Assignment 9:

In this exercise, you will troubleshoot network connectivity problems caused by wrong configurations related to VLANs and inter-VLAN routing

Addressing Table:

Device	Interface	IP Address	Subnet Mask	Default Gateway	VLAN
R1	G0/1.10	172.17.10.1	255.255.255.0	N/A	VLAN 10
	G0/1.30	172.17.30.1	255.255.255.0	N/A	VLAN 30
PC1	NIC	172.17.10.10	255.255.255.0	172.17.10.1	VLAN 10
PC3	NIC	172.17.30.10	255.255.255.0	172.17.30.1	VLAN 30

Instructions

Complete the following tasks:

Part 1: Identify the Network Issues

Examine the network and locate the source of any connectivity issues.

Commands you may find useful include:

R1# show ip interface brief
R1# show interface g0/1.10
R1# show interface g0/1.30
S1# show interface trunk

1. Test connectivity and use the necessary show commands to verify configurations.
2. Verify that all configured settings match the requirements shown in the Addressing Table.
3. List all of the problems and possible solutions in the Documentation Table.

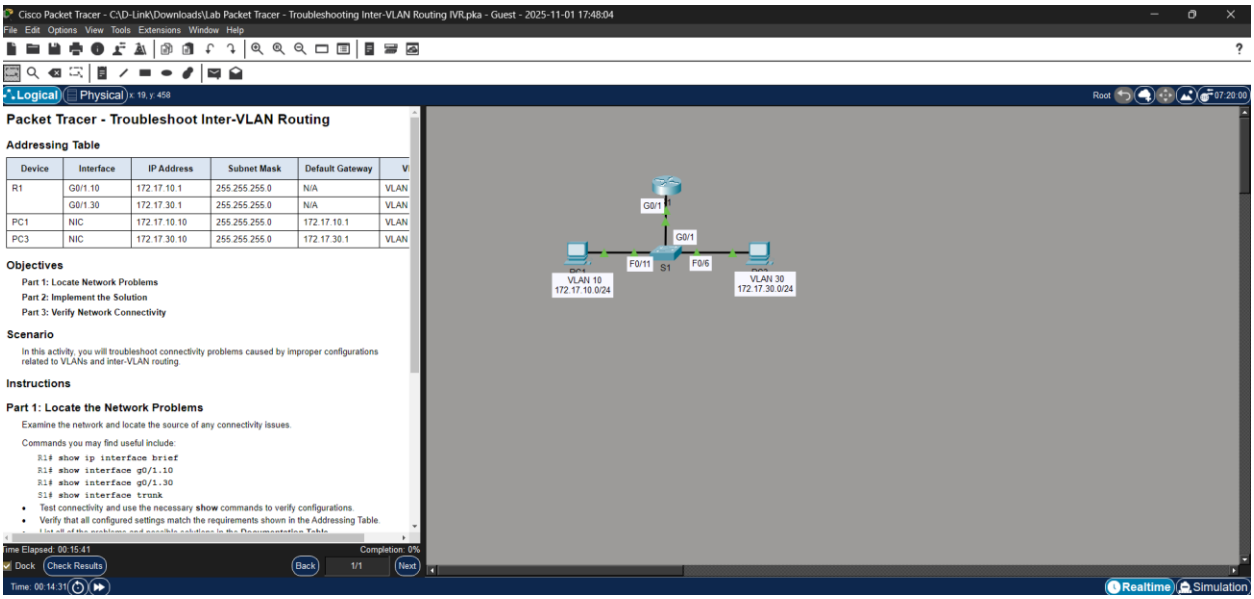
Part 2: Resolve the issues by Implementing appropriate solutions

Implement your recommended solutions.

Part 3 Validate your Implementation by verifying network connectivity

Verify the PCs can ping each other and R1. If not, continue to troubleshoot until the pings are successful.

Pka:



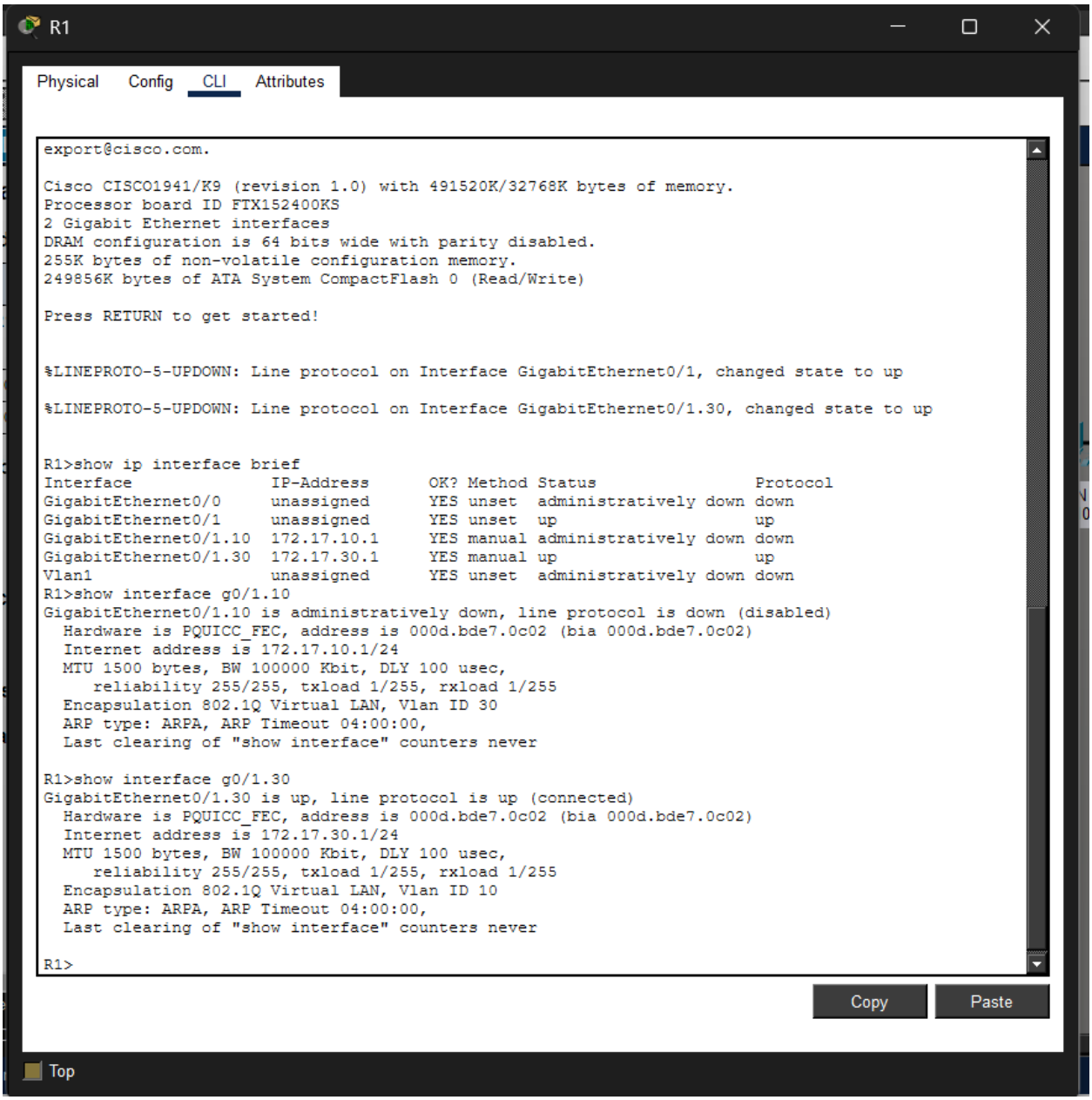
Solution:

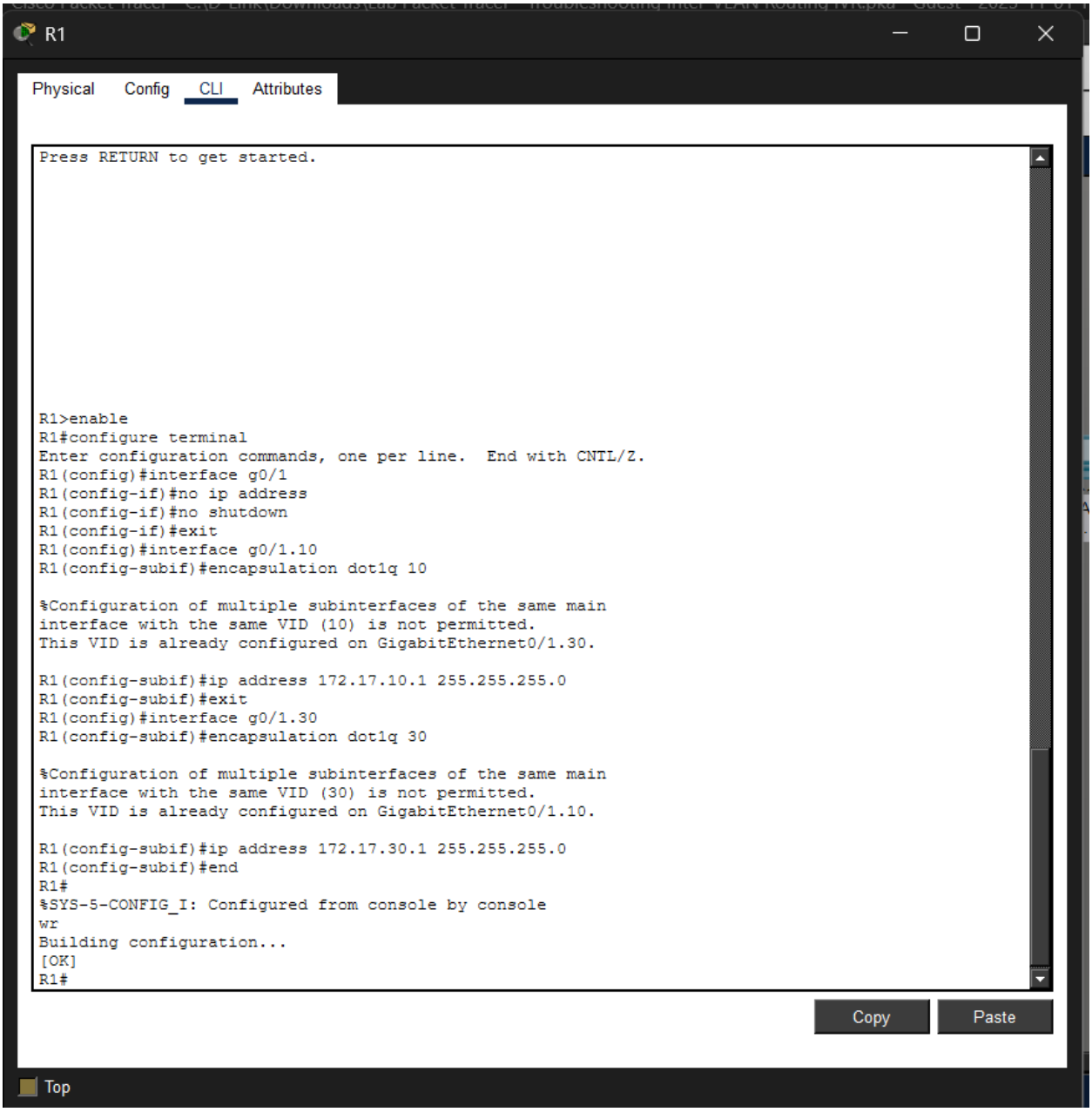
What to check :

1. **Trunk to R1** — The switch port that connects to R1 must be a trunk (dot1q) and allow VLANs **10,30**.
2. **VLANs exist** — Create VLAN 10 and VLAN 30 on the switch.
3. **PC ports in right VLANs** — PC1's port = VLAN 10, PC3's port = VLAN 30.
4. **R1 subinterfaces** — Use router-on-a-stick:
    - g0/1.10 → encapsulation dot1q 10 + ip 172.17.10.1 255.255.255.0
    - g0/1.30 → encapsulation dot1q 30 + ip 172.17.30.1 255.255.255.0
    - Parent g0/1 should be **no ip address** and **no shut**.
5. **Default gateways on PCs** —
    - PC1 DG: **172.17.10.1**
    - PC3 DG: **172.17.30.1**

