol is improved version of the classic IEEE 802.1D
- Both standard share many features and functions
- **RSTP Differences in five areas**
  - Port roles
  - Port states
  - Rapid STP :Link type
  - Faster topology change detection
  - Faster convergence

Port roles and port state

3 Types of Port Roles

Root Port	A port on a switch to reach the root bridge with the shortest path.
Designated Port	The other end of a Root port .
Blocked Port	A port blocked to prevent a loop .

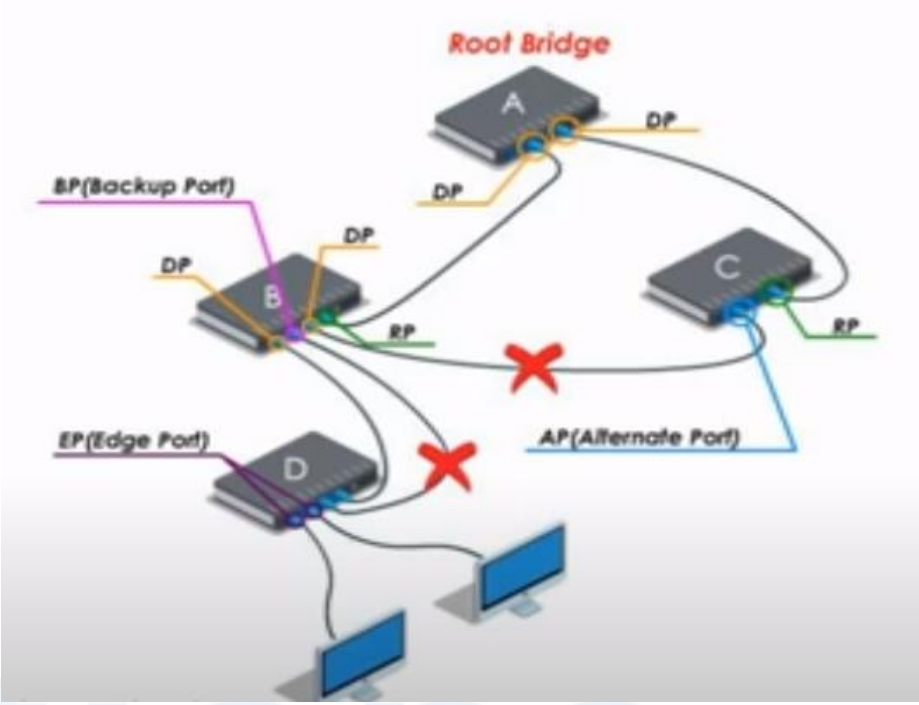
5 Types of Port States

Forwarding	Any port in the forwarding state will process BPDUs. receiving/forwarding frames.
Learning	The learning port starts learning about BPDUs. Transitioning and temporary.
Listening	The listening port is listening to BPDUs before transitioning to the learning state. Transitioning and temporary.
Blocking	Receiving but dropping any BPDUs.
Disabled	Non-operational in STP.

IEEE 802.1D VS IEEE 802.1W
port role

Port Roles

Spanning Tree Protocol (IEEE 802.1D)	Rapid Spanning Tree Protocol (IEEE 802.1W)
Root Port	Root Port
Designated Port	Designated Port
Blocked Port	Alternate Port
	Backup Port



