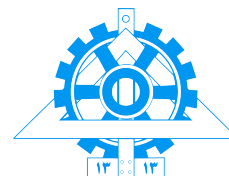In the name of Allah

بسم الله الرحمن الرحیم

STP and Switch
Laboratory Manual

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1   Introduction

In this session, we try checking switch network loop in Mininet and after implement it on Cisco devices. At the end of this session you must able to config Cisco switch and router.

Requirement

- Mininet + bridge-utils

- Cisco Packet Tracer or physical switch & router

2   Topology Configuration

Create Mininet custom topology like Figure 2.1 with link delay $1ms$.
run mininet with argument: **--switch lxbr,stp=1 --link tc**

   bash> run **sudo mn** $\cdots$ **--switch lxbr,stp=1 --link tc**

   bash> run **wireshark &** on host (mininet) immediately
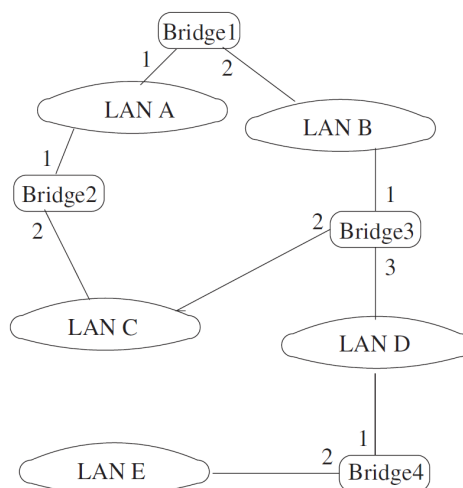
mininet **pingall**

Figure 2.1: Topology

   Whats happening?
Wait for 30 sec. Now rerun **pingall** command. Whats happening? Explain?

2.1   Report

Submit the gratuitous ARP sent by the host and switch. What in **STP** frame?
From the output of **show bridge**, identify which bridge ports are blocked, and which ports are in the forwarding state for each bridge.
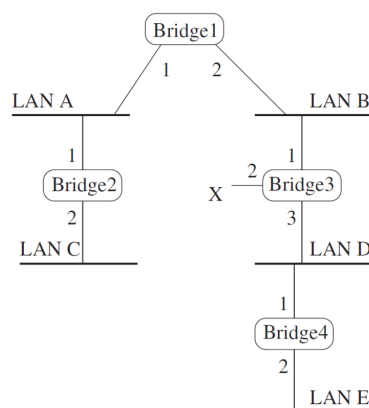
Figure 2.2: Corresponding tree for Figure 2.1 with the loop removed

2.2 Bridge Protocol Data Unit

Capture 5 BPDU[1] messages generated by bridges. Save the BPDUs for the lab report.

Report

1. How frequently (in seconds) does a bridge sends its BPDUs?

2. Submit the five different BPDUs you saved. Identify the values of root ID, root path cost, bridge ID, and port ID for each BPDU.

3 Cisco

Create new project in Cisco Packet Tracer and configure topology in Figure 2.1 by using 2960 switches and PC (Laptops) in toolbar.

(Use 2960 switch instead of bridge and set of two laptops and one switch instead of each LAN)
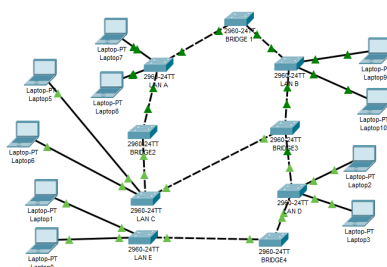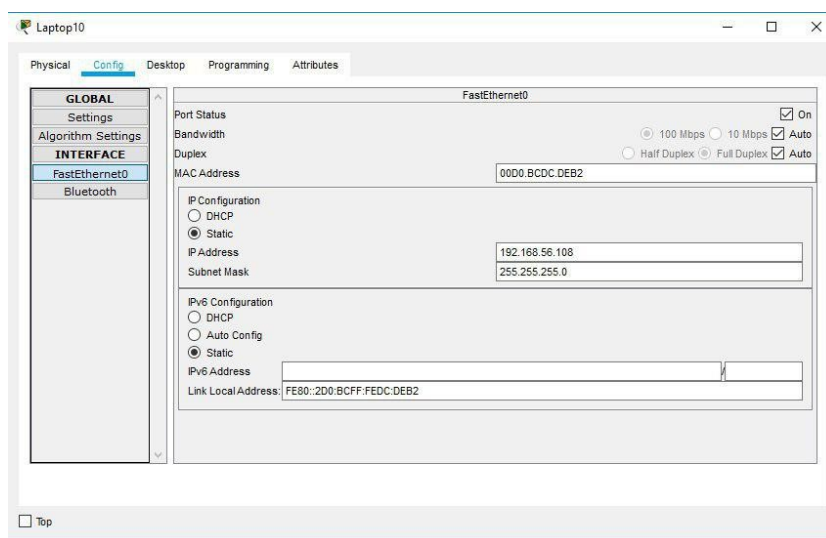your configuration must be similar to the Figure 2.1 in packet tracer.

Figure 3.1: Implemented Topology in CPT

3.1 Configuring IP address

Click on each laptop and select Config tab then select the FastEthernet0 on the left vertical bar. set IP address for each laptop in 192.168.56.101 to 192.168.56.110 range.

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[1]see Appendix B

Ping a laptop in LAN D by a laptop in LAN A.

How to Ping

click on source laptop and select Desktop tab then select command prompt. You can ping destination laptop
by its ip.

Report

1. show the ping result in your report.

2. all Cisco command (not required to save graphical image. only report switch or router command)

3.2 Disabling Spanning-Tree Protocol

Click on each switch in your topology and select CLI(Command Line Interface) tab. Enter following commands
for disabling STP.

   Switch> **enable**

   Switch# **configure terminal**

Switch(config)# **no spanning-tree vlan 1-4096**

Report

1. Repeat ping process from different source and show the ping result and explain the difference.

3.3 CLI help

Open a random router's CLI and navigate through User EXEC, Privileged EXEC, Global Configuration and
Interface Configuration Modes. In each mode, type ? to display a list of available commands and study these
commands.

Report

Save the output of CLI when you type "?" in each mode and describe one command.

3.4   IP configuration

Configure the IP addresses of your workstation and the bridge interfaces as shown in Table 1 and Table 2.

HOST_A			HOST_B		
Name	IP address	label	Name	IP address	label
shakti	128.238.61.101/24	1	vayu	128.238.61.102/24	2
agni	128.238.62.102/24	3	apah	128.238.62.103/24	4
yachi	128.238.63.103/24	5	fenchi	128.238.63.104/24	6
kenchi	128.238.64.104/24	7	guchi	128.238.64.105/24	8

Figure 3.2: Table 1: Host IP addresses

	eth0	eth1
router1	128.238.61.1/24	128.238.61.2/24
router2	128.238.62.2/24	128.238.62.3/24
router3	128.238.63.3/24	128.238.63.4/24
router4	128.238.64.4/24	128.238.64.5/24

Figure 3.3: Table 2: Router IP addresses

ping two random hosts and capture ping packet.

Report

1. What are the IP and MAC addresses of a packet that went from Host1 to the bridge?

2. What are the IP and MAC addresses of a packet that went from the router to Host2?

3. Answer the same questions, but for the echo reply that was returned from Host2.

3.5   Topology Configuration

In following Exercise we will use Figure 3.4 as our network topology.You need to change the IP addresses of the bridge interfaces, as well as that of hosts.
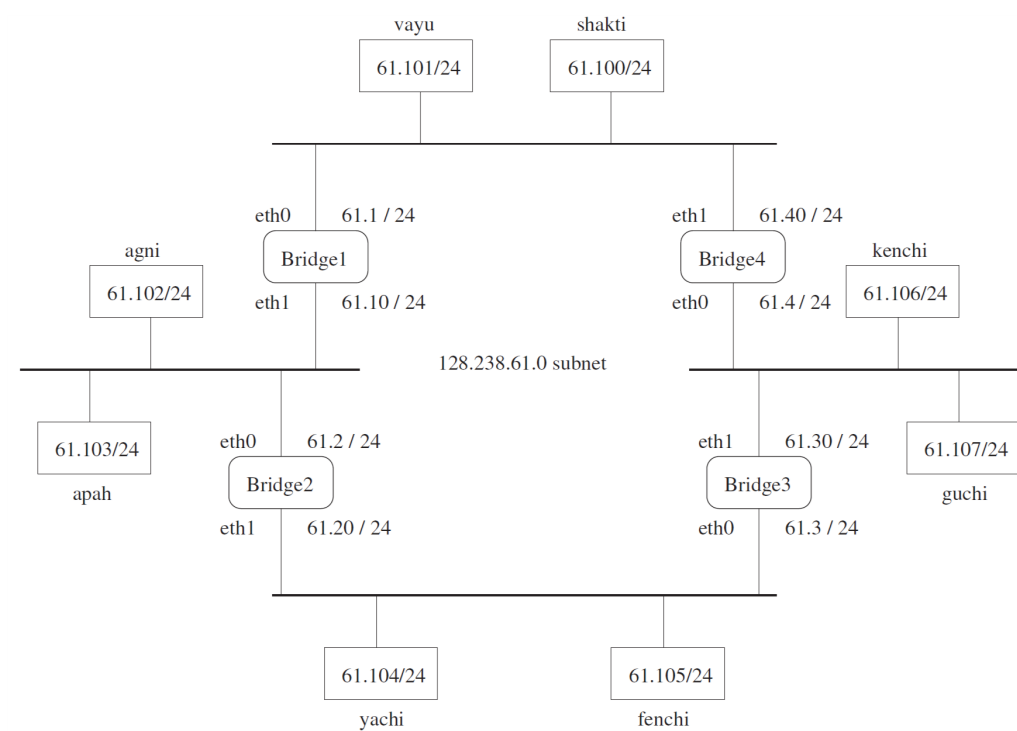
Figure 3.4: Bridge experiment network

Appendices
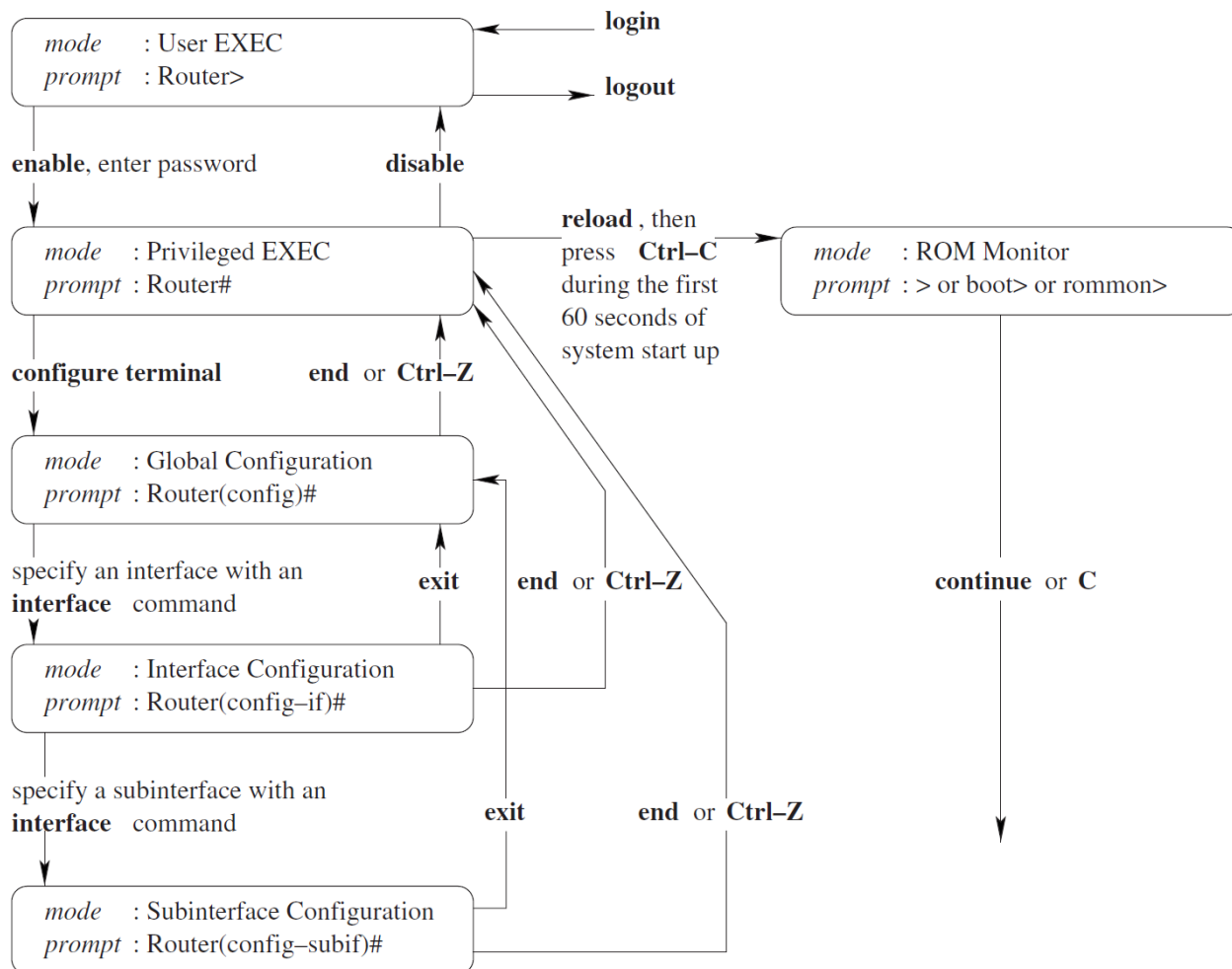
A   Cisco IOS configuration modes

Figure .5: Navigating through the Cisco IOS configuration modes
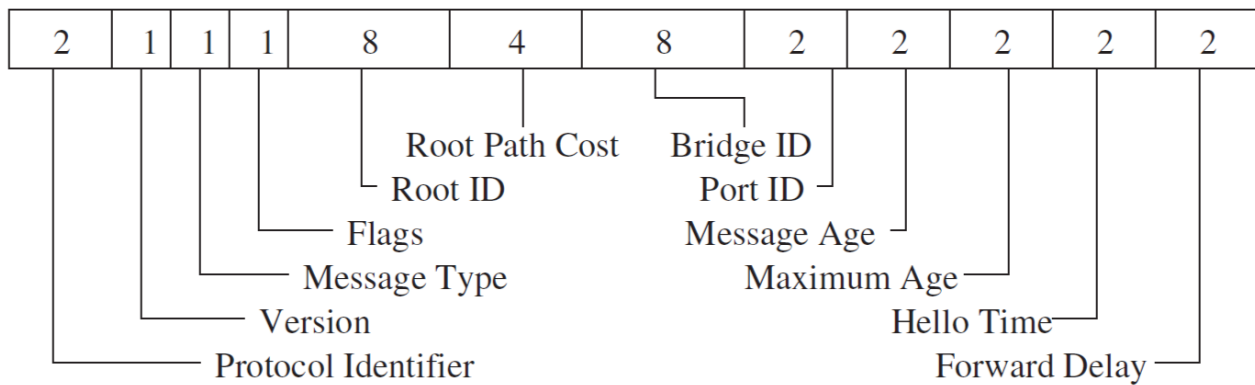
Reference: TCP/IP Essential

B BPDU

Figure .6: BPDU message format. The numbers indicate the field length in byte.