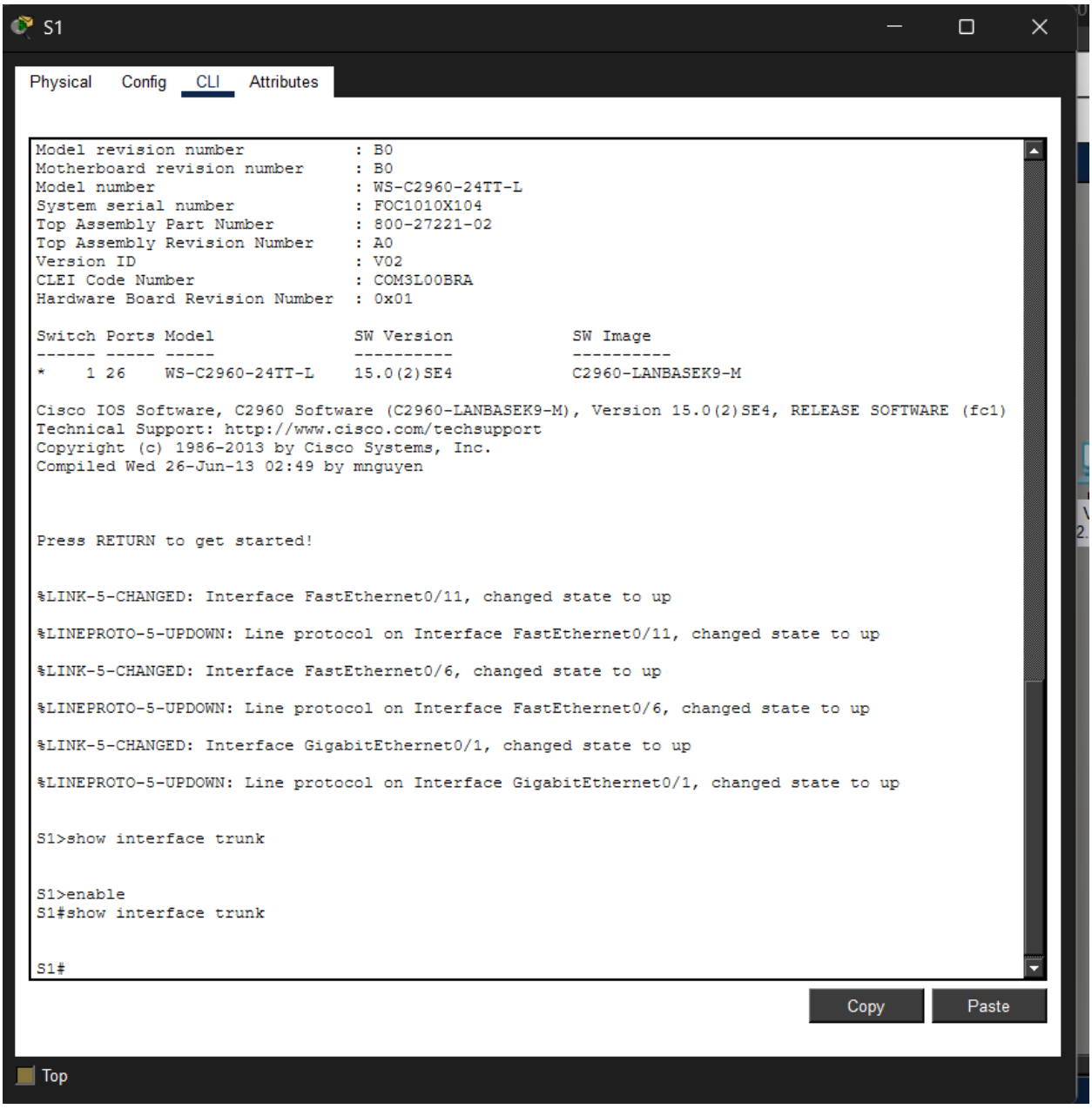
6. **Native VLAN** — Keep default native **VLAN 1** on both sides of the trunk (no native subinterface needed).

R1:

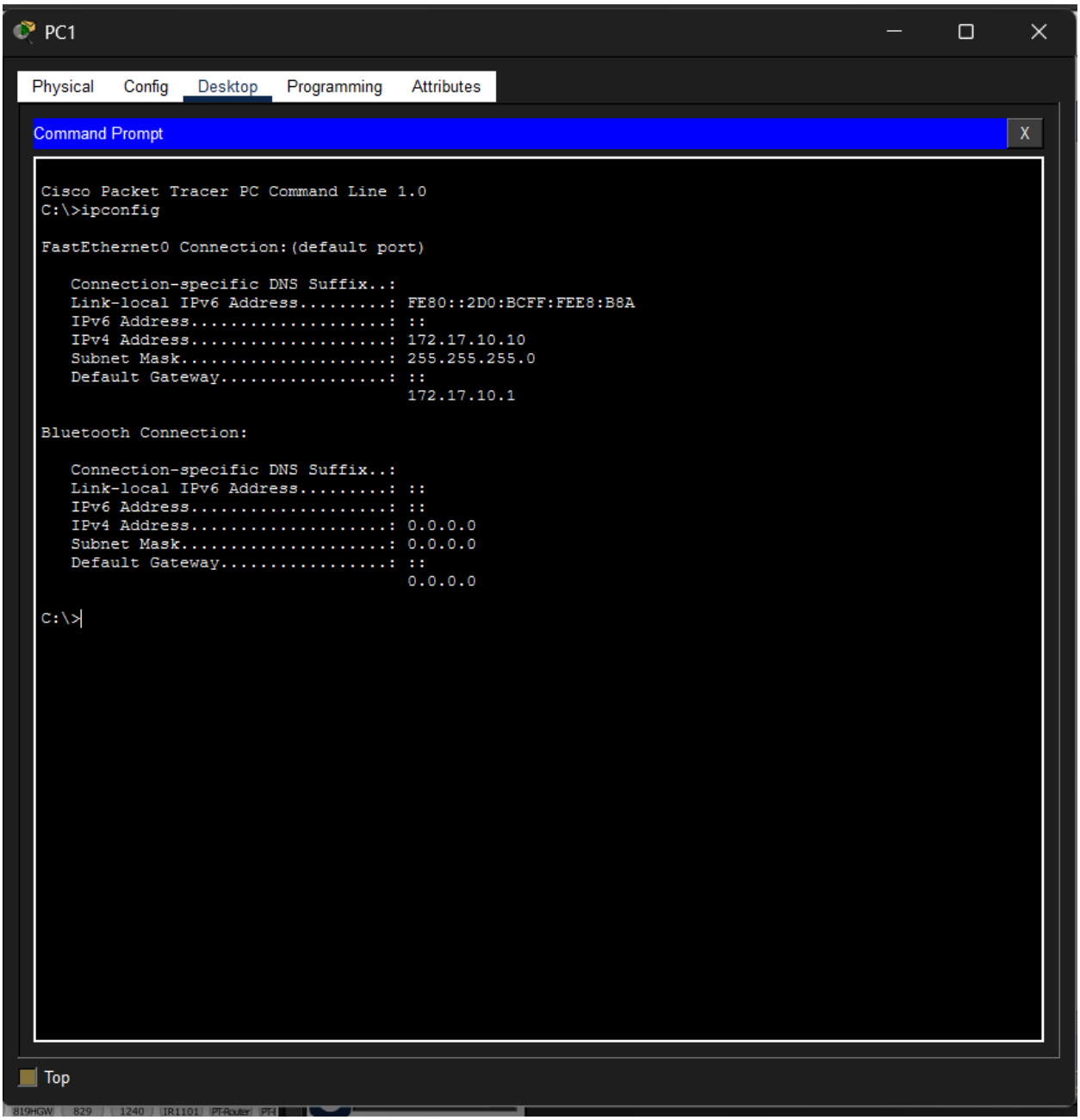

R1
Physical
Config
CLI
Attributes
export@cisco.com.
Cisco CISCO1941/K9 (revision 1.0) with 491520K/32768K bytes of memory.
Processor board ID FTX152400KS
2 Gigabit Ethernet interfaces
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
249856K bytes of ATA System CompactFlash 0 (Read/Write)
Press RETURN to get started!
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.30, changed state to up
R1>show ip interface brief
Interface IP-Address OK? Method Status Protocol
GigabitEthernet0/0 unassigned YES unset administratively down down
GigabitEthernet0/1 unassigned YES unset up up
GigabitEthernet0/1.10 172.17.10.1 YES manual administratively down down
GigabitEthernet0/1.30 172.17.30.1 YES manual up up
Vlan1 unassigned YES unset administratively down down
R1>show interface g0/1.10
GigabitEthernet0/1.10 is administratively down, line protocol is down (disabled)
Hardware is PQUICC_FEC, address is 000d.bde7.0c02 (bia 000d.bde7.0c02)
Internet address is 172.17.10.1/24
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation 802.1Q Virtual LAN, Vlan ID 30
ARP type: ARPA, ARP Timeout 04:00:00,
Last clearing of "show interface" counters never
R1>show interface g0/1.30
GigabitEthernet0/1.30 is up, line protocol is up (connected)
Hardware is PQUICC_FEC, address is 000d.bde7.0c02 (bia 000d.bde7.0c02)
Internet address is 172.17.30.1/24
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation 802.1Q Virtual LAN, Vlan ID 10
ARP type: ARPA, ARP Timeout 04:00:00,
Last clearing of "show interface" counters never
R1>
Copy
Paste
Top


R1
Physical
Config
CLI
Attributes
Press RETURN to get started.
R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface g0/1
R1(config-if)#no ip address
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#interface g0/1.10
R1(config-subif)#encapsulation dot1q 10
%Configuration of multiple subinterfaces of the same main
interface with the same VID (10) is not permitted.
This VID is already configured on GigabitEthernet0/1.30.
R1(config-subif)#ip address 172.17.10.1 255.255.255.0
R1(config-subif)#exit
R1(config)#interface g0/1.30
R1(config-subif)#encapsulation dot1q 30
%Configuration of multiple subinterfaces of the same main
interface with the same VID (30) is not permitted.
This VID is already configured on GigabitEthernet0/1.10.
R1(config-subif)#ip address 172.17.30.1 255.255.255.0
R1(config-subif)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
R1#
Copy
Paste
Top

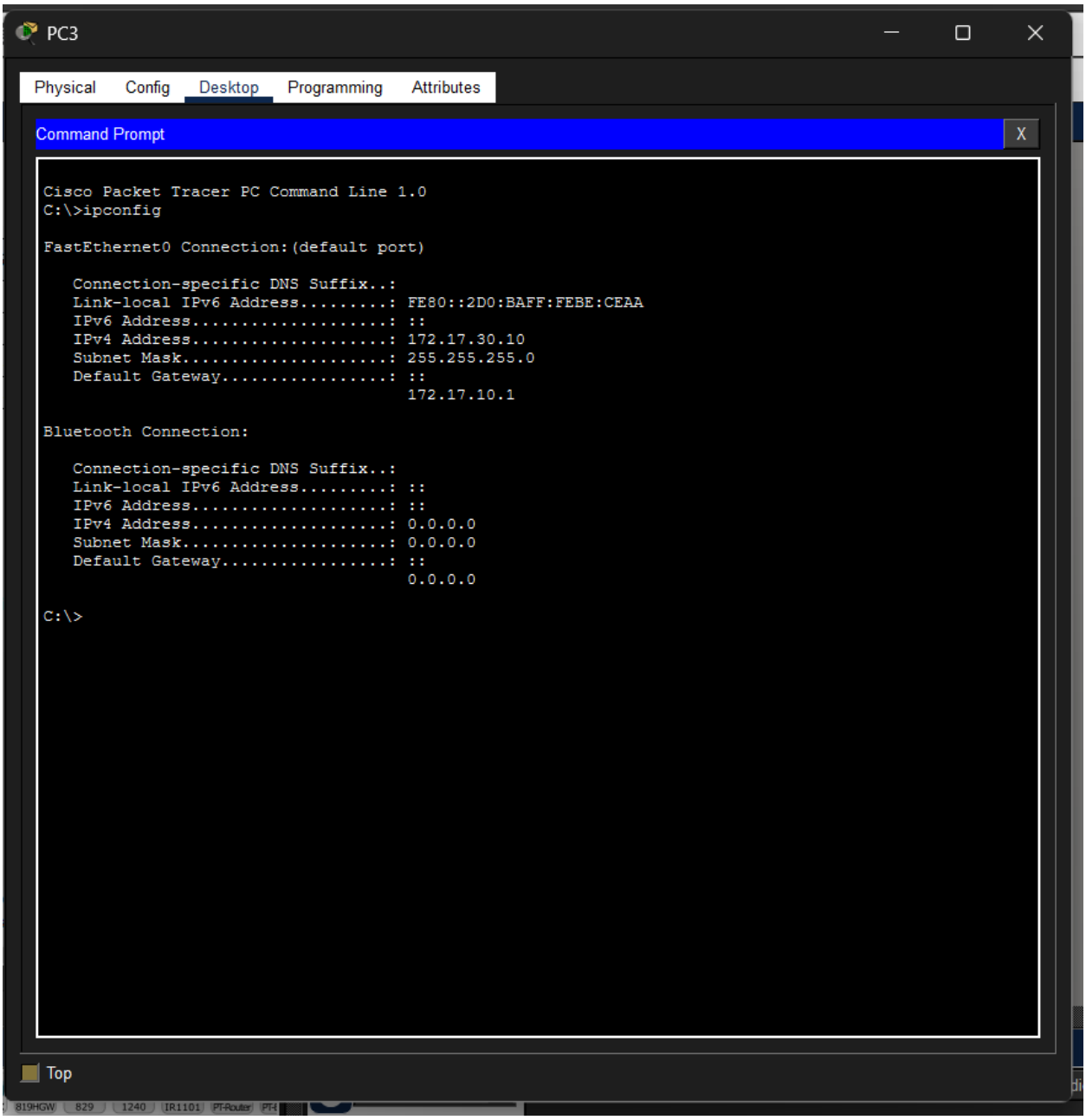
On S1:


S1
Physical
Config
CLI
Attributes
Model revision number : B0
Motherboard revision number : B0
Model number : WS-C2960-24TT-L
System serial number : FOC1010X104
Top Assembly Part Number : 800-27221-02
Top Assembly Revision Number : A0
Version ID : V02
CLEI Code Number : COM3L00BRA
Hardware Board Revision Number : 0x01
Switch Ports Model SW Version SW Image
* 1 26 WS-C2960-24TT-L 15.0(2)SE4 C2960-LANBASEK9-M
Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 15.0(2)SE4, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2013 by Cisco Systems, Inc.
Compiled Wed 26-Jun-13 02:49 by mnguyen
Press RETURN to get started!
%LINK-5-CHANGED: Interface FastEthernet0/11, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/6, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/6, changed state to up
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
S1>show interface trunk
S1>enable
S1#show interface trunk
S1#
Copy
Paste
Top

On PC1 (Checking DG)

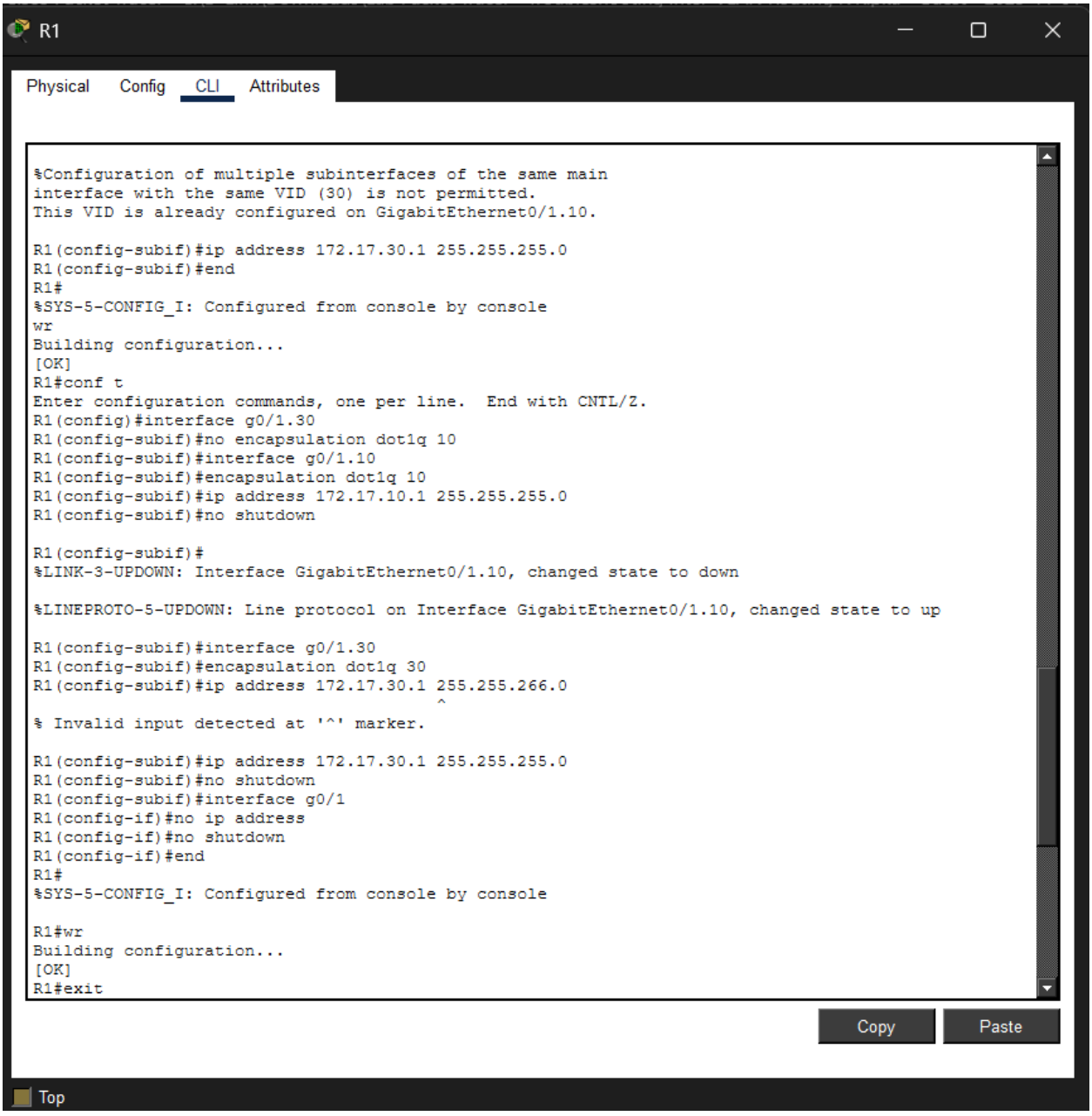


On PC3 (Checking DG):