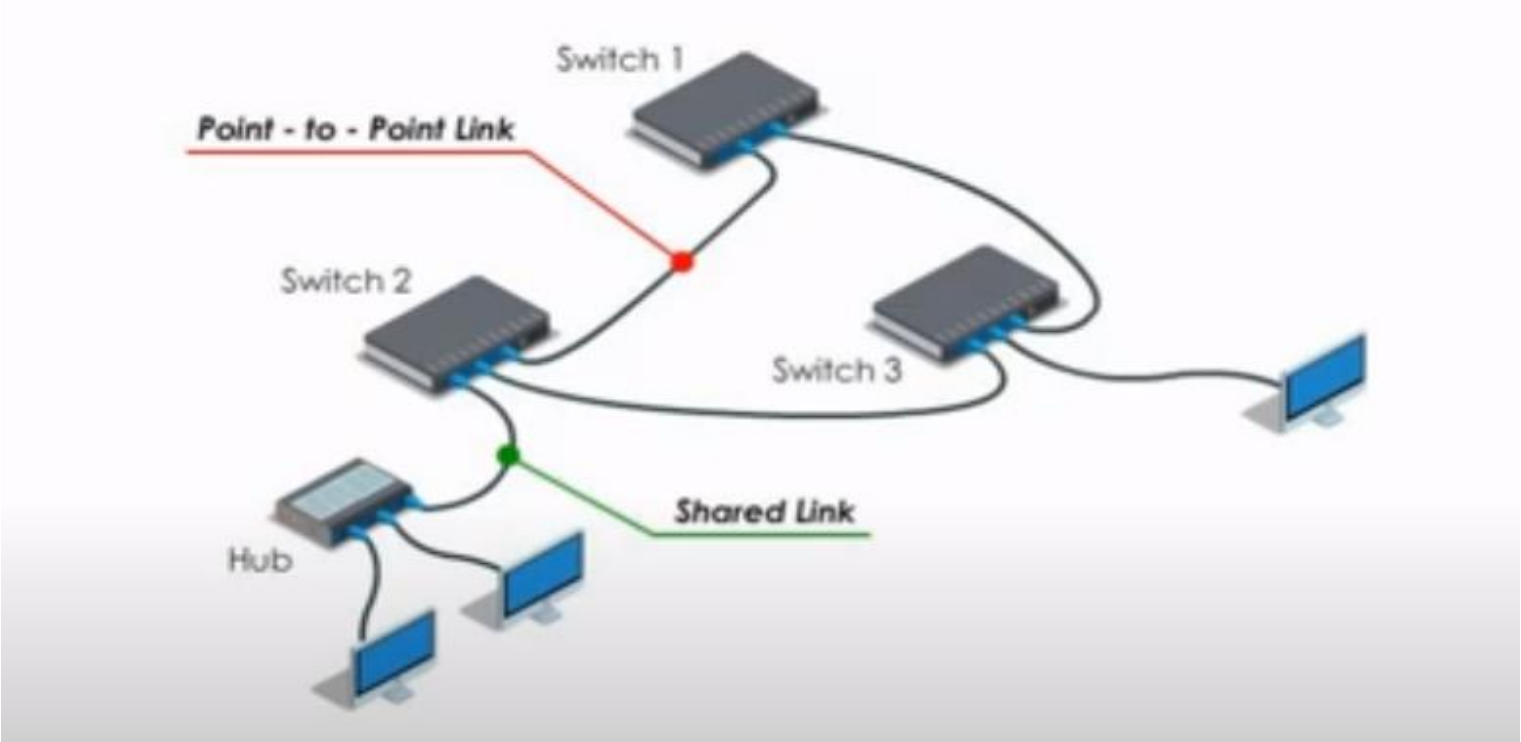
IEEE 802.1D VS IEEE 802.1W
Port states

Spanning Tree Protocol (IEEE 802.1D)		*Rapid Spanning Tree Protocol (IEEE 802.1W)*
Forwarding		Forwarding
Learning		Learning
Listening		Discarding
Blocking		
Disabled		

Differences

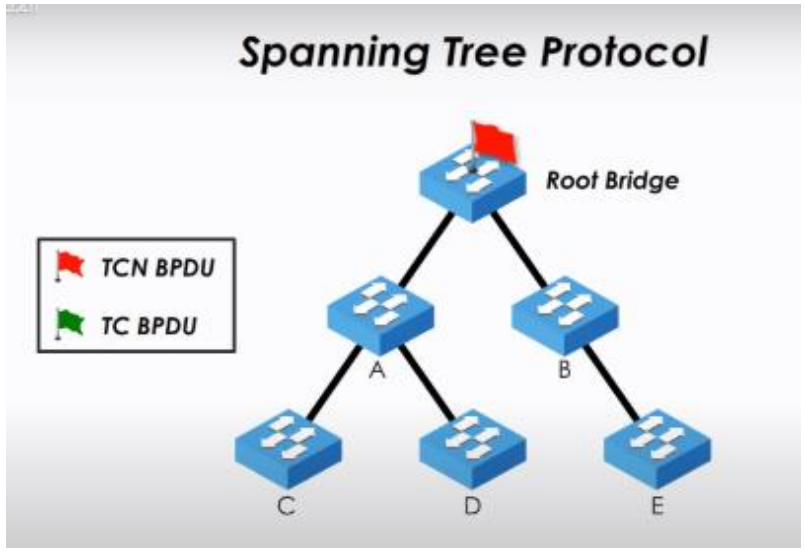
- The third differences the Link type
- RSTP introduces a new concept :Link type
- There are two link types :point to point link & shared link

