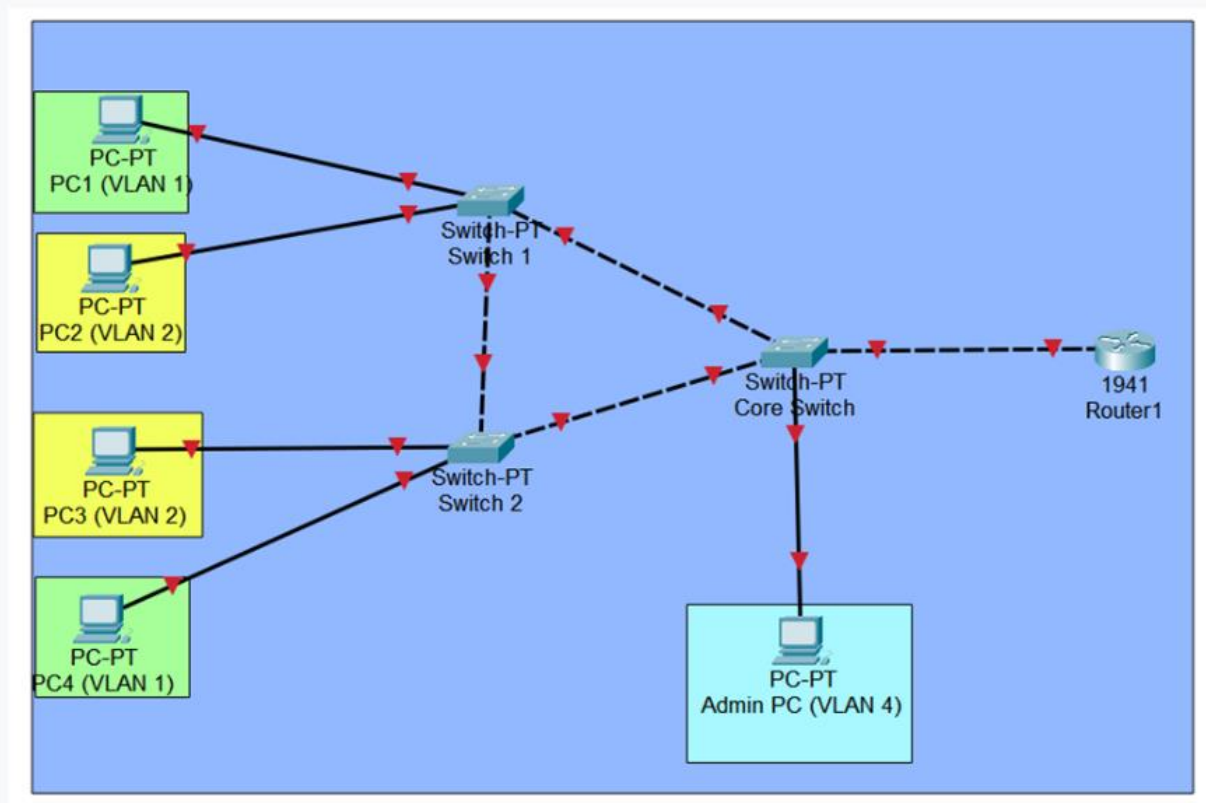


Project 2:

Introduction:

A network topology is provided to you in a PKA file. Your responsibility as the network administrator of this company is to set up the network devices at the branch site based on the given requirements. Specifically, you are tasked with configuring 3 VLANs and implementing inter-VLAN routing in the router. Additionally, you need to configure the switches in the branch office according to the specified requirements for STP and Etherchannel.

Figure 1: The Topology:



Objectives:

- Subnet the provided network and determine the IP address range for each subnet.
- Set up VLANs on all switches.
- Set customized device hostnames.
- Enable SSH in the core switch.
- Configure trunk and access ports on all switches according to the specified requirements.
- Assign switch ports to appropriate VLANs based on the given requirements.
- Configure IP settings for PCs and SVI interfaces of switches, selecting IPs from the correct subnets.
- Enable Intervlan Routing on Router R1.
- Implement STP/Etherchannel as per the provided requirements.
- Conduct connectivity testing.

SOLUTION:

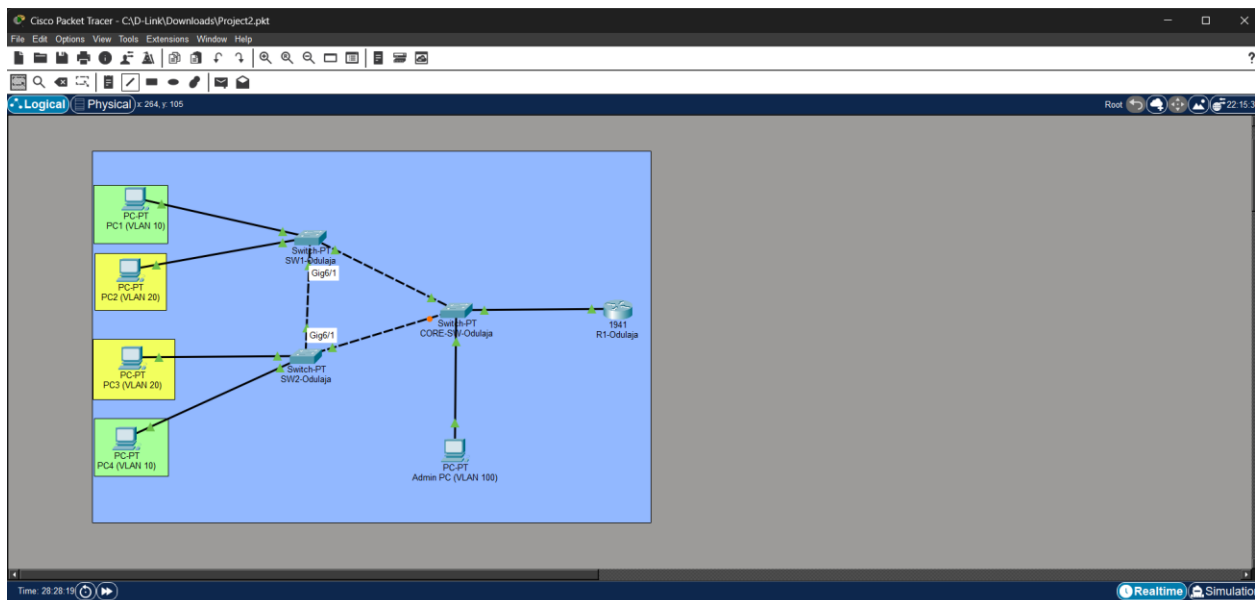
Networking Lab Report

Networking Project Report: VLAN, Trunking, STP, and SSH Configuration

Part 1: Network Topology

Label: Final VLAN and Inter-VLAN Routing Topology

Description: This topology connects multiple access switches (SW1-Odulaja and SW2-Odulaja) to a core switch (CORE-SW-Odulaja) and a router (R1-Odulaja) using trunk links and EtherChannel. The Admin PC is placed in VLAN 100 for secure SSH management.



Part 2: VLAN Configuration Verification

Label: VLAN Configuration on Switches

Description: VLANs 10 (Dept1), 20 (Dept2), and 100 (Management) were created and assigned to their respective ports on each switch.

SW1-Odulaja VLAN Configuration:

SW1-Odulaja

Physical

Config

CLI

Attributes

Bridge ID

Priority

32868

(priority 32768 sys-id-ext 100)

Address

00E0.F9DD.B783

Hello Time

2 sec

Max Age

20 sec

Forward Delay

15 sec

Aging Time

20

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa2/1	Desg	FWD	19	128.3	P2p
Gi6/1	Root	FWD	4	128.7	P2p

SW1-Odulaja>

SW1-Odulaja con0 is now available

Press RETURN to get started.

SW1-Odulaja>show vlan brief

VLAN	Name	Status	Ports
1	default	active	Pol, Fa3/1, Fa4/1, Fa5/1 Gig8/1, Gig9/1
10	Dept1	active	Fa0/1
20	Dept2	active	Fa1/1
100	MGMT	active	Fa2/1
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

SW1-Odulaja>

Copy

Paste

Top

SW2-Odulaja VLAN Configuration:

SW2-Odulaja

Physical Config CLI Attributes

d - default port

Number of channel-groups in use: 1
Number of aggregators: 1

Group	Port-channel	Protocol	Ports
2	Po2(SU)	LACP	Gig8/1(P)

SW2-Odulaja>

SW2-Odulaja con0 is now available

Press RETURN to get started.

SW2-Odulaja>show vlan brie

VLAN Name	Status	Ports
1 default	active	Fa3/1, Fa4/1, Fa5/1, Gig7/1 Gig9/1
10 Dept1	active	Fa1/1
20 Dept2	active	Fa0/1
100 MGMT	active	Fa2/1
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

SW2-Odulaja>

Copy

Paste

Top

CORE-SW-Odulaja VLAN Configuration:



The screenshot shows the CLI interface of a switch named CORE-SW-Odulaja. The interface has tabs for Physical, Config, CLI (selected), and Attributes. The CLI window displays the following text:

```
!
!
--More--

CORE-SW-Odulaja con0 is now available

Press RETURN to get started.

%LINK-3-UPDOWN: Interface Port-channel2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2, changed state to down
%LINK-5-CHANGED: Interface Port-channel2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2, changed state to up

CORE-SW-Odulaja>show vlan brief
```

VLAN	Name	Status	Ports
1	default	active	Po1, Fa0/1, Fa1/1, Fa2/1 Fa3/1, Fa4/1, Gig6/1
10	Dept1	active	
20	Dept2	active	
100	MGMT	active	Gig7/1, Gig9/1
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

CORE-SW-Odulaja>

At the bottom right of the CLI window, there are buttons for 'Copy' and 'Paste'.

Part 3: Trunk and EtherChannel Verification

Label: Trunk and EtherChannel Configuration

Description: Trunk ports were configured using IEEE 802.1Q encapsulation to allow VLANs 10, 20, and 100 across links. LACP (802.3ad) was implemented for redundancy and load balancing.

CORE-SW-Odulaja Trunk Links and EtherChannel:

CORE-SW-Odulaja

Physical Config **CLI** Attributes

Press RETURN to get started.