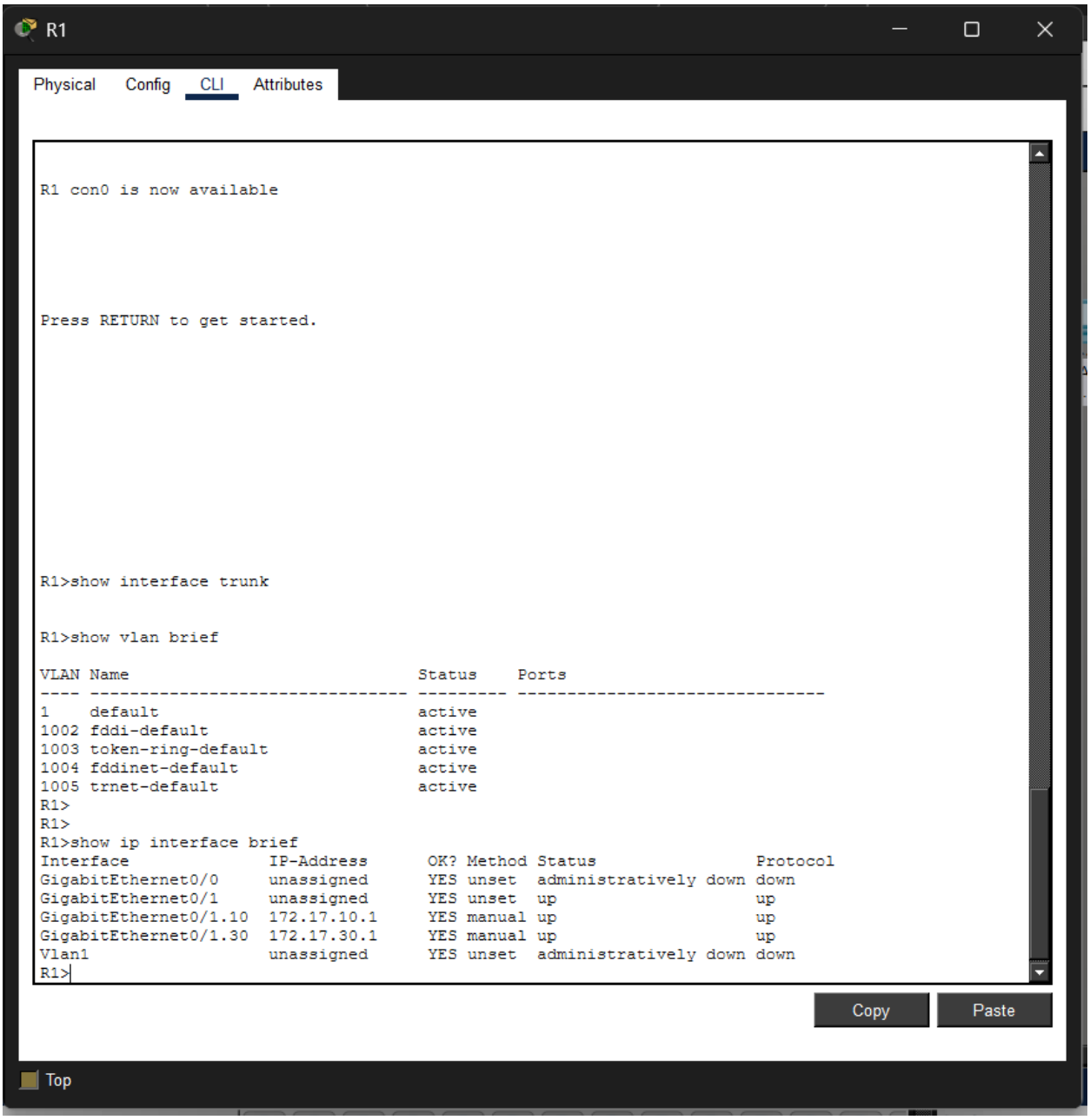


Corrected Configurations:

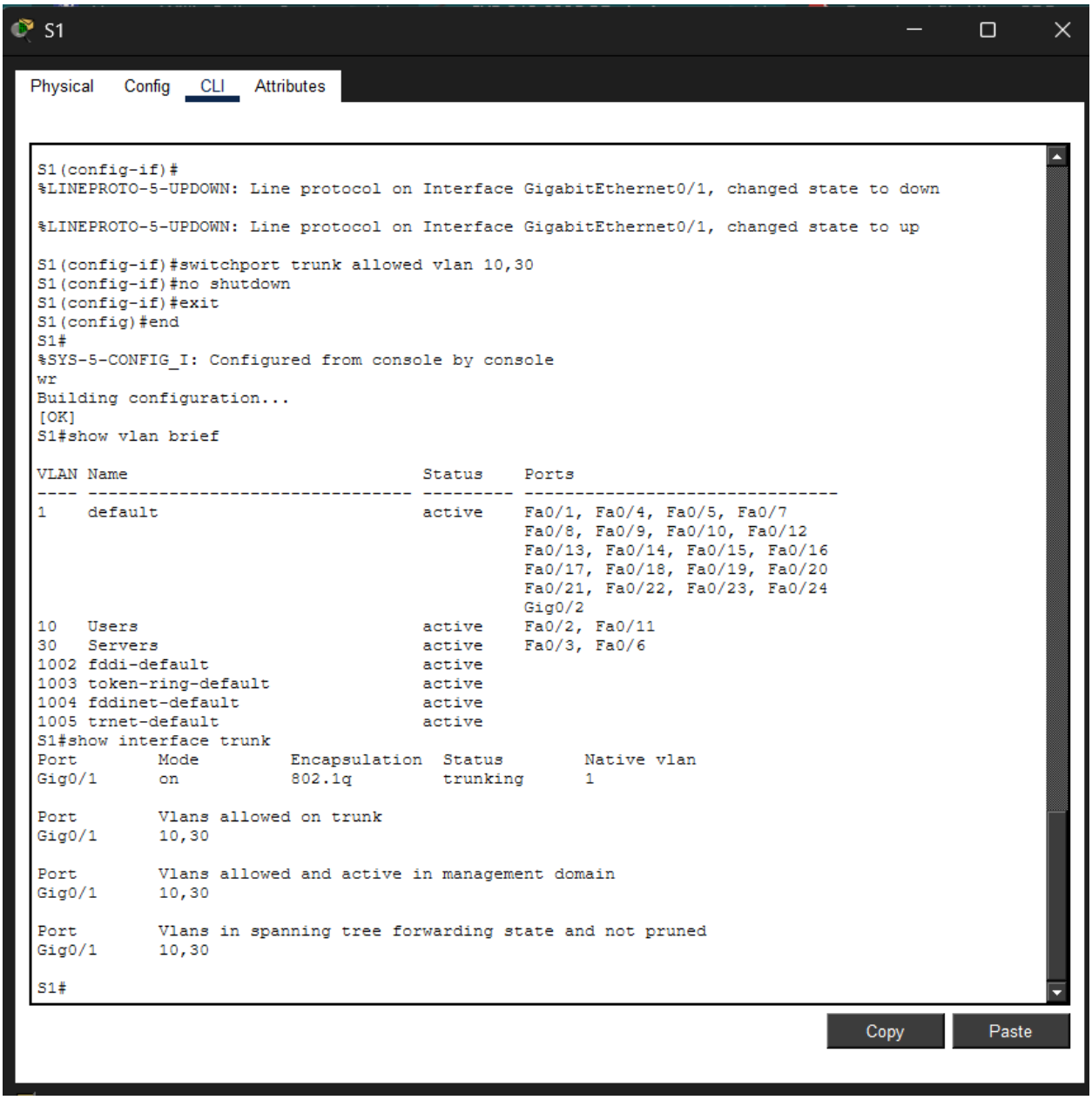
On R1:



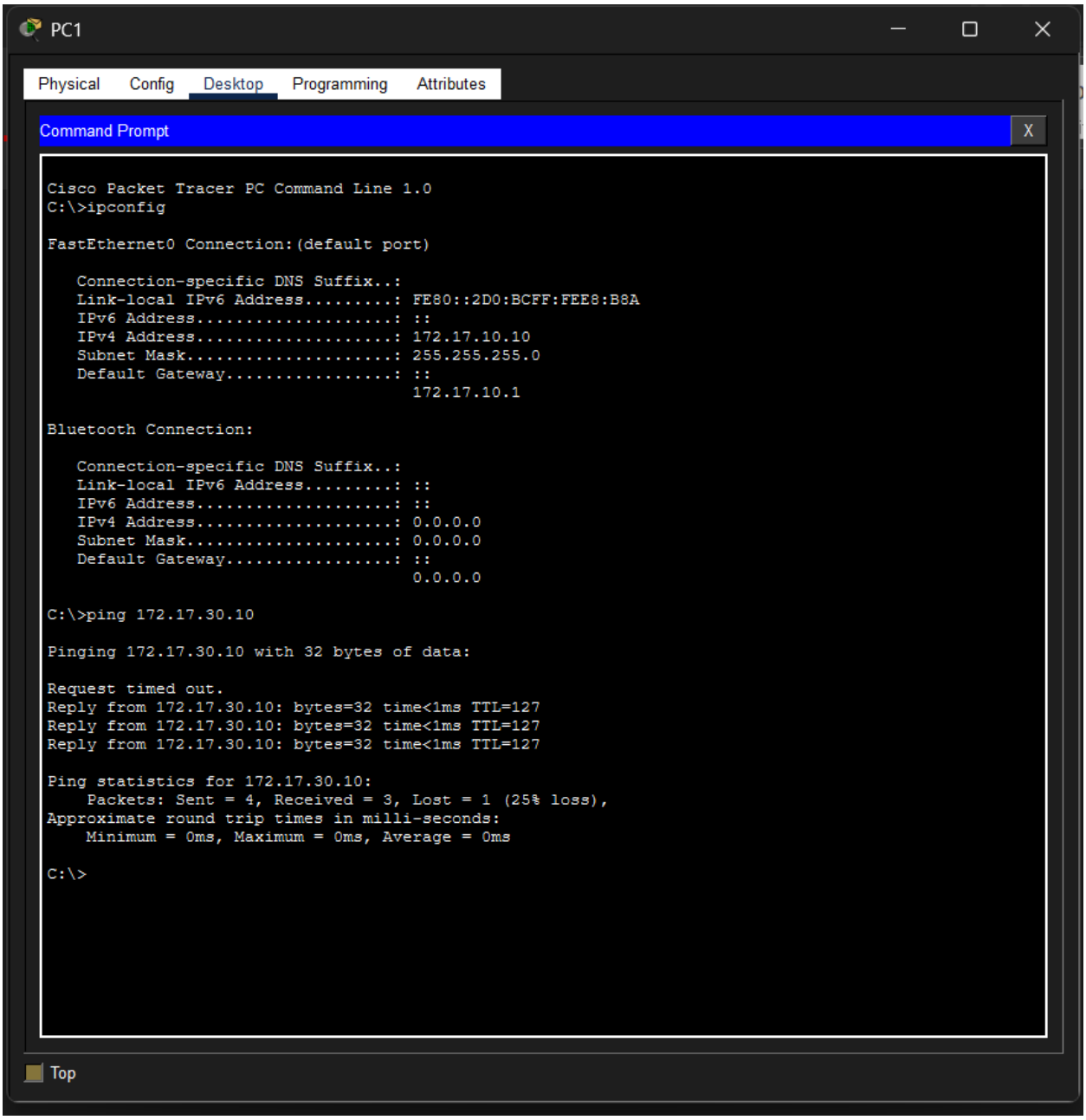
Verification on R1:



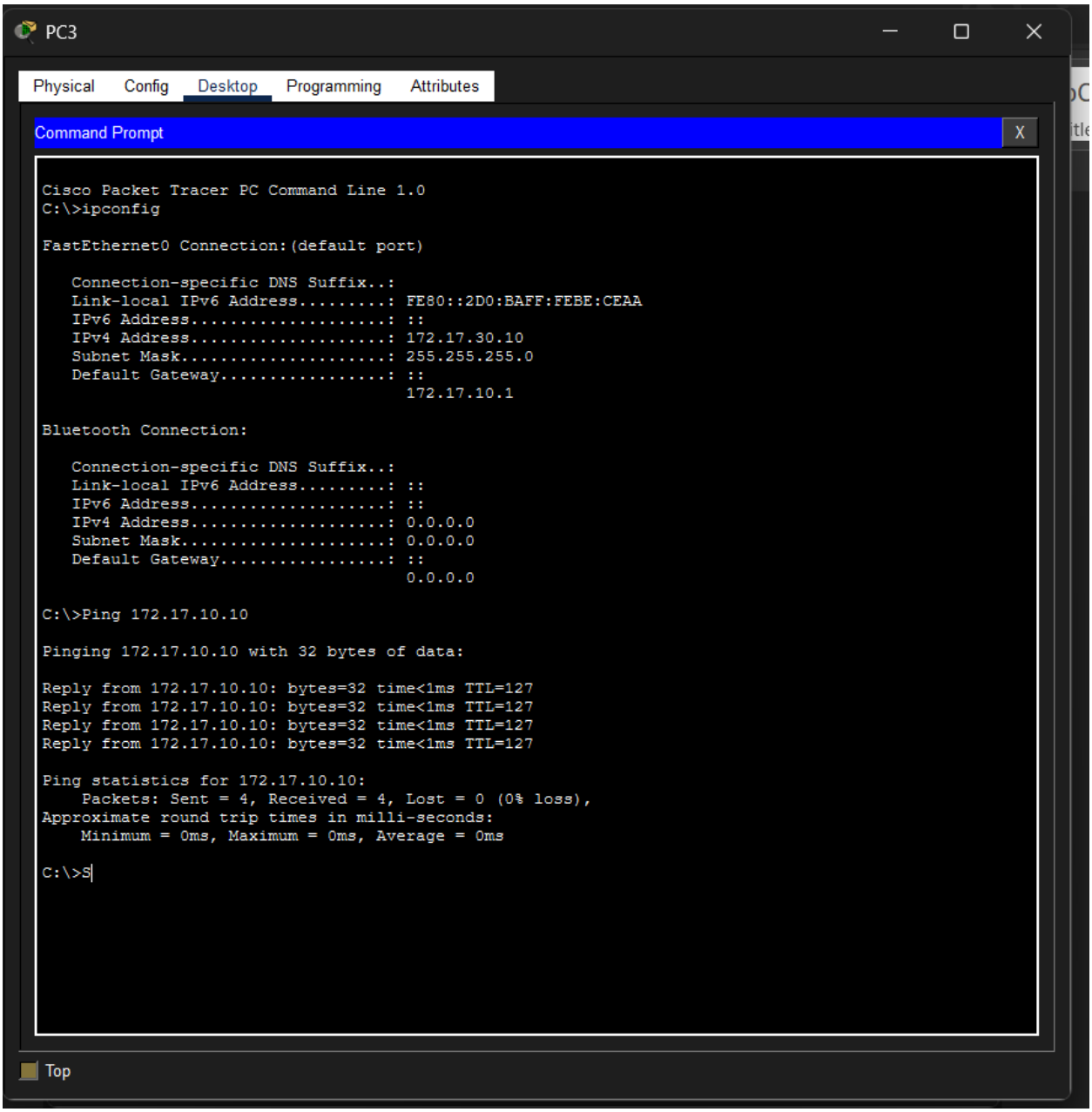
On S1:


S1
Physical
Config
CLI
Attributes
S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
S1(config-if)#switchport trunk allowed vlan 10,30
S1(config-if)#no shutdown
S1(config-if)#exit
S1(config)#end
S1#
%SYS-5-CONFIG_I: Configured from console by console
wr
Building configuration...
[OK]
S1#show vlan brief
VLAN Name Status Ports
---- -------------------------------- --------- -------------------------------
1 default active Fa0/1, Fa0/4, Fa0/5, Fa0/7
Fa0/8, Fa0/9, Fa0/10, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
Gig0/2
10 Users active Fa0/2, Fa0/11
30 Servers active Fa0/3, Fa0/6
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
S1#show interface trunk
Port Mode Encapsulation Status Native vlan
Gig0/1 on 802.1q trunking 1
Port Vlans allowed on trunk
Gig0/1 10,30
Port Vlans allowed and active in management domain
Gig0/1 10,30
Port Vlans in spanning tree forwarding state and not pruned
Gig0/1 10,30
S1#
Copy
Paste

On PC1:


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig
FastEthernet0 Connection:(default port)
Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::2D0:BCFF:FEE8:B8A
IPv6 Address.....: ::
IPv4 Address.....: 172.17.10.10
Subnet Mask.....: 255.255.255.0
Default Gateway.....: ::
172.17.10.1
Bluetooth Connection:
Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
0.0.0.0
C:\>ping 172.17.30.10
Pinging 172.17.30.10 with 32 bytes of data:
Request timed out.
Reply from 172.17.30.10: bytes=32 time<1ms TTL=127
Reply from 172.17.30.10: bytes=32 time<1ms TTL=127
Reply from 172.17.30.10: bytes=32 time<1ms TTL=127
Ping statistics for 172.17.30.10:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
Top

On PC3:


PC3
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ipconfig
FastEthernet0 Connection:(default port)
Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::2D0:BAFF:FEBE:CEAA
IPv6 Address.....: ::
IPv4 Address.....: 172.17.30.10
Subnet Mask.....: 255.255.255.0
Default Gateway.....: ::
172.17.10.1
Bluetooth Connection:
Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: ::
IPv6 Address.....: ::
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: ::
0.0.0.0
C:\>Ping 172.17.10.10
Pinging 172.17.10.10 with 32 bytes of data:
Reply from 172.17.10.10: bytes=32 time<1ms TTL=127
Reply from 172.17.10.10: bytes=32 time<1ms TTL=127
Reply from 172.17.10.10: bytes=32 time<1ms TTL=127
Reply from 172.17.10.10: bytes=32 time<1ms TTL=127
Ping statistics for 172.17.10.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>S
Top

VLAN & Inter-VLAN Routing – Troubleshooting Report

This report documents findings and fixes for connectivity issues related to VLANs and inter-VLAN routing. The topology uses router-on-a-stick with subinterfaces on R1 and VLANs 10 and 30 on switch S1. PC1 is in VLAN 10 and PC3 is in VLAN 30.

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway	VLAN
R1	G0/1.10	172.17.10.1	255.255.255.0	N/A	VLAN 10
R1	G0/1.30	172.17.30.1	255.255.255.0	N/A	VLAN 30
PC1	NIC	172.17.10.10	255.255.255.0	172.17.10.1	VLAN 10
PC3	NIC	172.17.30.10	255.255.255.0	172.17.30.1	VLAN 30

Problems and Solutions

Problems	Solutions
Trunk not configured (or down) between S1 and R1.	On S1: configure trunk on G0/1 and allow VLANs 10,30. On R1: ensure G0/1 is up and has no IP.
VLANs 10 and/or 30 missing on S1.	On S1: vlan 10; name Users; vlan 30; name Servers.
PC ports in wrong VLAN.	On S1: assign PC1 to VLAN 10 and PC3 to VLAN 30.
Subinterfaces missing or wrong encapsulation.	On R1: configure G0/1.10 (dot1Q 10) and G0/1.30 (dot1Q 30) with correct IPs.
Parent interface administratively down.	On R1: no shutdown on G0/1.
PC default gateways incorrect or missing.	Set PC1 DG to 172.17.10.1 and PC3 DG to 172.17.30.1.
Native VLAN mismatch.	Keep native VLAN 1 on both sides.

Verification Steps & Useful Commands

1) From PCs: ping the default gateway and opposite PC.
2) On S1: show vlan brief, show interface trunk.
3) On R1: show ip interface brief, show interfaces g0/1.10, show interfaces g0/1.30.
4) Ensure subinterfaces have the correct dot1Q tags and IPs.

Expected Result

PC1 and PC3 should ping each other and R1 subinterface IPs. If pings fail, re-check VLAN

Pka: