

Name _____ Date _____

Module 5 - STP

Switching, Routing, and Wireless Essentials – Semester 2

Student Version

Module 5 Sections:

- 5.0 Introduction
- 5.1 Explain common problems in a redundant, L2 switched network.
- 5.2 Explain how STP operates in a simple switched network.
- 5.3 Explain how Rapid PVST+ operates.
- 5.4 Module Practice and Quiz

Required Materials:

Reading Organizer

Packet Tracer Activities: 5.1.9 - Investigate STP Loop Prevention

Labs: None

Module's 5 - 6 Exam

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Name _____ Date _____

Module 5 - STP

Reading Organizer

Student Version

Note: The Reading Organizer has weighted scoring. Any question with the word **explain, define, or describe** in it is expected to have a longer answer and is worth two points each.

After completion of this module, you should be able to:

- Explain common problems in a redundant, L2 switched network.
- Explain how STP operates in a simple switched network.
- Explain how Rapid PVST+ operates.

5.0 Introduction

1. A well-designed Layer 2 network will have _____ switches and paths to ensure that if one switch goes down, another path to a different switch is available to forward data.
2. What protocol is designed specifically to eliminate Layer 2 loops in your network?

5.1 Purpose of STP

3. What does a loop in an Ethernet LAN cause?
4. Spanning Tree Protocol (STP) is a _____ network protocol that allows for _____ while creating a loop-free Layer 2 topology.
5. What is the IEEE standard for STP?

6. Explain what path redundancy provides.

7. Describe what happens when multiple paths exist between two devices on an Ethernet network, and there is no spanning tree implementation on the switches.

8. List the problems that can occur if a Layer 2 loop is created.

a.

b.

c.

9. What are the mechanisms IPv4 and IPv6 use on a layer 3 router to limit the number of times a layer 3 device can retransmit a packet?

a. IPv4 - _____

b. IPv6 – _____

10. What was STP was specifically developed to do?

11. Without STP enabled, Layer 2 loops can form, causing _____, _____ and _____ frames to loop endlessly.

12. When a loop occurs what happens to the MAC address table on a switch?

13. Describe what an unknown unicast frame is?

14. Explain how you can stop a broadcast storm created by a routing loop?

15. Explain what a broadcast storm is.

16. What are two hardware issues that can create broadcast storms?

a.

b.

17. Is a host caught in a Layer 2 loop accessible to other hosts on the network?

18. Is spanning tree enable by default on Cisco switches?

17. The spanning tree algorithm begins by selecting a single _____.

18. STP prevents loops from occurring by configuring a loop-free path through the network using strategically placed _____ ports.

5.2 STP Operations

19. STP builds a loop-free topology in a four-step process. What are the four steps?

a.

b.

c.

d.

20. During STA and STP functions, switches use _____ to share information about themselves and their connections.

21. What are BPDUs used to elect?

- a.
- b.
- c.
- d.

22. List the three parts of the Bridge ID or BID and explain what they do.

- a. _____ –

- b. _____ –

- c. _____ –

23. The STA designates a _____ as the root bridge and uses it as the reference point for all path calculations.

24. Switches exchange BPDUs to build the loop-free topology beginning with selecting the _____.

25. After a switch boots, it begins to send out BPDUs every _____ seconds.

26. Which switch will become the root bridge?

27. The default BID is 32768, it is possible for two or more switches to have the same priority. In this scenario, where the priorities are the same, how is the root bridge decided?
28. What is recommended to ensure that the root bridge decision best meets network requirements?
29. How is the STA path information, known as the internal root path cost, determined?
30. What is the root path cost.?
31. Cisco switches by default use the values as defined by the _____ standard, also known as the short path cost, for both STP and RSTP.
32. Explain what the root port is.
33. Paths with the lowest cost become _____, and all other redundant paths are _____.
34. Every segment between two switches will have one designated port. Explain what the designated port is.
35. What happens to a port that is not a root port or a designated port?
36. If one end of a segment is a root port, then the other end is a _____.
37. If a port is not a root port or a designated port, then it becomes an alternate (or backup) port. What state are alternate ports and backup ports placed in?

38. What criteria does a switch use to designate a root port when the switch has multiple equal-cost paths to the root bridge?

- a.
- b.
- c.

39. STP convergence requires three timers. List and explain each.

a. _____ –

b. _____ –

c. _____ –

40. List and define the five STP port states.

a. _____ –

b. _____ –

c. _____ -

d. _____ -

e. _____ -

41. Fill in the operational details of each port state.

Port State	BPDU	MAC Address Table	Forwarding Data Frames
Blocking			
Listening			
Learning			
Forwarding			
Disabled			

42. Explain how Per-VLAN Spanning Tree (PVST) is different than STP.

5.3 Evolution of STP

43. Cisco switches running IOS 15.0 or later, run _____ by default.
44. _____ supersedes the original _____ while retaining backward compatibility.
45. What is the primary difference between RSTP and STP?
46. Rapid PVST+ is the Cisco implementation of RSTP on a per-VLAN basis. With Rapid PVST+ an independent instance of RSTP runs for each _____.
47. Write in the correct port states for STP and RSTP.

STP	RSTP

48. What is the delay in seconds after a switch starts up for the listening and learning states?
- a. Listening –
 - b. Learning –
 - c. Total Delay –
49. Which protocol can you use to avoid the listening and learning delay?

50. An important aspect to network design is fast and predictable _____.

51. _____ routing allows for redundant paths and loops in the topology, without blocking ports.

52. What other technologies are being used to prevent routing loops?

a.

b.

c.