%LINK-3-UPDOWN: Interface Port-channel2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2, changed state to down
%LINK-5-CHANGED: Interface Port-channel2, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel2, changed state to up
CORE-SW-Odulaja>show vlan brief

VLAN	Name	Status	Ports
1	default	active	Po1, Fa0/1, Fa1/1, Fa2/1 Fa3/1, Fa4/1, Gig6/1
10	Dept1	active	
20	Dept2	active	
100	MGMT	active	Gig7/1, Gig9/1
1002	fddi-default	active	
1003	token-ring-default	active	
1004	fddinet-default	active	
1005	trnet-default	active	

CORE-SW-Odulaja>show interfaces trunk

Port	Mode	Encapsulation	Status	Native vlan
Po2	on	802.1q	trunking	1
Gig5/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Po2	10,20,100
Gig5/1	10,20,100

Port	Vlans allowed and active in management domain
Po2	10,20,100
Gig5/1	10,20,100

Port	Vlans in spanning tree forwarding state and not pruned
Po2	10,20,100
Gig5/1	10,20,100

CORE-SW-Odulaja>

Copy Paste

Top

SW1-Odulaja EtherChannel Summary:

SW1-Odulaja

Physical Config **CLI** Attributes

SW1-Odulaja con0 is now available

Press RETURN to get started.

SW1-Odulaja>show vlan brief

VLAN Name	Status	Ports
1 default	active	Pol, Fa3/1, Fa4/1, Fa5/1 Gig8/1, Gig9/1
10 Dept1	active	Fa0/1
20 Dept2	active	Fa1/1
100 MGMT	active	Fa2/1
1002 fddi-default	active	
1003 token-ring-default	active	
1004 fddinet-default	active	
1005 trnet-default	active	

SW1-Odulaja>

SW1-Odulaja>show etherchannel summary

Flags: D - down P - in port-channel
I - stand-alone s - suspended
H - Hot-standby (LACP only)
R - Layer3 S - Layer2
U - in use f - failed to allocate aggregator
u - unsuitable for bundling
w - waiting to be aggregated
d - default port

Number of channel-groups in use: 1
Number of aggregators: 1

Group	Port-channel	Protocol	Ports
1	Pol(SD)	LACP	Gig6/1(I) Gig7/1(I)

SW1-Odulaja>

Copy

Paste

SW2-Odulaja EtherChannel Summary:

```
SW2-Odulaja con0 is now available

Press RETURN to get started.

SW2-Odulaja>show vlan brie

VLAN Name                Status    Ports
-----
1    default                active    Fa3/1, Fa4/1, Fa5/1, Gig7/1
10   Dept1                   active    Fa1/1
20   Dept2                   active    Fa0/1
100  MGMT                    active    Fa2/1
1002 fddi-default          active
1003 token-ring-default    active
1004 fddinet-default        active
1005 trnet-default          active
SW2-Odulaja>
SW2-Odulaja>show etherchannel summary
Flags: D - down          P - in port-channel
       I - stand-alone s - suspended
       H - Hot-standby (LACP only)
       R - Layer3        S - Layer2
       U - in use        f - failed to allocate aggregator
       u - unsuitable for bundling
       w - waiting to be aggregated
       d - default port

Number of channel-groups in use: 1
Number of aggregators:          1

Group  Port-channel  Protocol    Ports
-----
2      Po2 (SU)      LACP        Gig8/1 (P)
SW2-Odulaja>
```

Copy Paste

Part 4: Spanning Tree Protocol (STP)

Label: STP Root Bridge Configuration

Description: STP was verified for VLANs 10, 20, and 100 to ensure loop prevention and redundancy. SW1 is root for VLAN 10, SW2 is root for VLAN 20, and CORE-SW is root for VLAN 100.

CORE-SW-Odulaja

PhysicalConfigCLIAttributes

Cost8

Port13(Port-channel2)

Hello Time2 secMax Age 20 secForward Delay 15 sec

Bridge ID

Priority32778(priority 32768 sys-id-ext 10)

Address00D0.FF04.11EE

Hello Time2 secMax Age 20 secForward Delay 15 sec

Aging Time20

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi5/1	Desg	FWD	4	128.6	P2p
Po2	Root	FWD	4	128.13	P2p

CORE-SW-Odulaja>show spanning-tree vlan 20

VLAN0020

Spanning tree enabled protocol ieee

Root ID

Priority24596

Address00D0.97A9.E74E

Cost4

Port13(Port-channel2)

Hello Time2 secMax Age 20 secForward Delay 15 sec

Bridge ID

Priority32788(priority 32768 sys-id-ext 20)

Address00D0.FF04.11EE

Hello Time2 secMax Age 20 secForward Delay 15 sec

Aging Time20

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi5/1	Desg	FWD	4	128.6	P2p
Po2	Root	FWD	4	128.13	P2p

CORE-SW-Odulaja>show spanning-tree vlan 100

VLAN0100

Spanning tree enabled protocol ieee

Root ID

Priority24676

Address00D0.FF04.11EE

This bridge is the root

Hello Time2 secMax Age 20 secForward Delay 15 sec

Bridge ID

Priority24676(priority 24576 sys-id-ext 100)

Address00D0.FF04.11EE

Hello Time2 secMax Age 20 secForward Delay 15 sec

Aging Time20

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi7/1	Desg	FWD	4	128.8	P2p
Gi5/1	Desg	FWD	4	128.6	P2p
Gi9/1	Desg	FWD	19	128.10	P2p
Po2	Desg	FWD	4	128.13	P2p

CORE-SW-Odulaja>

Copy

Paste

SW1-Odulaja

PhysicalConfigCLIAttributes

Address00E0.F9DD.B783
This bridge is the root
Hello Time2 secMax Age20 secForward Delay15 sec

Bridge IDPriority24586 (priority 24576 sys-id-ext 10)
Address00E0.F9DD.B783
Hello Time2 secMax Age20 secForward Delay15 sec
Aging Time20

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Desg	FWD	19	128.1	P2p
Gi7/1	Desg	FWD	4	128.8	P2p
Gi6/1	Desg	FWD	4	128.7	P2p