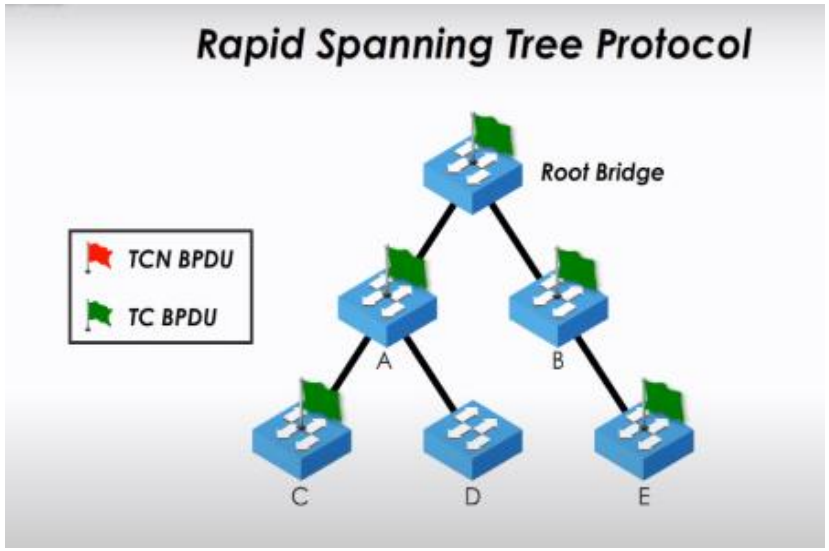
Rabid STP (link type)



Differences

RSTP provides faster topology change detection





BPDU Timers of convergence

RSTP provides significantly faster convergence in response to network changes

BPDU Timers	Spanning Tree Protocol (IEEE 802.1D)	Rapid Spanning Tree Protocol (IEEE 802.1W)
Max Age	20	6 (3 x Hello time)
Delay Forward for the Listening State	15	0
Delay Forward for the Learning state	15	0
Total	50	6

RSTP:Proposal/Agrement process

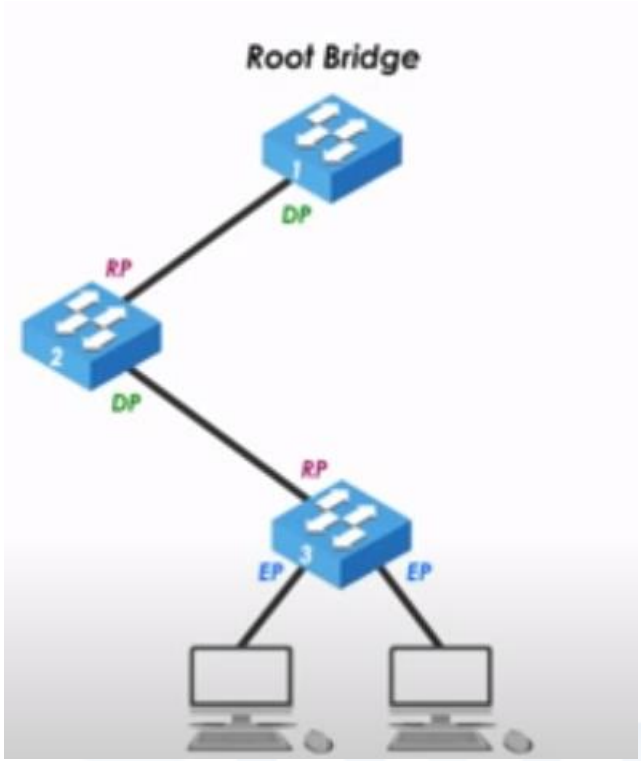
IEEE 802.1D

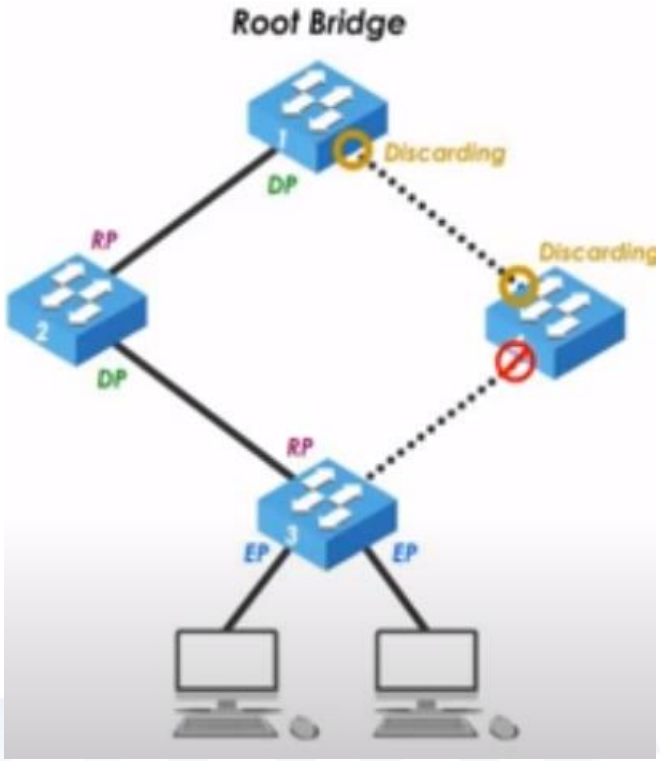
Bit	Function
0	Topology Change
1	Unused
2	Unused
3	Unused
4	Unused
5	Unused
6	Unused
7	Topology Change Acknowledgement

