

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:

Cisco Packet Tracer - C:\D-Link\Downloads\Lab Packet Tracer - Troubleshooting Inter-VLAN Routing IVR.pka - Guest - 2025-11-01 17:48:04

File Edit Options View Tools Extensions Window Help

Logical Physical x 19, y 458

Packet Tracer - Troubleshoot Inter-VLAN Routing

Addressing Table

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

Objectives

- Part 1: Locate Network Problems
- Part 2: Implement the Solution
- Part 3: Verify Network Connectivity

Scenario

In this activity, you will troubleshoot connectivity problems caused by improper configurations related to VLANs and inter-VLAN routing.

Instructions

Part 1: Locate the Network Problems

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

Commands you may find useful include:

- show ip interface brief
- show interface g0/1.10
- show interface g0/1.30
- show interface trunk

- Test connectivity and use the necessary show commands to verify configurations.
- Verify that all configured settings match the requirements shown in the Addressing Table.

Time Elapsed: 00:15:41

Dock Check Results Back 1/1 Next Time: 00:14:31 Realtime Simulation

Solution:

What to check :

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

The screenshot shows a Windows-style application window titled "R1" with a dark theme. The tab bar at the top has four tabs: "Physical", "Config", "CLI" (which is selected), and "Attributes". The main pane displays the following text:

```
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>
```

At the bottom right of the window are two buttons: "Copy" and "Paste". At the bottom left is a "Top" button.

CISCO FINGER TRACER C:\D\ETHR\DOWNHODG\ZBDFINGER\TRACER - WIRELESS SHOOTING WIRELESS ROUTING, IVY REPS0 - 2023-11-01

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#
```

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)

The screenshot shows a Cisco Packet Tracer interface titled "PC1". A tab bar at the top includes "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below this is a "Command Prompt" window with a blue header bar containing the text "Command Prompt" and a close button "X". The main area of the window displays the output of the "ipconfig" command:

```
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:FE8: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:\>
```

At the bottom of the window, there is a toolbar with icons for "Top", "819HGW", "829", "1240", "[R1]101", "PT-Router", and "PT4".

On PC3 (Checking DG):

The screenshot shows a Cisco Packet Tracer interface with a window titled "Command Prompt". The window contains the following text output from the Cisco Packet Tracer PC Command Line 1.0:

```
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:FE8E: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:\>
```

The window has a title bar "PC3" and a menu bar with tabs: Physical, Config, Desktop, Programming, and Attributes. The "Desktop" tab is currently selected. The bottom of the window shows a toolbar with icons for Top, 819HGW, 829, 1240, IR1101, PT-Router, and PT4.

Corrected Configurations:

On R1:

The screenshot shows a Cisco IOS CLI interface titled "R1". The window has tabs for "Physical", "Config", "CLI" (which is selected), and "Attributes". The main pane displays the following configuration session:

```
%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#conf t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#interface g0/1.30
R1(config-subif)#no encapsulation dot1q 10
R1(config-subif)#interface g0/1.10
R1(config-subif)#encapsulation dot1q 10
R1(config-subif)#ip address 172.17.10.1 255.255.255.0
R1(config-subif)#no shutdown

R1(config-subif)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/1.10, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.10, changed state to up