SW1-Odulaja>show spanning-tree vlan 20
VLAN0020
Spanning tree enabled protocol ieee
Root IDPriority24596
Address00D0.97A9.E74E
Cost4
Port7 (GigabitEthernet6/1)
Hello Time2 secMax Age20 secForward Delay15 sec

Bridge IDPriority32788 (priority 32768 sys-id-ext 20)
Address00E0.F9DD.B783
Hello Time2 secMax Age20 secForward Delay15 sec
Aging Time20

Interface	Role	Sts	Cost	Prio.Nbr	Type
Gi7/1	Desg	FWD	4	128.8	P2p
Gi6/1	Root	FWD	4	128.7	P2p

SW1-Odulaja>show spanning-tree vlan 100
VLAN0100
Spanning tree enabled protocol ieee
Root IDPriority24676
Address00D0.FF04.11EE
Cost8
Port7 (GigabitEthernet6/1)
Hello Time2 secMax Age20 secForward Delay15 sec

Bridge IDPriority32868 (priority 32768 sys-id-ext 100)
Address00E0.F9DD.B783
Hello Time2 secMax Age20 secForward Delay15 sec
Aging Time20

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa2/1	Desg	FWD	19	128.3	P2p
Gi6/1	Root	FWD	4	128.7	P2p

SW1-Odulaja>

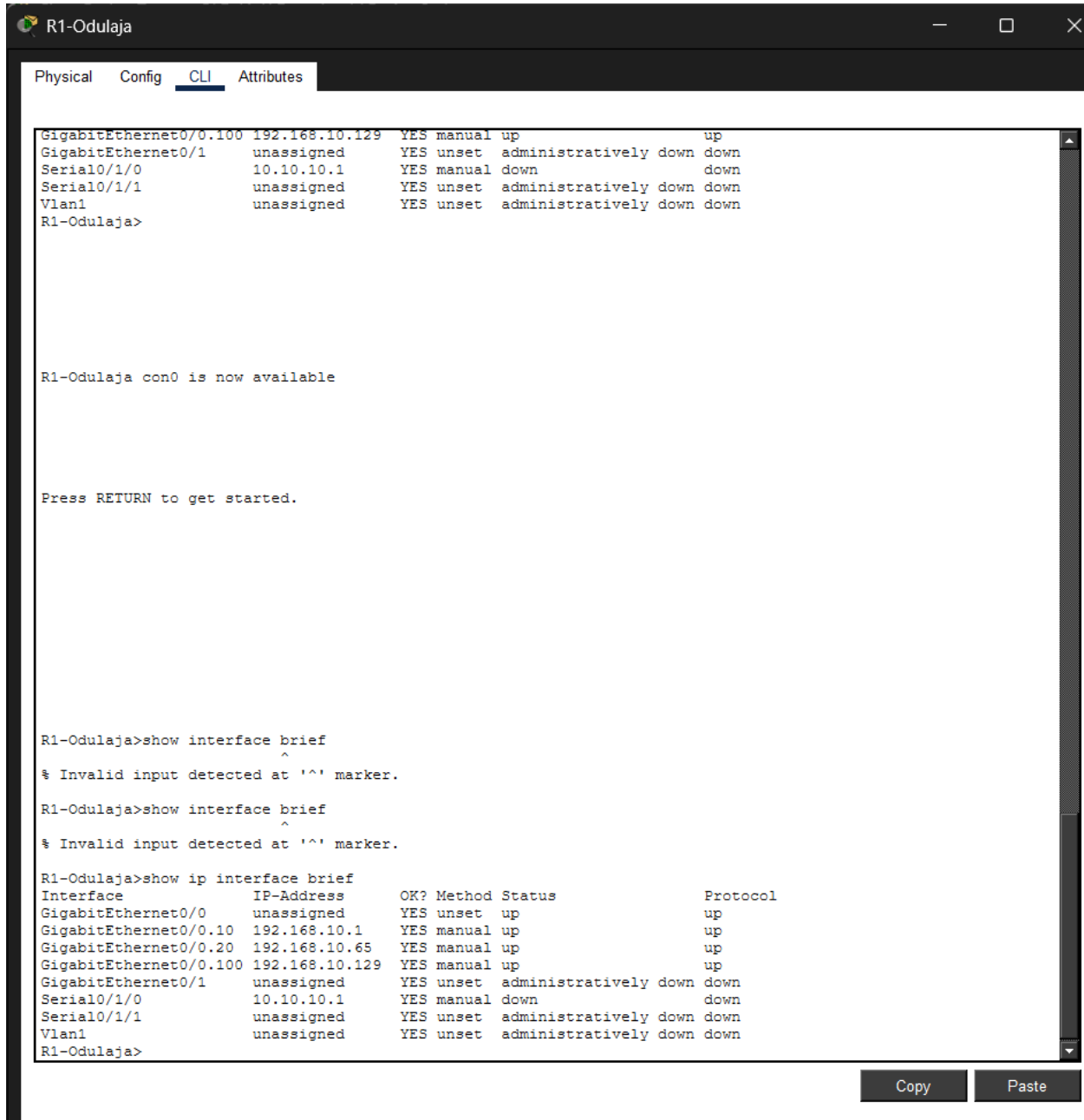
Copy

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Part 5: Router-on-a-Stick Configuration

Label: Inter-VLAN Routing Verification

Description: Router R1-Odulaja subinterfaces were created for each VLAN to enable inter-VLAN communication.



