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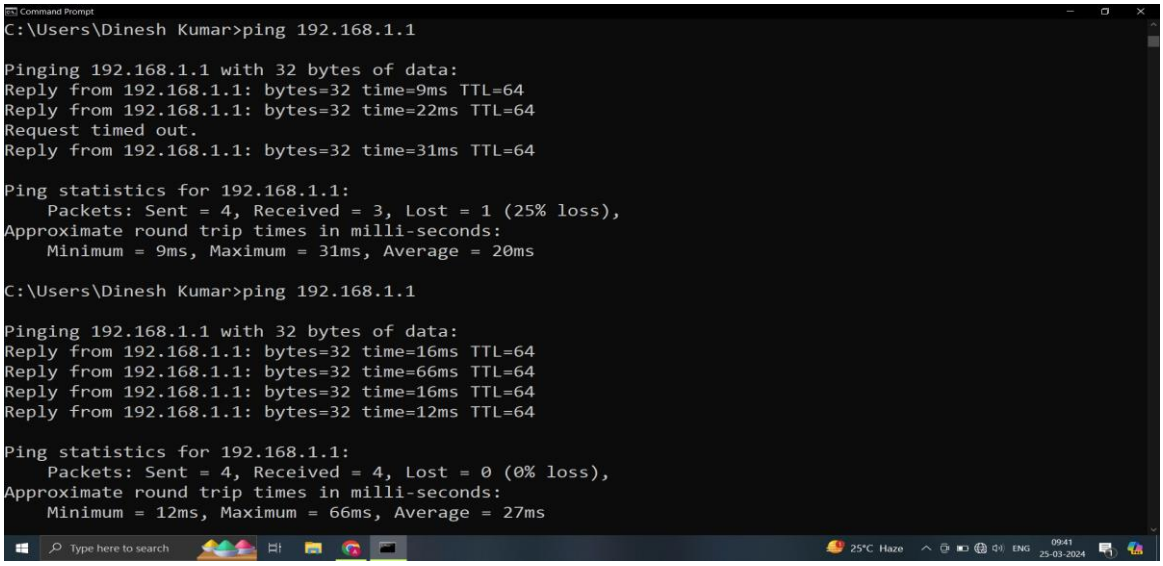
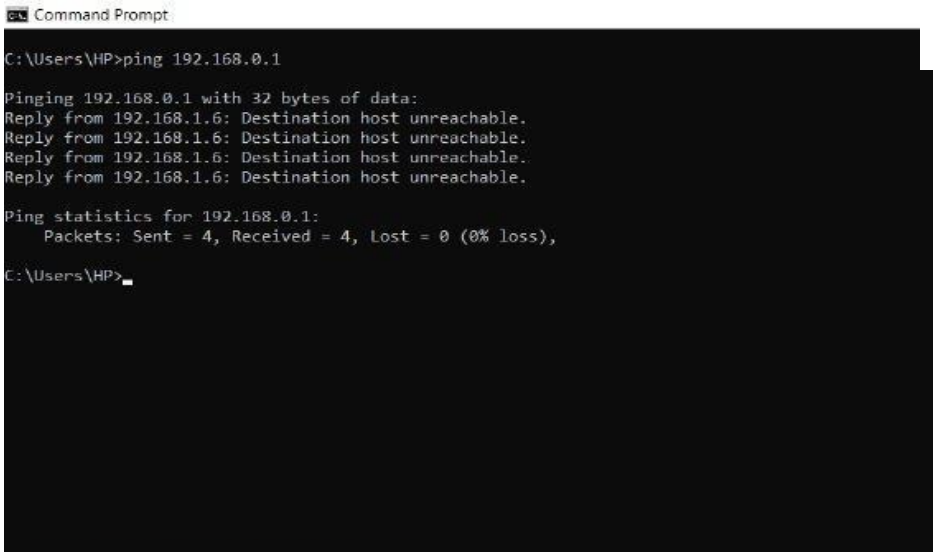
NETWORKING

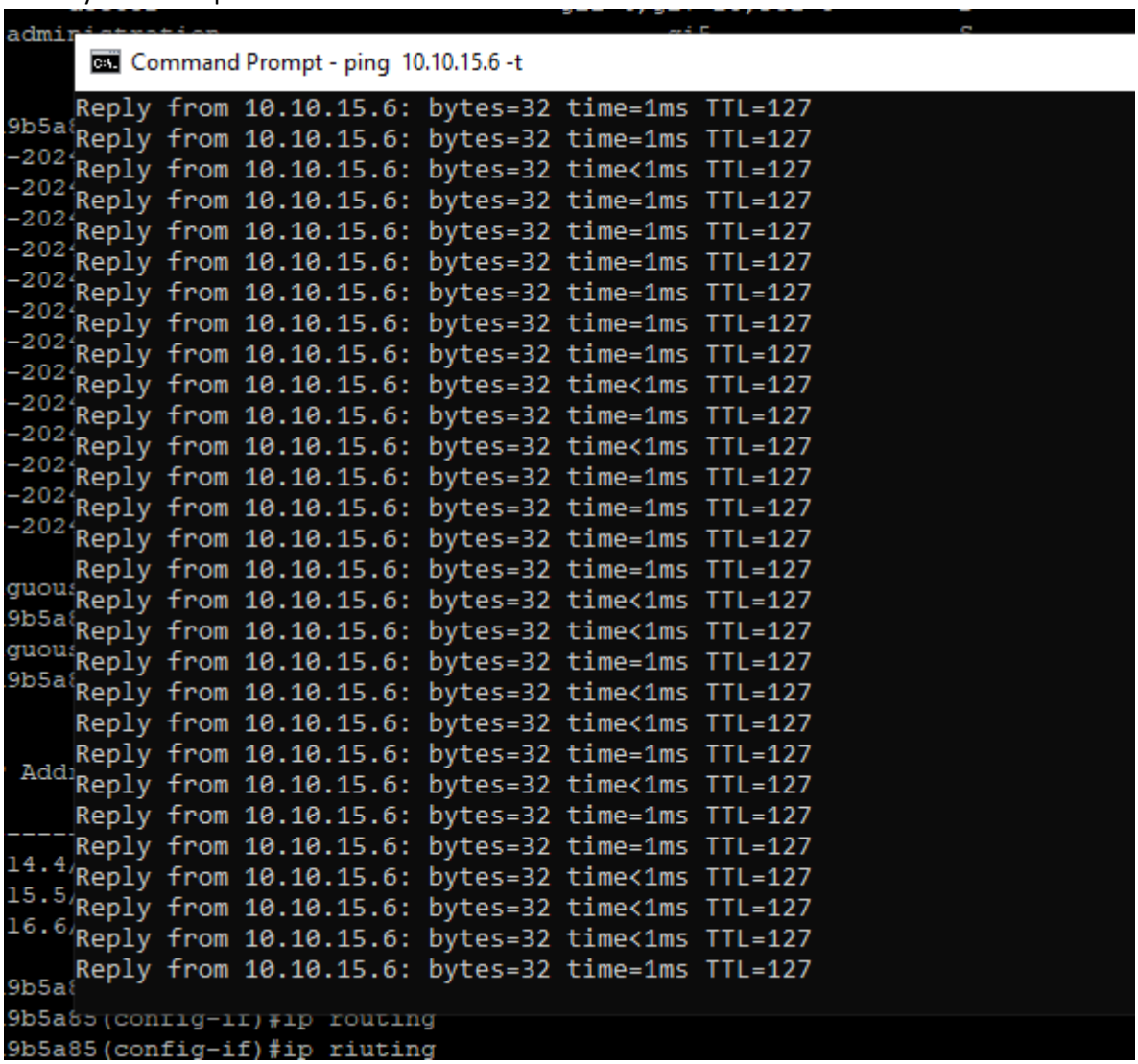
LEVEL 2

1.Imagine you're a student at a high school with a computer lab. The lab has several computers all connected to a Local Area Network (LAN) for shared resources like printers and internet access. One day, strange things start happening on the school's network: Some students can't access the printer anymore.2. Others find their files mysteriously deleted or corrupted. 3. The teacher'scomputer seems sluggish and unresponsive.What security vulnerabilities might be allowing unauthorized access to the school's LAN, and how could these issues be prevented?



