

Configuring a Layer 2 Network with the Spanning Tree Protocol

Fundamentals of Communications and Networking, Third Edition - Lab 04

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Time on Task:

4 hours, 51 minutes

Progress:

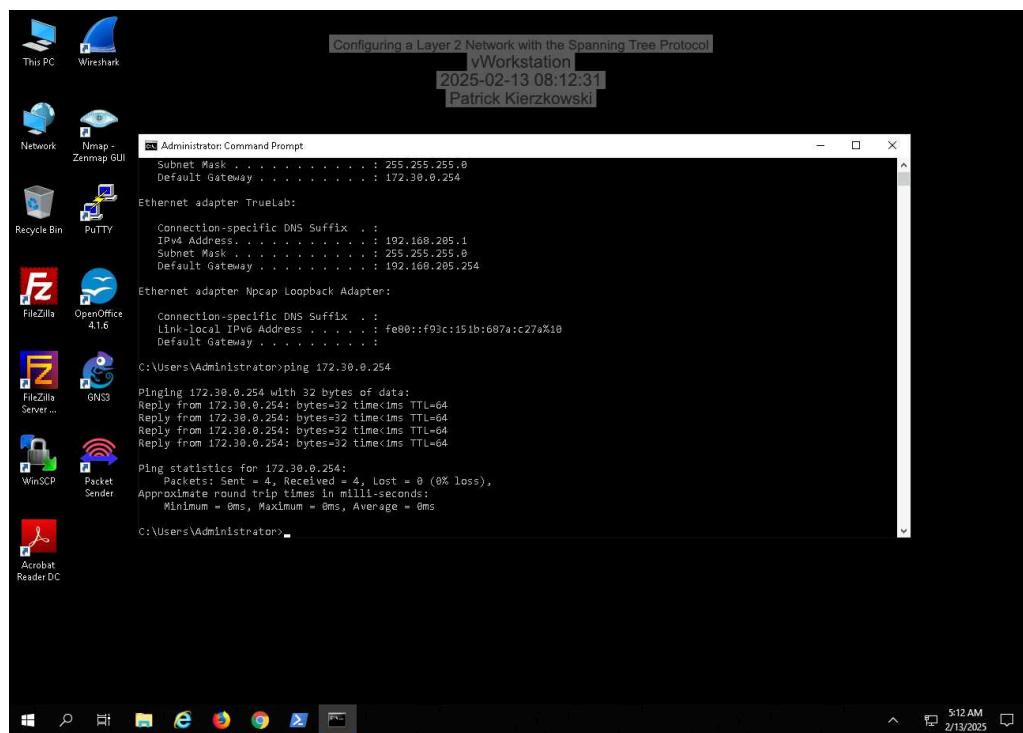
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Report Generated: Monday, July 7, 2025 at 9:45 PM

Section 1: Hands-On Demonstration

Part 1: Assess the Layer 2 Network Configuration

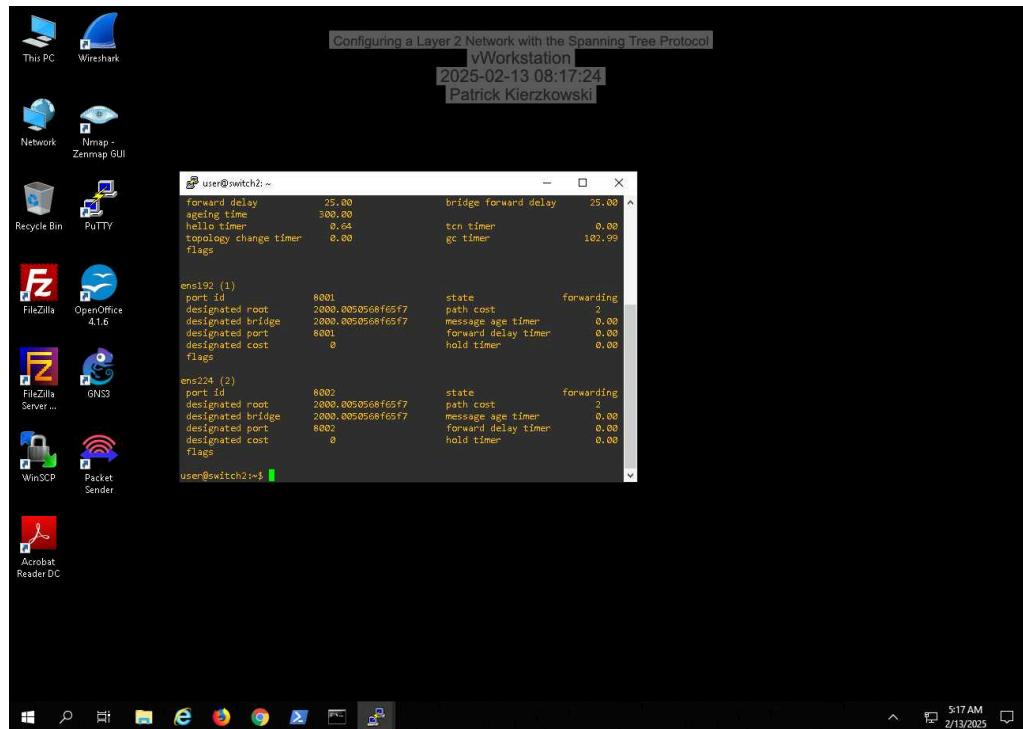
4. Make a screen capture showing the responses from your ICMP echo request to 172.30.0.254.



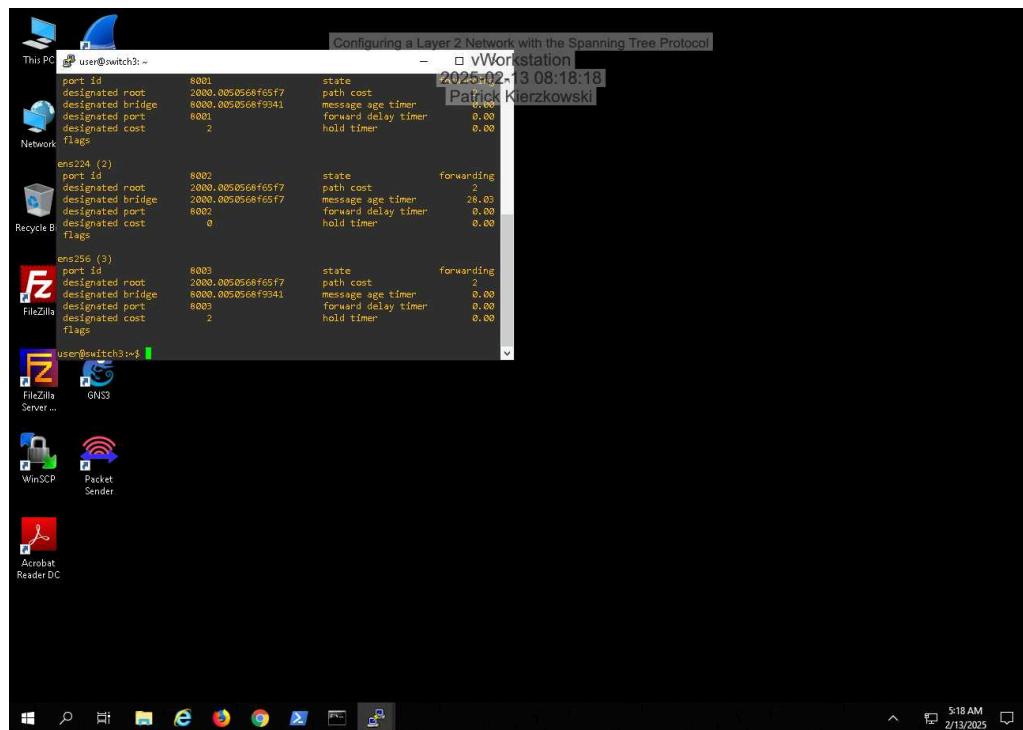
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18. Make a screen capture showing the matching bridge ID and designated root bridge values on Switch2.



21. Make a screen capture showing all three ports in forwarding mode on Switch3.

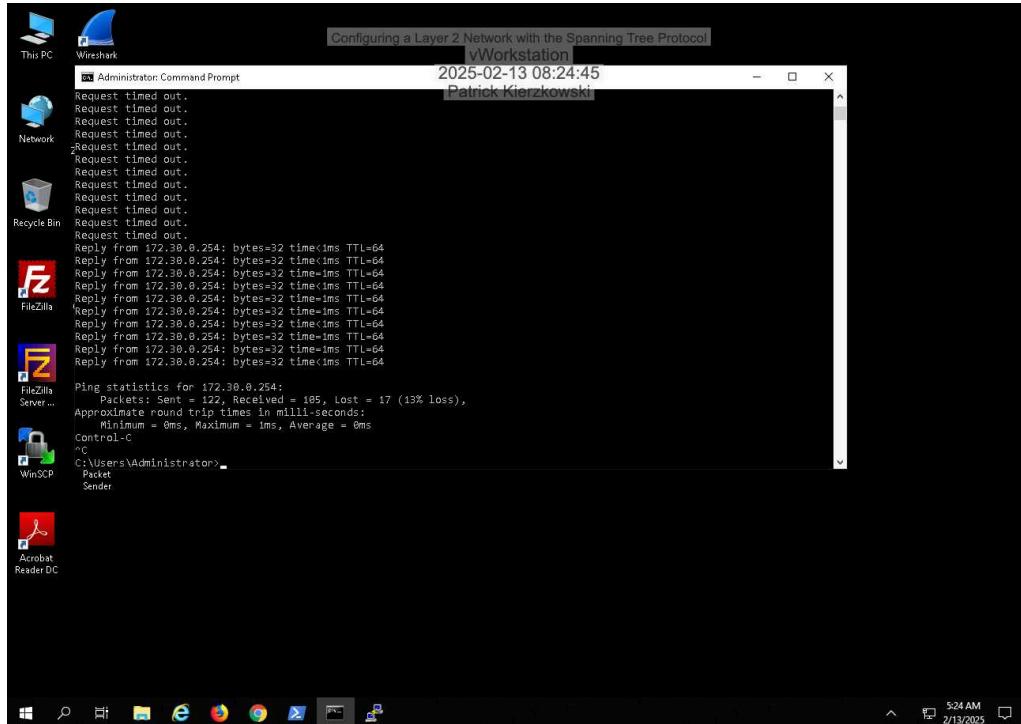


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Part 2: Redirect Network Traffic using STP

14. Make a screen capture showing the number of Lost packets under Ping statistics.



17. Make a screen capture showing port ens256 in a disabled state.



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22. Make a screen capture showing port ens256 back in a forwarding state.



```
user@switch1:~$ Every 2.0s: brctl showstp br0
br0
bridge id      8000.0050568f6e22
designated root 2000.0050568f65f7
root port      3
max age       30.00
hello time    2.00
forward delay  25.00
ageing time   300.00
hello timer   0.00
topology change timer 0.00
flags          TOPLOGY_CHANGE
path cost      4
bridge max age 30.00
bridge hello time 2.00
bridge forward delay 25.00
tcn timer     0.00
gc timer      164.94

ens192 (1)
port id       8001
state         forwarding
designated root 2000.0050568f65f7
designated bridge 2000.0050568f6e22
designated port  8001
designated cost 4
hold timer    0.14
flags

ens24 (2)
port id       8002
state         blocking
designated root 2000.0050568f65f7
designated bridge 2000.0050568f65f7
designated port  8001
designated cost 0
hold timer    0.00
flags

ens256 (3)
port id       8003
state         forwarding
designated root 2000.0050568f65f7
designated bridge 2000.0050568f9341
designated port  8001
designated cost 2
hold timer    0.00
flags
```

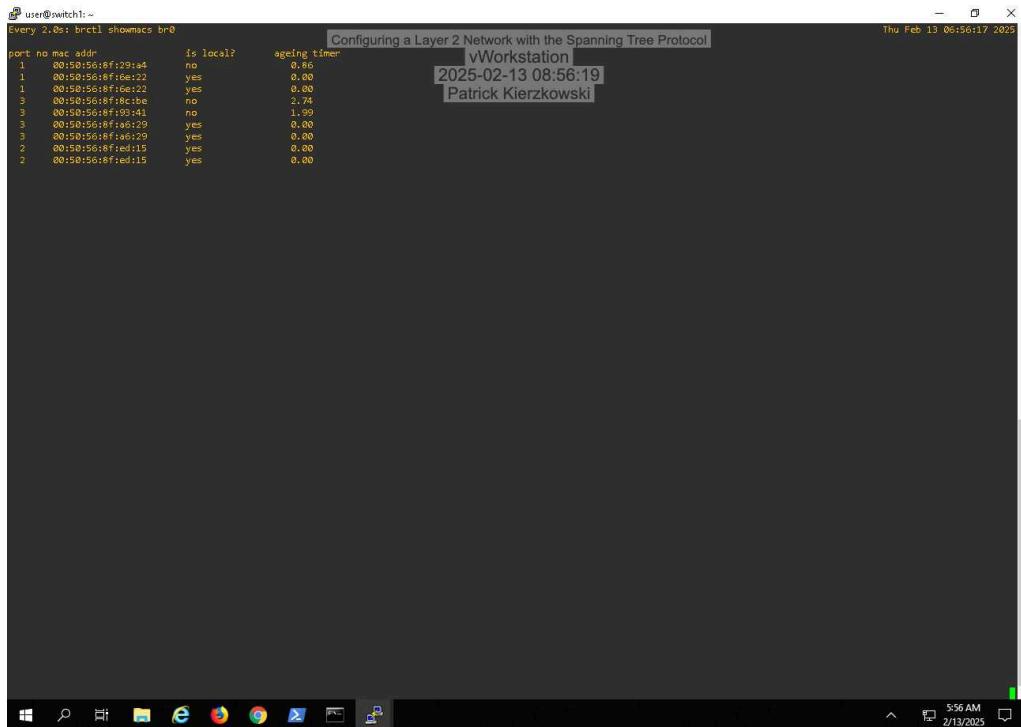
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Section 2: Applied Learning

Part 1: Review STP Parameters and MAC Address Tables

7. Make a screen capture showing the list of MAC addresses known by Switch1.



The screenshot shows a Windows terminal window with the title bar "Configuring a Layer 2 Network with the Spanning Tree Protocol vWorkstation" and the date "Thu Feb 13 08:56:17 2025". The command "brctl showmacs br0" has been run, displaying a table of MAC addresses and their properties:

port no	macs addr	is local?	ageing timer
1	00:50:56:8f:29:a4	no	0.86
1	00:50:56:8f:6e:22	yes	0.00
1	00:50:56:8f:6e:22	yes	0.00
3	00:50:56:8f:8c:1b	no	2.74
3	00:50:56:8f:8c:1b	no	1.97
3	00:50:56:8f:8c:29	yes	0.00
3	00:50:56:8f:8c:29	yes	0.00
2	00:50:56:8f:ed:15	yes	0.00
2	00:50:56:8f:ed:15	yes	0.00

The terminal window also shows the Windows taskbar at the bottom with icons for File Explorer, Task View, Start, Search, Edge, Chrome, Mail, and File Explorer. The system tray shows the date and time as "5:56 AM 2/13/2025".

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14. Make a screen capture showing the current Forward Delay value for br0 on Switch2.

The screenshot shows a Windows desktop environment with several open windows and icons on the taskbar.

Terminal Windows:

- Configuring a Layer 2 Network with the Spanning Tree Protocol:** A terminal window titled "root@switch2:~" showing the output of the command `brctl show`. The output includes information about the bridge (bridge name: bridge0, bridge id: 2000.0050568f65f7), port (port 0), and spanning tree parameters (STP enabled: yes, interfaces: ens192, ens234).
- vWorkstation:** A terminal window titled "root@switch2:~" showing the output of the command `brctl showstp br0`. It provides detailed STP configuration for bridge0, including root port (port 0), max age (30.00), hello time (2.00), forward delay (25.00), ageing time (300.00), hello timer (1.00), topology change timer (0.00), and flags.
- eni192 (1):** A terminal window titled "root@switch2:~" showing the output of the command `brctl showmst`. It lists the MST configuration for interface eni192, including designated bridge (2000.0050568f65f7), designated port (8001), and designated cost (0).

Taskbar Icons:

- FileZilla Server ...
- GNS3
- WinSCP
- Packet Sender
- Acrobat Reader DC

System Tray:

- Power icon: Power button
- Network icon: Connected to vWorkstation
- Date and Time: 6:02 AM 2/13/2025

Part 2: Alter STP Timer Values

15. Make a screen capture showing the number of Lost packets from your ping test.

The screenshot shows a Windows 10 desktop environment. On the left, there's a vertical taskbar with icons for This PC, Wireshark, Network, Recycle Bin, FileZilla, FileZilla Server..., WinSCP, and Acrobat Reader DC. The main window is titled 'Configuring a Layer 2 Network with the Spanning Tree Protocol vWorkstation' and shows a command prompt window from 'Administrator: Command Prompt'. The prompt displays a series of 'Reply' messages from IP address 172.30.0.254, followed by ping statistics for 172.30.0.254, and ends with a Control-C command. Below the command prompt is a Wireshark capture window showing traffic on interface 'ens224 (2)'. The Wireshark interface includes a timeline at the top right showing times like 19, 38.00, 2.00, 25.00, 0.00, and 214.64, and a packet list table below it.

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21. Make a screen capture showing the new Forward Delay value on br0.

```
root@switch2:~# brctl setfd br0 10
root@switch2:~# brctl showstp br0
bridge id      2000.0050568f65f7
designated root 2000.0050568f65f7
root port      0
max age       30.00
桥端老化       2.00
forward delay   10.00
老化时间       300.00
Hello时间     1.97
拓扑变化计时器 0.00
flags
Port 1
port id      8001    state      forwarding
指定根        2000.0050568f65f7
指定桥        2000.0050568f65f7
指定端口      8001    path cost: 0
path cost: 2
消息年龄计时器 0.00
转发延迟计时器 0.00
```

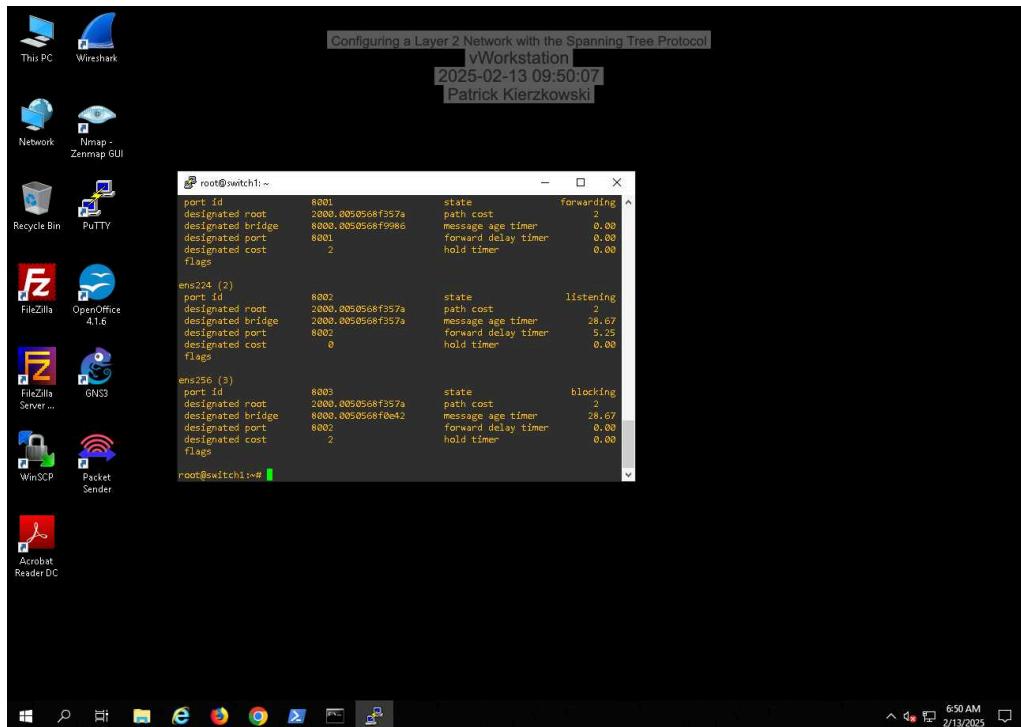
29. Make a screen capture showing the number of Lost packets from your second ping test.

```
Administrator: Command Prompt
C:\> ping 172.30.0.254 -t
Request timed out.
Reply from 172.30.0.254: bytes=32 time<1ms TTL=64
Ping statistics for 172.30.0.254:
    Packets: Sent = 69, Received = 54, Lost = 15 (21% loss),
    约定往返时间在毫秒中的往返时间:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
Control-C
C:\>
```

Section 3: Challenge and Analysis

Part 1: Edit Path Cost Values

Make a screen capture showing the output of the showstp command with the new path cost on the ens224 port.



Part 2: Assign a New Root Bridge

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Make a screen capture showing the output of the showstp command with the new bridge ID value.

The bridge ID and the designated root value should be identical, indicating Switch3 is now the root bridge.

```
root@switch3:~# brctl setbridgepri br0 4096
root@switch3:~# brctl showstp br0
br0
bridge id          1000.000000000042
designated root    1000.000000000042
root port          0
path cost          0
max age           20.00
hello time         2.00
forward delay      15.00
ageing time        300.00
hello timer        0.78
topology change timer 0.00
flags
          path cost          0
          bridge max age   20.00
          bridge hello time 2.00
          bridge forward delay 15.00
          ten timer        0.00
          gc timer         122.23
ens192 (2)
          FileZilla
          GNS3
```