The screenshot shows the CLI of a router named R1-Odulaja. The 'CLI' tab is selected. The output of the 'show interface brief' command is as follows:

```
GigabitEthernet0/0.100 192.168.10.129 YES manual up up
GigabitEthernet0/1 unassigned YES unset administratively down down
Serial0/1/0 10.10.10.1 YES manual down down
Serial0/1/1 unassigned YES unset administratively down down
Vlan1 unassigned YES unset administratively down down
R1-Odulaja>
```

Below this, there are two attempts to run the 'show interface brief' command, both resulting in an error: '% Invalid input detected at '^' marker.'

Finally, the 'show ip interface brief' command is executed, showing the following output:

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0	unassigned	YES	unset	up	up
GigabitEthernet0/0.10	192.168.10.1	YES	manual	up	up
GigabitEthernet0/0.20	192.168.10.65	YES	manual	up	up
GigabitEthernet0/0.100	192.168.10.129	YES	manual	up	up
GigabitEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/1/0	10.10.10.1	YES	manual	down	down
Serial0/1/1	unassigned	YES	unset	administratively down	down
Vlan1	unassigned	YES	unset	administratively down	down

The CLI prompt is 'R1-Odulaja>'.

At the bottom right of the window, there are 'Copy' and 'Paste' buttons.

Part 6: Management and SSH Access

Label: Secure SSH Access Verification

Description: SSH was configured on CORE-SW-Odulaja for remote administrative access using domain branch.local and username admin. RSA keys were generated and SSH version 2 enabled.

CORE-SW-Odulaja SSH Configuration:

The screenshot displays the CLI of a switch named CORE-SW-Odulaja. The interface shows the configuration for spanning-tree protocol IEEE and the status of various interfaces.

```
Spanning tree enabled protocol ieee
Root ID    Priority    24596
           Address    00D0.97A9.E74E
           Cost      4
           Port      13(Port-channel2)
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

Bridge ID   Priority    32788 (priority 32768 sys-id-ext 20)
           Address    00D0.FF04.11EE
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20

Interface   Role Sts Cost      Prio.Nbr Type
-----
Gi5/1       Desg FWD 4        128.6   P2p
Po2         Root FWD 4        128.13  P2p

CORE-SW-Odulaja>show spanning-tree vlan 100
VLAN0100
Spanning tree enabled protocol ieee
Root ID    Priority    24676
           Address    00D0.FF04.11EE
           This bridge is the root
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec

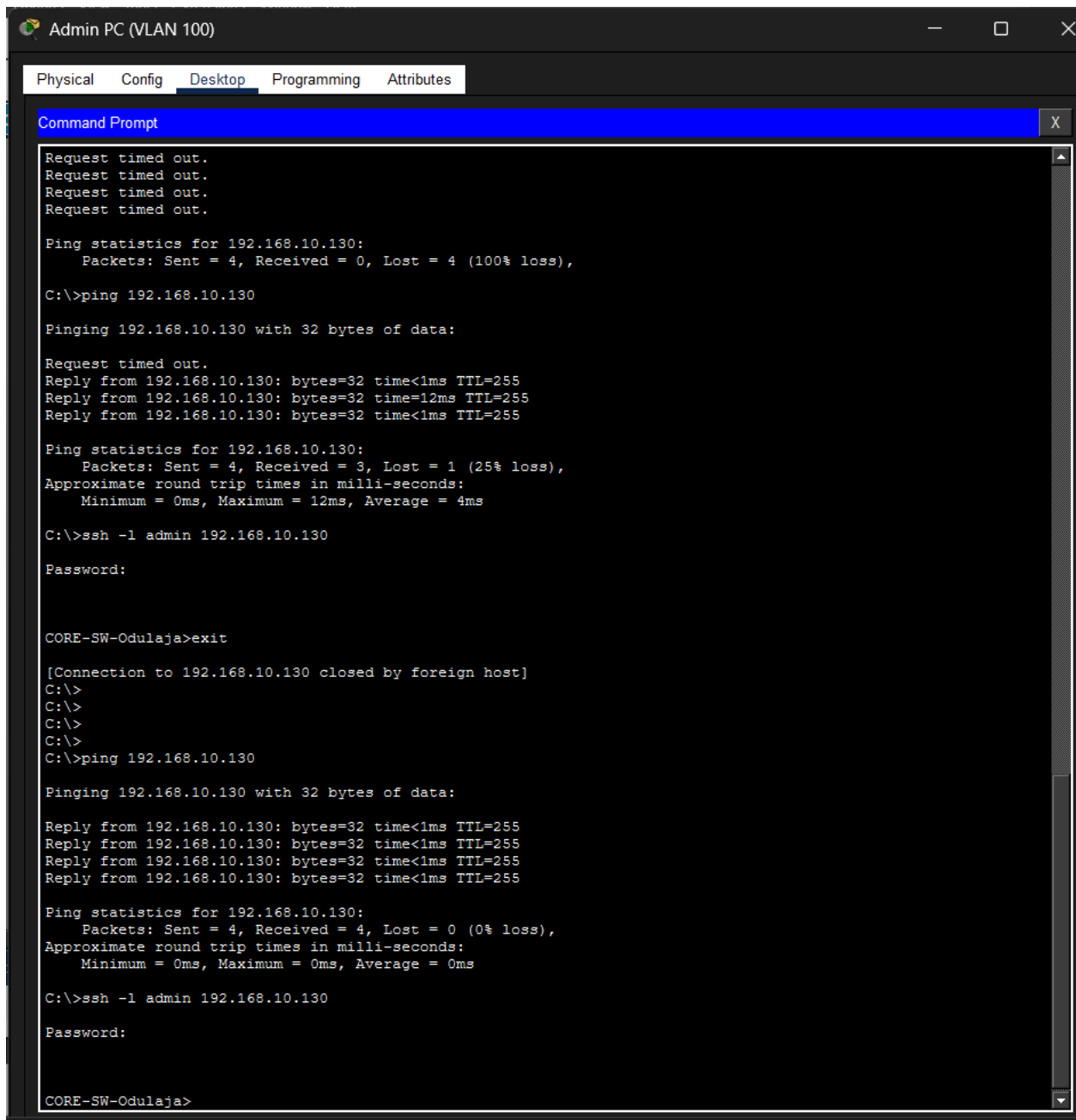
Bridge ID   Priority    24676 (priority 24576 sys-id-ext 100)
           Address    00D0.FF04.11EE
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 20

Interface   Role Sts Cost      Prio.Nbr Type
-----
Gi7/1       Desg FWD 4        128.8   P2p
Gi5/1       Desg FWD 4        128.6   P2p
Gi9/1       Desg FWD 19       128.10  P2p
Po2         Desg FWD 4        128.13  P2p

CORE-SW-Odulaja>show ip interface brief
Interface   IP-Address      OK? Method Status  Protocol
Port-channel1  unassigned      YES manual down    down
Port-channel2  unassigned      YES manual up     up
FastEthernet0/1  unassigned      YES manual down    down
FastEthernet1/1  unassigned      YES manual down    down
FastEthernet2/1  unassigned      YES manual down    down
FastEthernet3/1  unassigned      YES manual down    down
FastEthernet4/1  unassigned      YES manual down    down
GigabitEthernet5/1  unassigned      YES manual up      up
GigabitEthernet6/1  unassigned      YES manual down    down
GigabitEthernet7/1  unassigned      YES manual up      up
GigabitEthernet8/1  unassigned      YES manual up      up
GigabitEthernet9/1  unassigned      YES manual up      up
Vlan1        unassigned      YES manual administratively down down
Vlan100      192.168.10.130 YES manual up      up
CORE-SW-Odulaja>
```

Copy Paste

Admin PC SSH Login and Ping Test:



The screenshot shows a network simulator window titled "Admin PC (VLAN 100)". It has four tabs: "Physical", "Config", "Desktop", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the following sequence of commands and outputs:

```
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.10.130:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.10.130

Pinging 192.168.10.130 with 32 bytes of data:

Request timed out.
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time=12ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.130:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 4ms

C:\>ssh -l admin 192.168.10.130

Password:

CORE-SW-Odulaja>exit

[Connection to 192.168.10.130 closed by foreign host]
C:\>
C:\>
C:\>
C:\>
C:\>ping 192.168.10.130

Pinging 192.168.10.130 with 32 bytes of data:

Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.130:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ssh -l admin 192.168.10.130

Password:

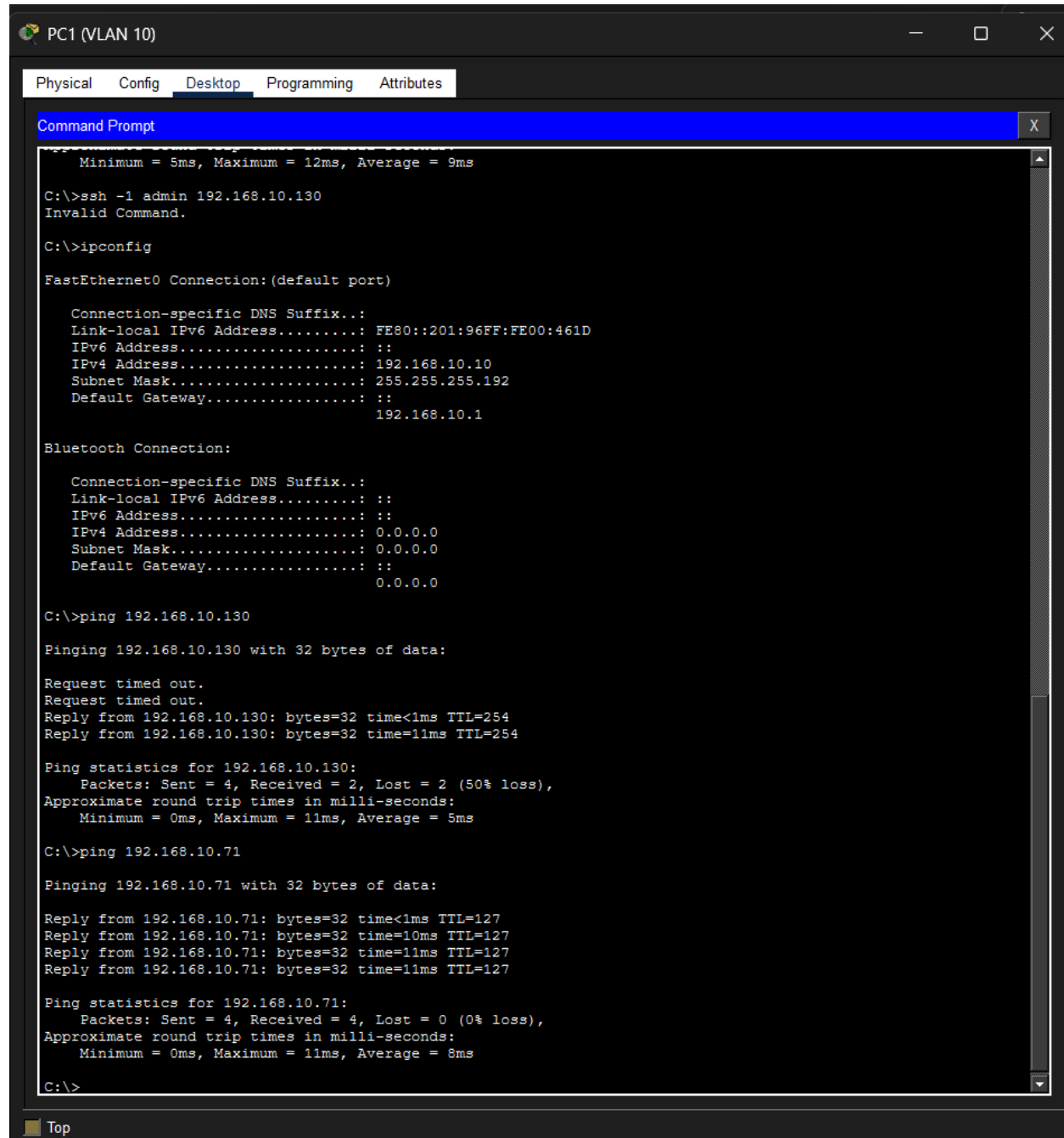
CORE-SW-Odulaja>
```