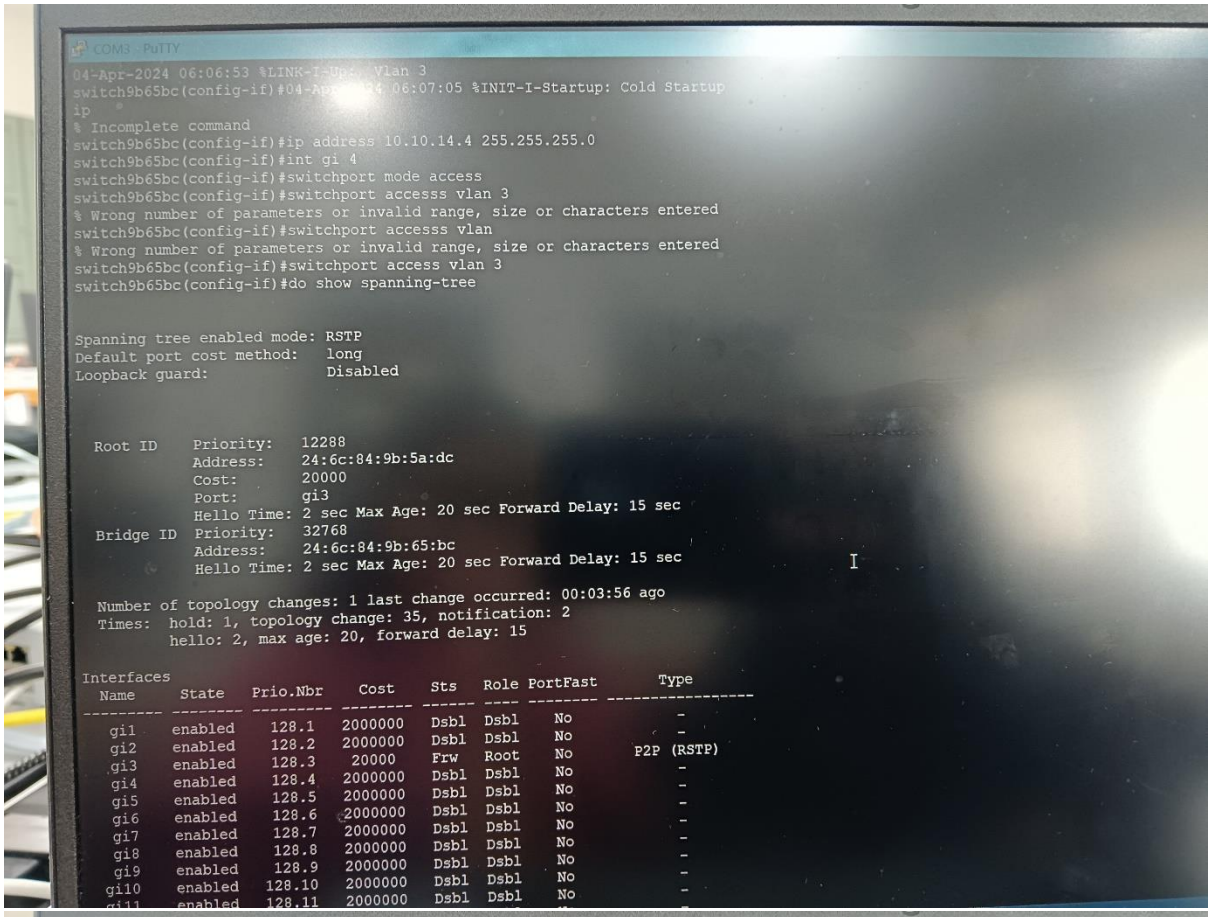


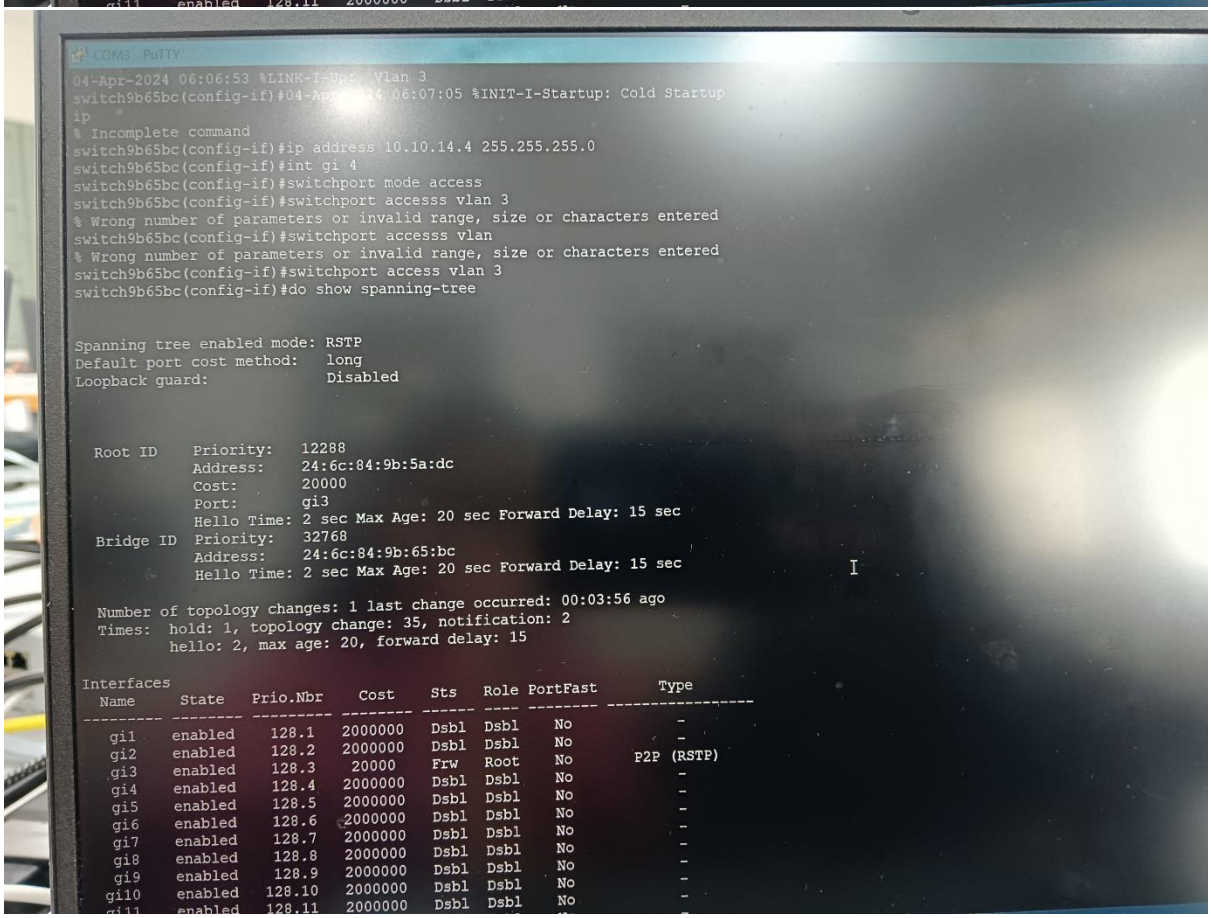
2.Imagine you're a network security specialist working at a busy hospital. The hospital network consists of various departments with different security requirements: 1. Patient care: Doctors and nurses need secure access to patient medical records and monitoring systems. 2. Administration: Staff need access to email, payroll systems, and other administrative resources and 3. Guest Wi-Fi: Patients and visitors have a separate network for basic internet access. Unfortunately, a security breach occurs. Hackers gain access to the hospital network and potentially steal sensitive patient data.How could VLANs have helped prevent this security breach and improve overall network security in the hospital?



```
switch9b5a85(config-if)#name
% missing mandatory parameter
switch9b5a85(config-if)#name doctor
switch9b5a85(config-if)#exit
switch9b5a85(config)#show doctor
% Unrecognized command
switch9b5a85(config)#do show ip interface


    IP Address        I/F    I/F Status  Type   Directed  Prec Redirect Status
                             admin/oper         Broadcast
------------------ --------- ---------- ------- --------- ---- -------- ------
10.10.14.4/24      vlan 1    UP/UP      Static  disable   No   enable   Valid

switch9b5a85(config)#interface vlan 03-Apr-2024 03:44:31 %LINK-W-Down:  gil
03-Apr-2024 03:44:32 %LINK-I-Up:  gil
03-Apr-2024 03:44:37 %STP-W-PORTSTATUS: gil: STP status Forwarding
do show
% bad parameter value
switch9b5a85(config)#do show vlan
Created by: D-Default, S-Static, G-GVRP, R-Radius Assigned VLAN, V-Voice VLAN

Vlan       Name           Tagged Ports      UnTagged Ports      Created by
---- ----------------- ------------------ ------------------ ----------------
 1        doctor                             gil-28,Po1-8           D

switch9b5a85(config)#interface vlan 2
switch9b5a85(config-if)#ip address 10.10.15.5 255.255.255.0
switch9b5a85(config-if)#int gi 5
switch9b5a85(config-if)#int gi 5
switch9b5a85(config-if)#switchport mode access
switch9b5a85(config-if)#switchport access vlan 2
switch9b5a85(config-if)#ip address 10.10.15.5 255.255.255.0
Duplicate IP subnet. Subnet 10.10.15.0 with mask 255.255.255.0 is in use by interface VLAN 2.
switch9b5a85(config-if)#name
% Unrecognized command
switch9b5a85(config-if)#interface vlan 2
switch9b5a85(config-if)#name
% missing mandatory parameter
switch9b5a85(config-if)#name administration
switch9b5a85(config-if)#do show ip interface


    IP Address        I/F    I/F Status  Type   Directed  Prec Redirect Status
```

3.You're the network administrator expanding the school network. You need to connect a new switch (Switch B) to the existing network switch (Switch A). However, there's a concern that an older device accidentally configured for bridging might be connected to an unused port on Switch B.Tasks: 1. Explain the potential risks if Switch B receives BPDUs (Bridge Protocol Data Units) on a port configured for normal operation. 2. How can PortFast be used on Switch B to expedite connection to Switch A and minimize downtime? 3. Why is it crucial to combine PortFast with BPDU Guard on the same port?


COM3 - PuTTY
04-Apr-2024 06:06:53 %LINK-I-Up: Vlan 3
switch9b65bc(config-if)#04-Apr-2024 06:07:05 %INIT-I-Startup: Cold Startup
ip
% Incomplete command
switch9b65bc(config-if)#ip address 10.10.14.4 255.255.255.0
switch9b65bc(config-if)#int gi 4
switch9b65bc(config-if)#switchport mode access
switch9b65bc(config-if)#switchport accesss vlan 3
% Wrong number of parameters or invalid range, size or characters entered
switch9b65bc(config-if)#switchport accesss vlan
% Wrong number of parameters or invalid range, size or characters entered
switch9b65bc(config-if)#switchport access vlan 3
switch9b65bc(config-if)#do show spanning-tree
Spanning tree enabled mode: RSTP
Default port cost method: long
Loopback guard: Disabled
Root ID Priority: 12288
Address: 24:6c:84:9b:5a:dc
Cost: 20000
Port: gi3
Hello Time: 2 sec Max Age: 20 sec Forward Delay: 15 sec
Bridge ID Priority: 32768
Address: 24:6c:84:9b:65:bc
Hello Time: 2 sec Max Age: 20 sec Forward Delay: 15 sec
Number of topology changes: 1 last change occurred: 00:03:56 ago
Times: hold: 1, topology change: 35, notification: 2
hello: 2, max age: 20, forward delay: 15
Interfaces
Name State Prio.Nbr Cost Sts Role PortFast Type
gi1 enabled 128.1 2000000 Dsbl Dsbl No -
gi2 enabled 128.2 2000000 Dsbl Dsbl No -
gi3 enabled 128.3 20000 Frw Root No P2P (RSTP)
gi4 enabled 128.4 2000000 Dsbl Dsbl No -
gi5 enabled 128.5 2000000 Dsbl Dsbl No -
gi6 enabled 128.6 2000000 Dsbl Dsbl No -
gi7 enabled 128.7 2000000 Dsbl Dsbl No -
gi8 enabled 128.8 2000000 Dsbl Dsbl No -
gi9 enabled 128.9 2000000 Dsbl Dsbl No -
gi10 enabled 128.10 2000000 Dsbl Dsbl No -

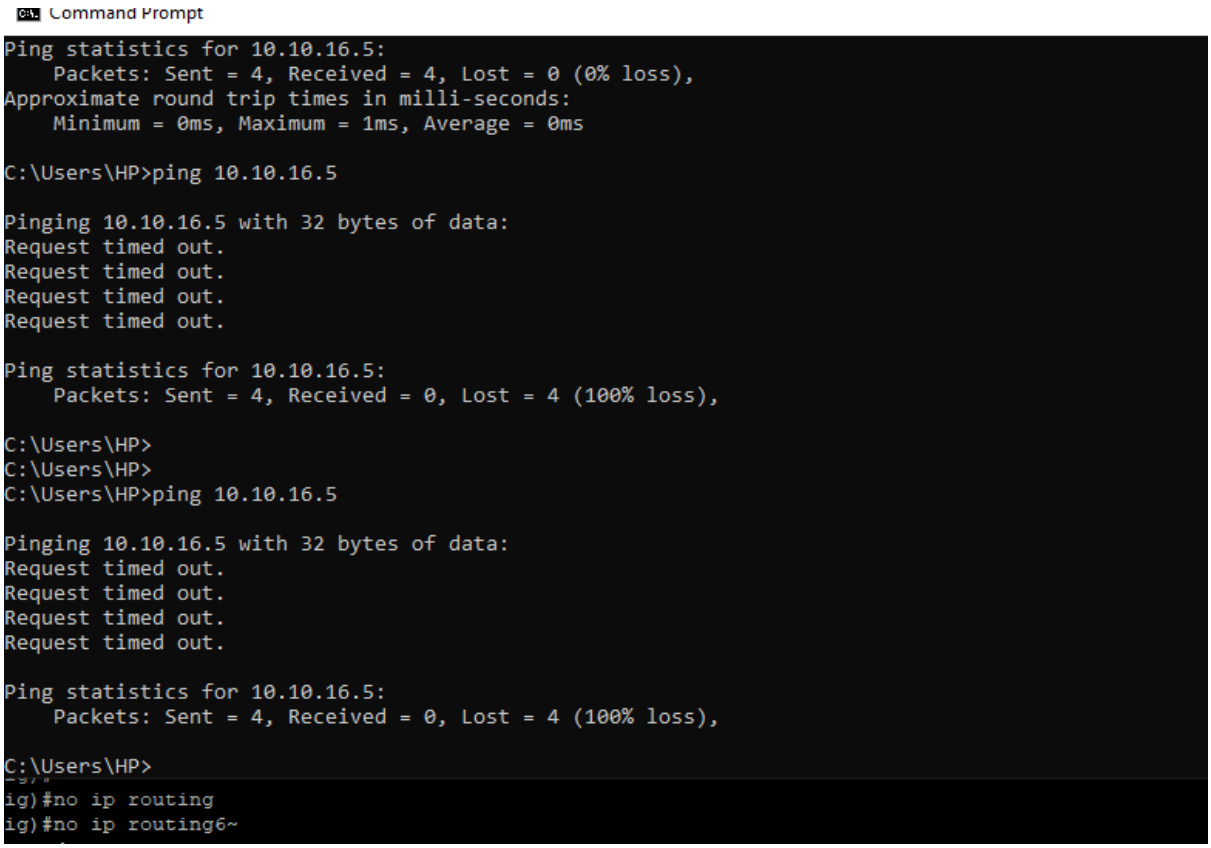

COM3 - PuTTY
04-Apr-2024 06:06:53 %LINK-I-Up: Vlan 3
switch9b65bc(config-if)#04-Apr-2024 06:07:05 %INIT-I-Startup: Cold Startup
ip
% Incomplete command
switch9b65bc(config-if)#ip address 10.10.14.4 255.255.255.0
switch9b65bc(config-if)#int gi 4
switch9b65bc(config-if)#switchport mode access
switch9b65bc(config-if)#switchport accesss vlan 3
% Wrong number of parameters or invalid range, size or characters entered
switch9b65bc(config-if)#switchport accesss vlan
% Wrong number of parameters or invalid range, size or characters entered
switch9b65bc(config-if)#switchport access vlan 3
switch9b65bc(config-if)#do show spanning-tree
Spanning tree enabled mode: RSTP
Default port cost method: long
Loopback guard: Disabled
Root ID Priority: 12288
Address: 24:6c:84:9b:5a:dc
Cost: 20000
Port: gi3
Hello Time: 2 sec Max Age: 20 sec Forward Delay: 15 sec
Bridge ID Priority: 32768
Address: 24:6c:84:9b:65:bc
Hello Time: 2 sec Max Age: 20 sec Forward Delay: 15 sec
Number of topology changes: 1 last change occurred: 00:03:56 ago
Times: hold: 1, topology change: 35, notification: 2
hello: 2, max age: 20, forward delay: 15
Interfaces
Name State Prio.Nbr Cost Sts Role PortFast Type
gi1 enabled 128.1 2000000 Dsbl Dsbl No -
gi2 enabled 128.2 2000000 Dsbl Dsbl No -
gi3 enabled 128.3 20000 Frw Root No P2P (RSTP)
gi4 enabled 128.4 2000000 Dsbl Dsbl No -
gi5 enabled 128.5 2000000 Dsbl Dsbl No -
gi6 enabled 128.6 2000000 Dsbl Dsbl No -
gi7 enabled 128.7 2000000 Dsbl Dsbl No -
gi8 enabled 128.8 2000000 Dsbl Dsbl No -
gi9 enabled 128.9 2000000 Dsbl Dsbl No -
gi10 enabled 128.10 2000000 Dsbl Dsbl No -

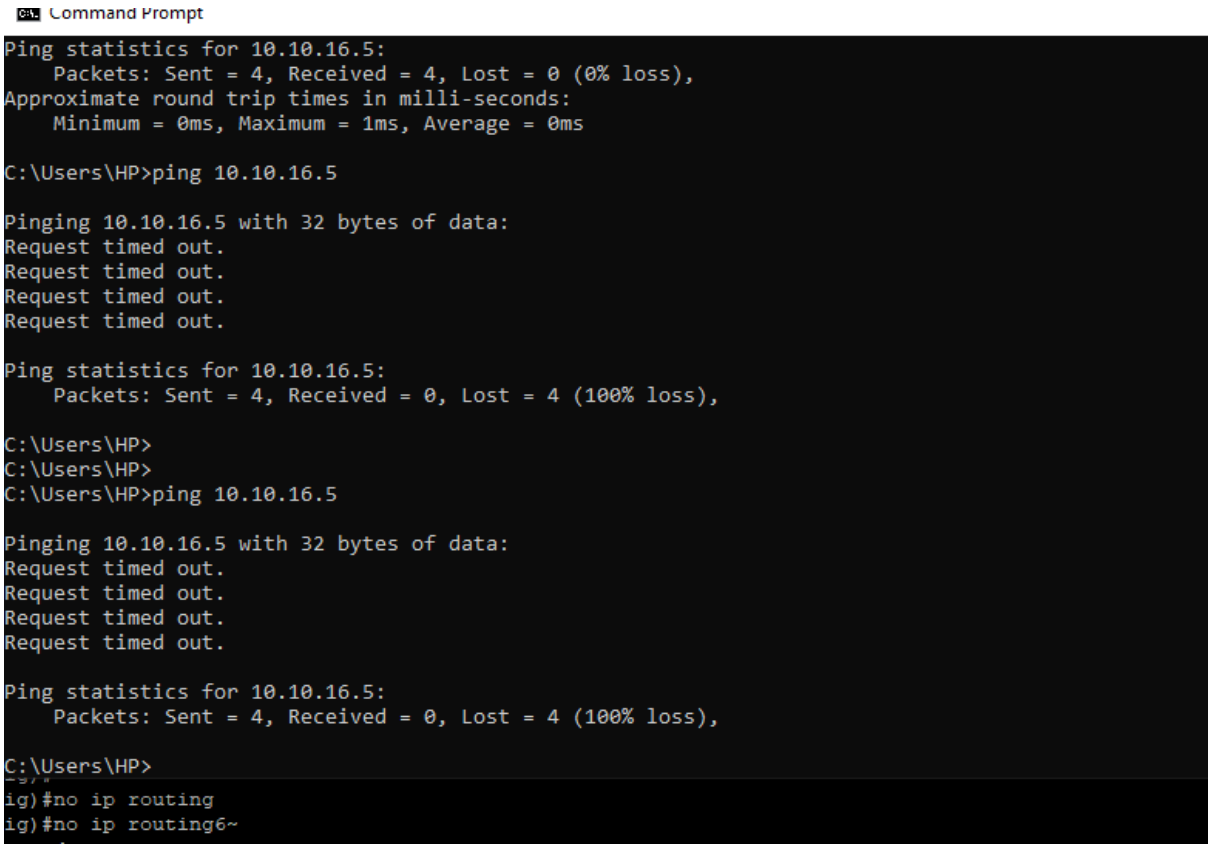
COM4 - PuTTY

```
Vlan       Name            Tagged Ports      UnTagged Ports      Created by
---- ----------------- ----------------- ------------------ ----------------
 1        doctor                         gi1-4,gi7-28,Po1-8        D
 2    administration                            gi5               S
 3         guest                                gi6               S

switch9b5a85(config-if)#03-Apr-2024 03:56:07 %LINK-W-Down:  gi1
03-Apr-2024 03:56:07 %LINK-W-Down:  Vlan 1
03-Apr-2024 03:56:09 %LINK-W-Down:  gi6
03-Apr-2024 03:56:09 %LINK-W-Down:  Vlan 3
03-Apr-2024 03:56:27 %LINK-I-Up:  gi3
03-Apr-2024 03:56:27 %LINK-I-Up:  Vlan 1
03-Apr-2024 03:56:28 %LINK-W-Down:  gi3
03-Apr-2024 03:56:28 %LINK-W-Down:  Vlan 1
03-Apr-2024 03:56:31 %LINK-I-Up:  gi3
03-Apr-2024 03:56:31 %LINK-I-Up:  Vlan 1
03-Apr-2024 03:56:36 %STP-W-PORTSTATUS: gi3: STP status Forwarding
03-Apr-2024 03:56:44 %LINK-I-Up:  gi6
03-Apr-2024 03:56:44 %LINK-I-Up:  Vlan 3
03-Apr-2024 03:56:49 %STP-W-PORTSTATUS: gi6: STP status Forwarding
d
% Ambiguous command
switch9b5a85(config-if)#d
% Ambiguous command
switch9b5a85(config-if)#do show ip interface


    IP Address        I/F    I/F Status  Type   Directed  Prec Redirect Status
                             admin/oper         Broadcast
------------------ --------- ---------- ------- --------- ---- -------- ------
10.10.14.4/24      vlan 1    UP/UP      Static  disable   No   enable   Valid
10.10.15.5/24      vlan 2    UP/DOWN    Static  disable   No   enable   Valid
10.10.16.6/24      vlan 3    UP/UP      Static  disable   No   enable   Valid

switch9b5a85(config-if)#ip routing
switch9b5a85(config-if)#ip routing
switch9b5a85(config-if)#ip riuting
% Unrecognized command
switch9b5a85(config-if)#ip routing
switch9b5a85(config-if)#03-Apr-2024 04:26:54 %AAA-I-DISCONNECT: User CLI session for user cisco over console , source 0.0.0.0 desti
et/SSH session may still be connected.

Console baud-rate auto detection is enabled, press Enter twice to complete the detection process
```

COM4 - PuTTY

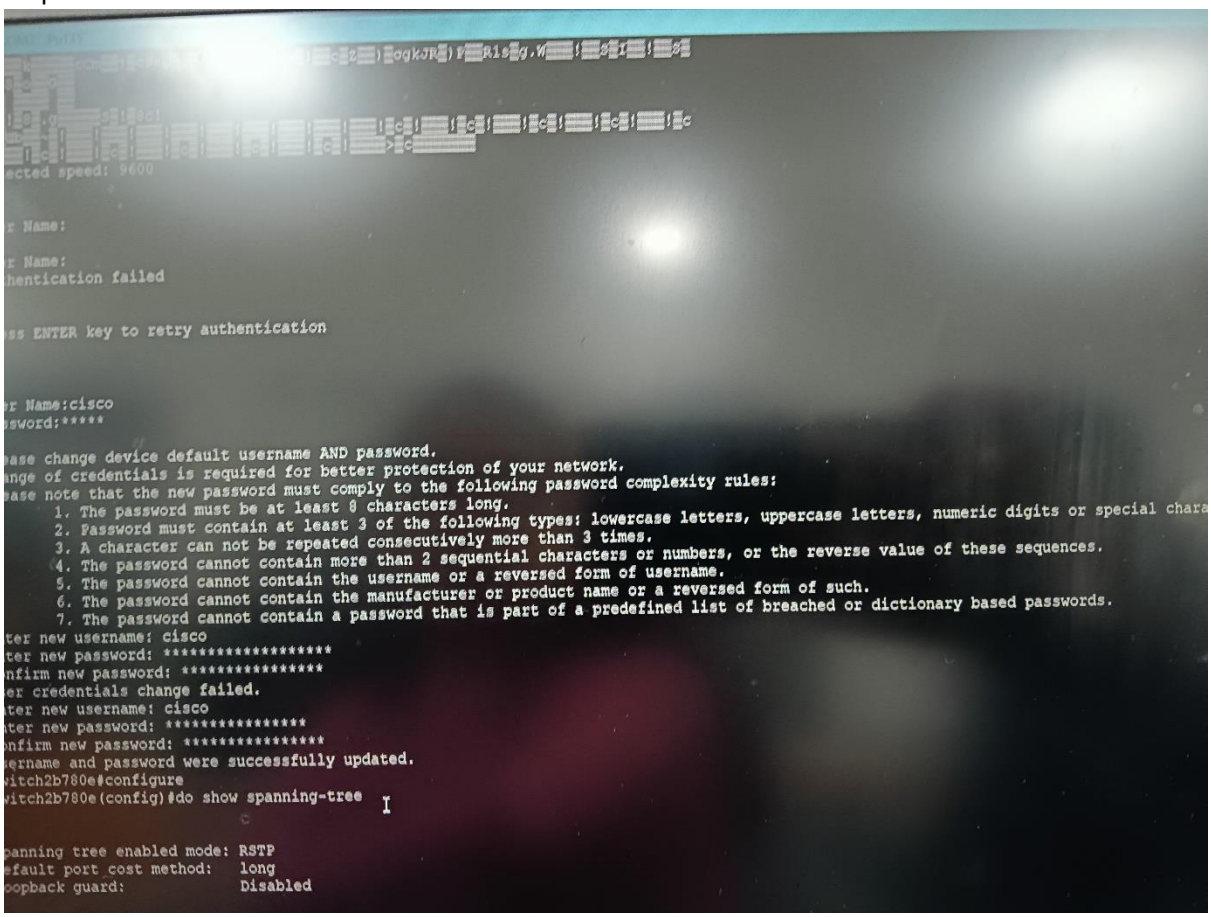
```
Vlan       Name            Tagged Ports      UnTagged Ports      Created by
---- ----------------- ----------------- ------------------ ----------------
 1        doctor                         gi1-4,gi7-28,Po1-8        D
 2    administration                            gi5               S
 3         guest                                gi6               S

switch9b5a85(config-if)#03-Apr-2024 03:56:07 %LINK-W-Down:  gi1
03-Apr-2024 03:56:07 %LINK-W-Down:  Vlan 1
03-Apr-2024 03:56:09 %LINK-W-Down:  gi6
03-Apr-2024 03:56:09 %LINK-W-Down:  Vlan 3
03-Apr-2024 03:56:27 %LINK-I-Up:  gi3
03-Apr-2024 03:56:27 %LINK-I-Up:  Vlan 1
03-Apr-2024 03:56:28 %LINK-W-Down:  gi3
03-Apr-2024 03:56:28 %LINK-W-Down:  Vlan 1
03-Apr-2024 03:56:31 %LINK-I-Up:  gi3
03-Apr-2024 03:56:31 %LINK-I-Up:  Vlan 1
03-Apr-2024 03:56:36 %STP-W-PORTSTATUS: gi3: STP status Forwarding
03-Apr-2024 03:56:44 %LINK-I-Up:  gi6
03-Apr-2024 03:56:44 %LINK-I-Up:  Vlan 3
03-Apr-2024 03:56:49 %STP-W-PORTSTATUS: gi6: STP status Forwarding
d
% Ambiguous command
switch9b5a85(config-if)#d
% Ambiguous command
switch9b5a85(config-if)#do show ip interface


    IP Address        I/F    I/F Status  Type   Directed  Prec Redirect Status
                             admin/oper         Broadcast
------------------ --------- ---------- ------- --------- ---- -------- ------
10.10.14.4/24      vlan 1    UP/UP      Static  disable   No   enable   Valid
10.10.15.5/24      vlan 2    UP/DOWN    Static  disable   No   enable   Valid
10.10.16.6/24      vlan 3    UP/UP      Static  disable   No   enable   Valid

switch9b5a85(config-if)#ip routing
switch9b5a85(config-if)#ip routing
switch9b5a85(config-if)#ip riuting
% Unrecognized command
switch9b5a85(config-if)#ip routing
switch9b5a85(config-if)#03-Apr-2024 04:26:54 %AAA-I-DISCONNECT: User CLI session for user cisco over console , source 0.0.0.0 desti
et/SSH session may still be connected.

Console baud-rate auto detection is enabled, press Enter twice to complete the detection process
```

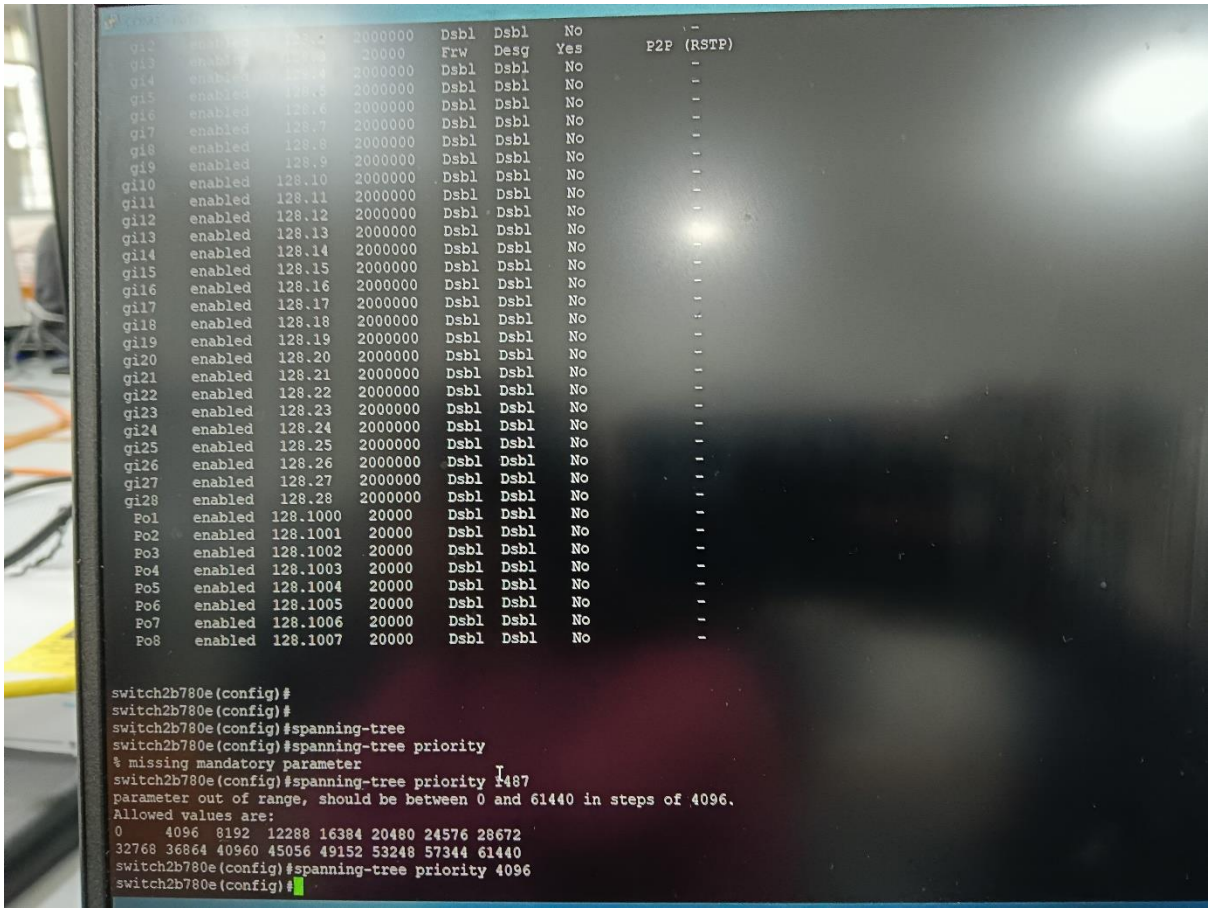




4.Imagine you're the network administrator for a growing company. To ensure redundancy and reliability, you've connected several switches in your network using additional cables between them. Initially, everything seems to be working smoothly. However, soon strange things start happening:

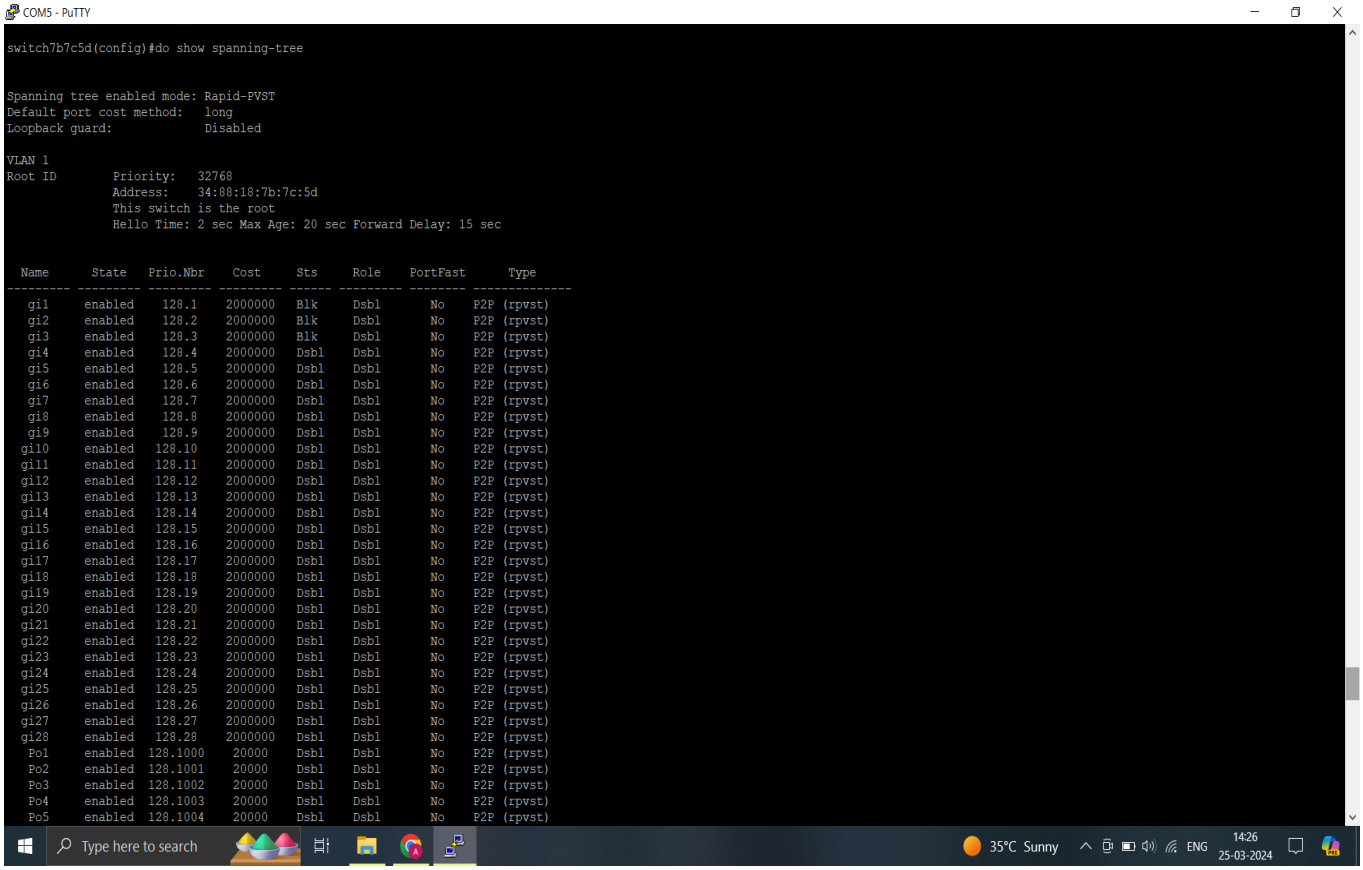
Users report experiencing sudden network outages and slowdowns. Network traffic seems erratic and unpredictable. Troubleshooting becomes difficult as tracing the path of data packets becomes a confusing maze.What's causing these network problems, and how can Spanning Tree Protocol (STP) help resolve them?





5.You suspect there might be an RSTP issue on your network. Some users are reporting slow connections and connectivity drops. What tools can you use to diagnose potential RSTP

problems? Interpret the switch output from the "show spanning-tree" command. What information can help you identify potential issues? Describe some troubleshooting steps you can take to resolve common RSTP issues.



6.You're the network administrator for a small office. The network consists of a switch with several devices connected, including workstations, printers, and a server. You've recently implemented Port Security to restrict unauthorized access.Explain the potential security risks if an unauthorized device is connected to a switch port. How can Port Security be used to mitigate these risks? Simulate an attacker attempting to connect an unauthorized device with a different MAC address to the same port.

```
switch77ebc0#conf t
switch77ebc0(config)#int range GigabitEthernet 1-5
switch77ebc0(config-if-range)#switchport mode access
switch77ebc0(config-if-range)#port
  security             Configure an interface to be a secure port
switch77ebc0(config-if-range)#port security
This action may take a few minutes
switch77ebc0(config-if-range)#port security
This action may take a few minutes
switch77ebc0(config-if-range)#port-security
% Unrecognized command
switch77ebc0(config-if-range)#port security
This action may take a few minutes
switch77ebc0(config-if-range)#port security
This action may take a few minutes
switch77ebc0(config-if-range)#port security
This action may take a few minutes
switch77ebc0(config-if-range)#26-Mar-2024 05:49:16 %LINK-W-Down:  gi12
26-Mar-2024 05:49:16 %LINK-W-Down:  Vlan 1
26-Mar-2024 05:49:22 %LINK-I-Up:  gi12
26-Mar-2024 05:49:22 %LINK-I-Up:  Vlan 1
26-Mar-2024 05:49:27 %STP-W-PORTSTATUS: gi12 of vlan 1: STP status Forwarding
```

7.You're the network administrator for a company with a critical server containing sensitive financial data. You want to ensure only authorized devices can access the server. How can MAC binding help secure the server?