IEEE 802.1W

Bit	Function
0	Topology Change
1	Proposal
2-3 00 01 10 11	Port Role: Unknown Alternative Root Port Designated Port
4	Learning
5	Forwarding
6	Agreement
7	Topology Change Acknowledgement

How RSTP reacts to change

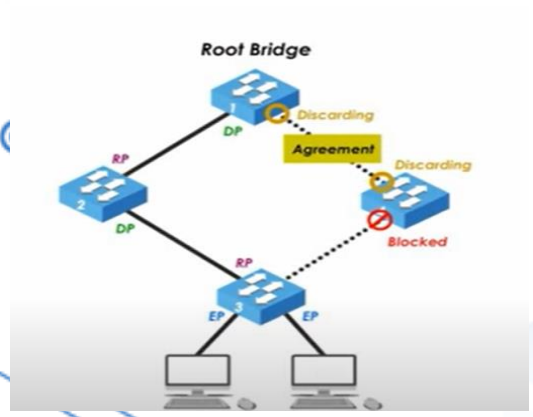


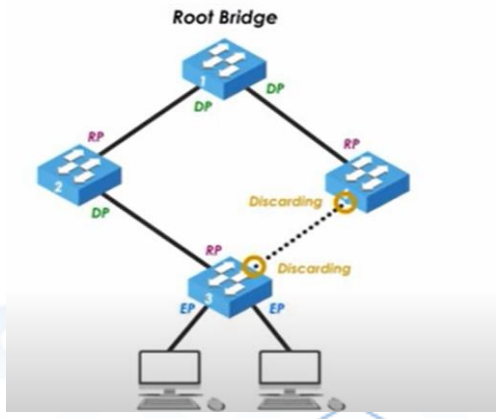


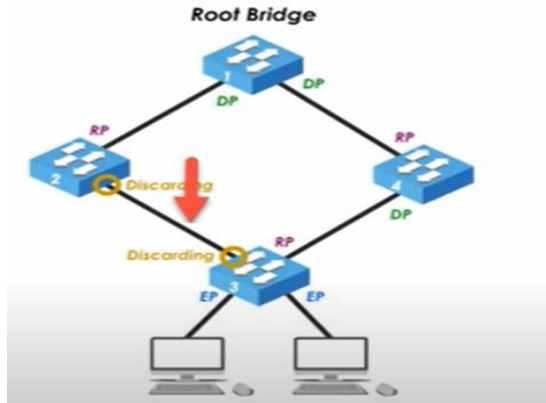
Synchronization

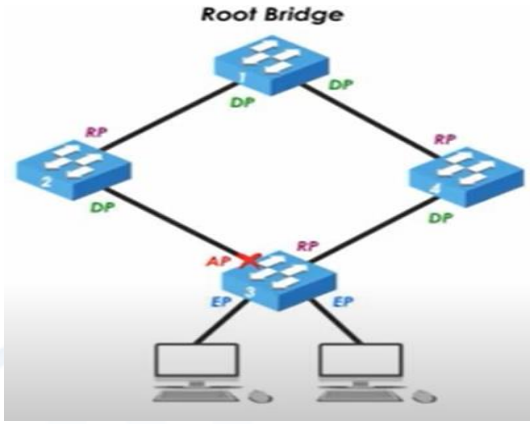
- Is a process that a switch blocks all non-edge ports before sending an agreement to another switch
- Synchronization is needed to make sure no loop is created during the

Proposal/Agrement process.









Conclusion

- RSTP proposal /agreement process is very quik because it does not depend on traditional BPDU timers as the standard STP does
- Instead, a switch negotiates it neighbors directly.
- RSTP provides faster topology change detection and much faster convergence time than the standard STP.

Q&A