Part 7: Connectivity and Testing

Label: Ping and Connectivity Tests

Description: Successful ping tests were conducted between PCs in different VLANs and between Admin PC and Core Switch to confirm inter-VLAN routing and management connectivity.

PC1 Ping Test:



```
PC1 (VLAN 10)
Physical Config Desktop Programming Attributes
Command Prompt
Minimum = 5ms, Maximum = 12ms, Average = 9ms
C:\>ssh -l admin 192.168.10.130
Invalid Command.
C:\>ipconfig

FastEthernet0 Connection: (default port)

    Connection-specific DNS Suffix...:
    Link-local IPv6 Address . . . . .: FE80::201:96FF:FE00:461D
    IPv6 Address . . . . .: ::
    IPv4 Address . . . . .: 192.168.10.10
    Subnet Mask . . . . .: 255.255.255.192
    Default Gateway . . . . .: ::
                                192.168.10.1

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 192.168.10.130

Pinging 192.168.10.130 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 192.168.10.130: bytes=32 time<1ms TTL=254
Reply from 192.168.10.130: bytes=32 time=11ms TTL=254

Ping statistics for 192.168.10.130:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 5ms

C:\>ping 192.168.10.71

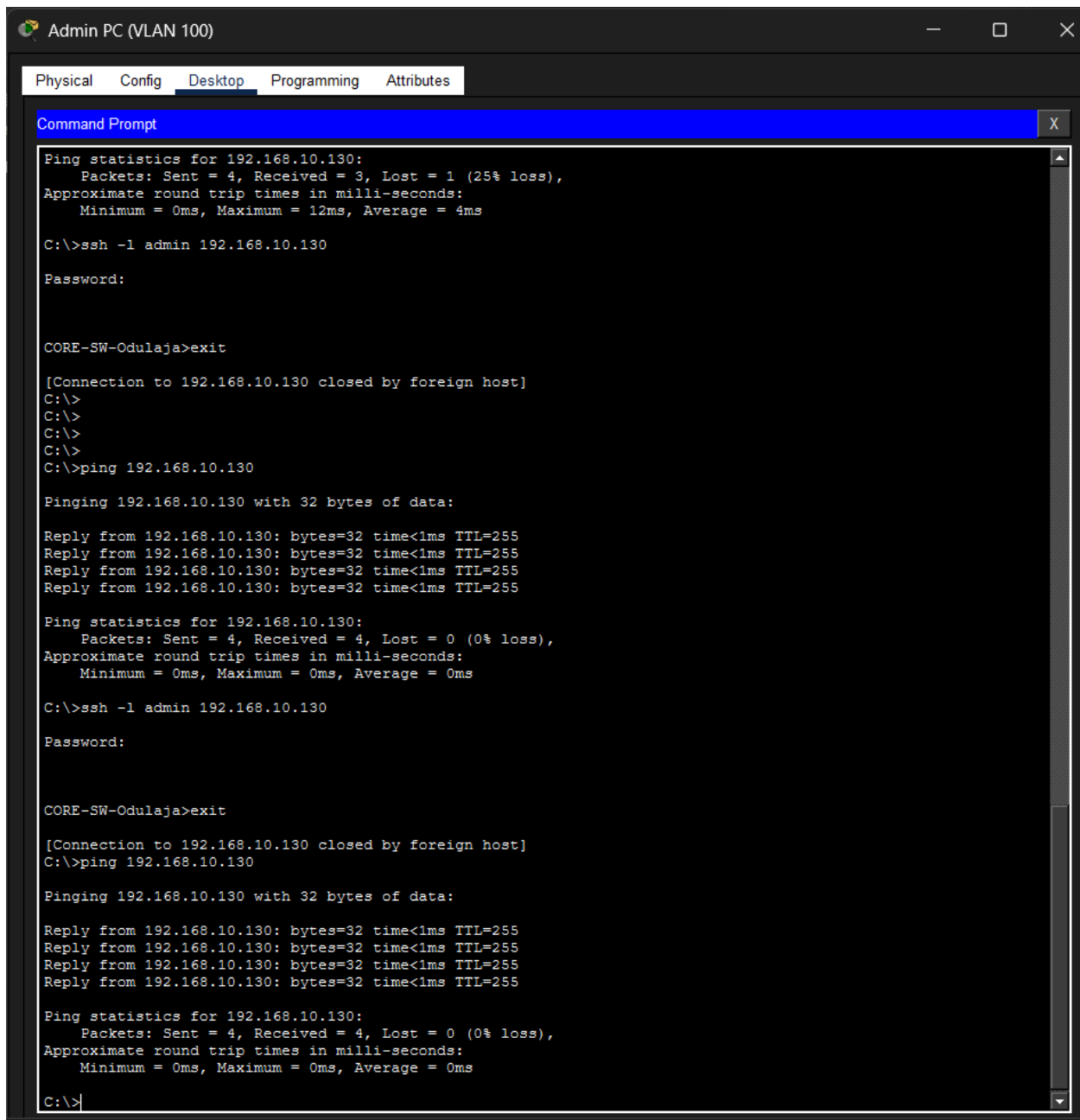
Pinging 192.168.10.71 with 32 bytes of data:

Reply from 192.168.10.71: bytes=32 time<1ms TTL=127
Reply from 192.168.10.71: bytes=32 time=10ms TTL=127
Reply from 192.168.10.71: bytes=32 time=11ms TTL=127
Reply from 192.168.10.71: bytes=32 time=11ms TTL=127

Ping statistics for 192.168.10.71:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 8ms

C:\>
```

Admin PC Ping and SSH Verification:



The screenshot shows a network configuration application window titled "Admin PC (VLAN 100)". It has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the results of a ping test to 192.168.10.130, which initially fails with a 25% loss. After an SSH connection is established and terminated, the ping test is repeated and succeeds with 0% loss. The Command Prompt also shows the user logging out of the SSH session and performing another successful ping test.

```
Admin PC (VLAN 100)
Physical Config Desktop Programming Attributes
Command Prompt
Ping statistics for 192.168.10.130:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 12ms, Average = 4ms

C:\>ssh -l admin 192.168.10.130

Password:

CORE-SW-Odulaja>exit

[Connection to 192.168.10.130 closed by foreign host]
C:\>
C:\>
C:\>
C:\>
C:\>ping 192.168.10.130

Pinging 192.168.10.130 with 32 bytes of data:

Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.130:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ssh -l admin 192.168.10.130

Password:

CORE-SW-Odulaja>exit

[Connection to 192.168.10.130 closed by foreign host]
C:\>ping 192.168.10.130

Pinging 192.168.10.130 with 32 bytes of data:

Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255
Reply from 192.168.10.130: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.130:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```


Part 8: CDP Neighbor and Running Config Verification

Label: CDP Neighbor Discovery

Description: Cisco Discovery Protocol was used to verify device interconnections and identify connected interfaces.

```
CORE-SW-Odulaja
Physical Config CLI Attributes
VLAN0100
Spanning tree enabled protocol ieee
Root ID    Priority    24676
Address    00D0.FF04.11EE
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID   Priority    24676 (priority 24576 sys-id-ext 100)
Address    00D0.FF04.11EE
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20

Interface   Role Sts Cost      Prio.Nbr Type
-----
Gi7/1       Desg FWD 4        128.8   P2p
Gi5/1       Desg FWD 4        128.6   P2p
Gi9/1       Desg FWD 19      128.10  P2p
Po2         Desg FWD 4        128.13  P2p

CORE-SW-Odulaja>show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
Port-channel1  unassigned      YES manual down        down
Port-channel2  unassigned      YES manual up          up
FastEthernet0/1 unassigned      YES manual down        down
FastEthernet1/1 unassigned      YES manual down        down
FastEthernet2/1 unassigned      YES manual down        down
FastEthernet3/1 unassigned      YES manual down        down
FastEthernet4/1 unassigned      YES manual down        down
GigabitEthernet5/1 unassigned      YES manual up          up
GigabitEthernet6/1 unassigned      YES manual down        down
GigabitEthernet7/1 unassigned      YES manual up          down
GigabitEthernet8/1 unassigned      YES manual up          up
GigabitEthernet9/1 unassigned      YES manual up          up
Vlan1         unassigned      YES manual administratively down down
Vlan100       192.168.10.130 YES manual up          up

CORE-SW-Odulaja>show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater, P - Phone
Device ID      Local Intrfce Holdtme  Capability Platform  Port ID
R1-Odulaja     Gig 5/1       164     R          C1900     Gig 0/0
R1-Odulaja     Gig 5/1       164     R          C1900     Gig 0/0.10
R1-Odulaja     Gig 5/1       164     R          C1900     Gig 0/0.20
SW2-Odulaja     Por 2         164     S          PT3000    Gig 8/1
R1-Odulaja     Gig 5/1       164     R          C1900     Gig 0/0.100
SW2-Odulaja     Por 2         164     S          PT3000    Por 2
```

Part 9: Summary and Conclusion

Summary:

This project successfully demonstrates VLAN segmentation, trunking, EtherChannel (LACP), STP redundancy, router-on-a-stick inter-VLAN routing, and SSH secure management. Each switch and router was configured according to best practices for redundancy, scalability, and security.

Key Achievements:

- VLANs 10, 20, and 100 implemented across three switches.
- LACP EtherChannel created between core and access switches.
- STP verified with distinct root bridges per VLAN.
- Router subinterfaces configured for inter-VLAN routing.
- SSH access enabled and verified from Admin PC.
- Full end-to-end connectivity achieved with redundancy and secure management.