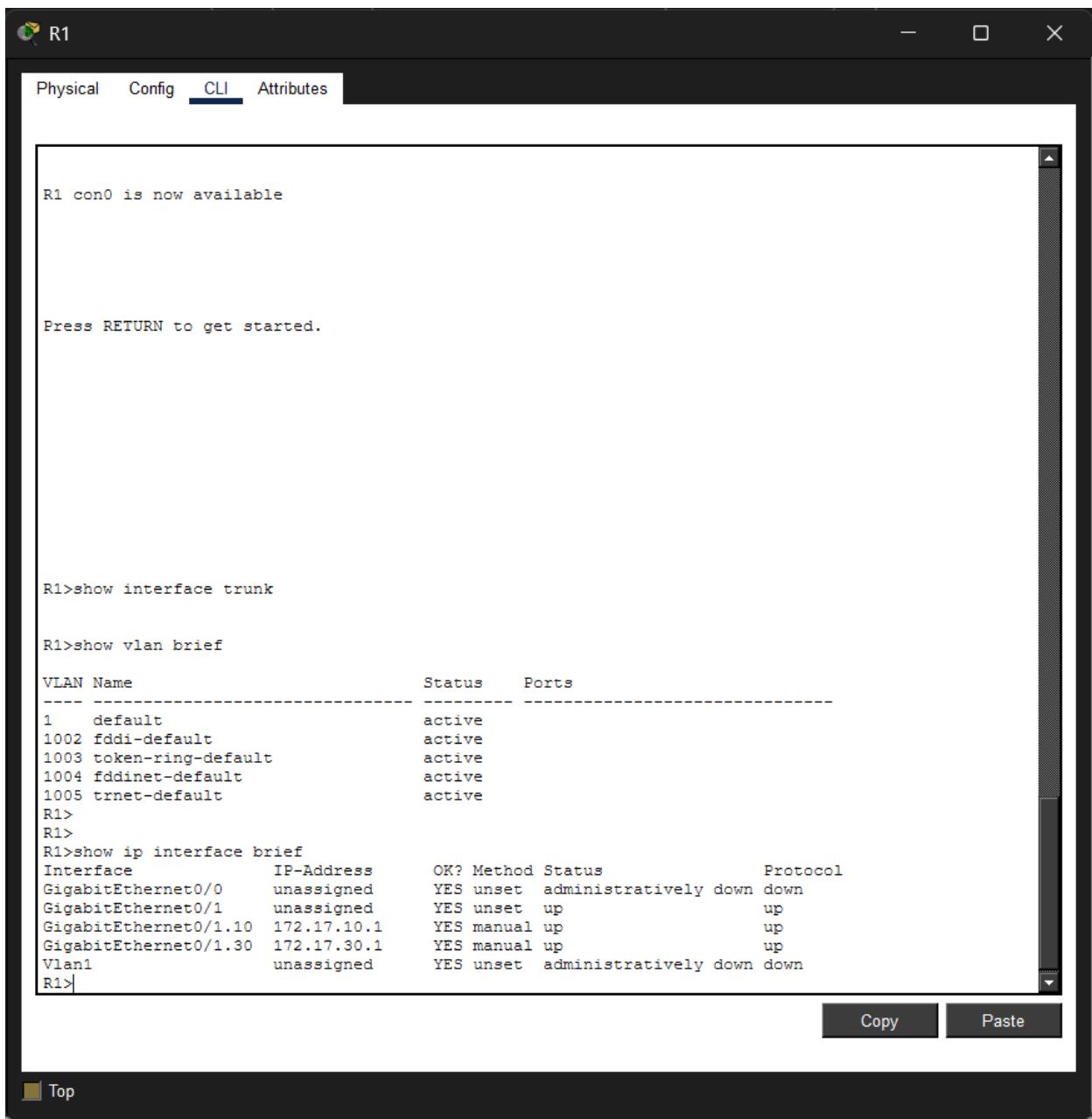
R1(config-subif)#interface g0/1.30
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip address 172.17.30.1 255.255.266.0
^
% Invalid input detected at '^' marker.

R1(config-subif)#ip address 172.17.30.1 255.255.255.0
R1(config-subif)#no shutdown
R1(config-subif)#interface g0/1
R1(config-if)#no ip address
R1(config-if)#no shutdown
R1(config-if)#end
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#exit
```

At the bottom right of the CLI window are "Copy" and "Paste" buttons. At the bottom left is a "Top" button.

Verification on R1:



R1 con0 is now available

Press RETURN to get started.

R1>show interface trunk

R1>show vlan brief

VLAN Name	Status	Ports
1 default	active	
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

R1>

R1>

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	up	up
GigabitEthernet0/1.30	172.17.30.1	YES	manual	up	up
Vlan1	unassigned	YES	unset	administratively down	down

R1>

Copy Paste

Top

On S1:

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	fdmi-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:

The screenshot shows a window titled "PC1" with a menu bar containing "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is selected. Below the menu is a blue header bar with the text "Command Prompt" and a close button ("X"). The main area of the window is a black terminal window displaying command-line output. The output shows the results of the "ipconfig" command, including network connections for "FastEthernet0" and "Bluetooth", and the results of a "ping" command to "172.17.30.10".

```
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:FE8: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:\>
```

On PC3:

The screenshot shows a window titled "PC3" with a tab bar at the top containing "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below the tab bar is a blue header bar with the text "Command Prompt" and a close button "X". The main area of the window displays the output of a Cisco Packet Tracer command-line interface. The output includes:

```
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:FE8E: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

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
```

At the bottom left of the window, there is a "Top" button.

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:

