Final Project Report

CPIT 470

By

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Phase 1

Task 1: IP addressing

The subnetwork addresses for each student is based on her own KAU ID. Here is an example to generate your network address based on your KAU ID.

- KU ID: 1743998
- Reverse ID: 8993471
- Add number 2 in front of the reversed ID: 28993471

Now, split this number into an IP address with every two digits forming a part: 28.99.34.71

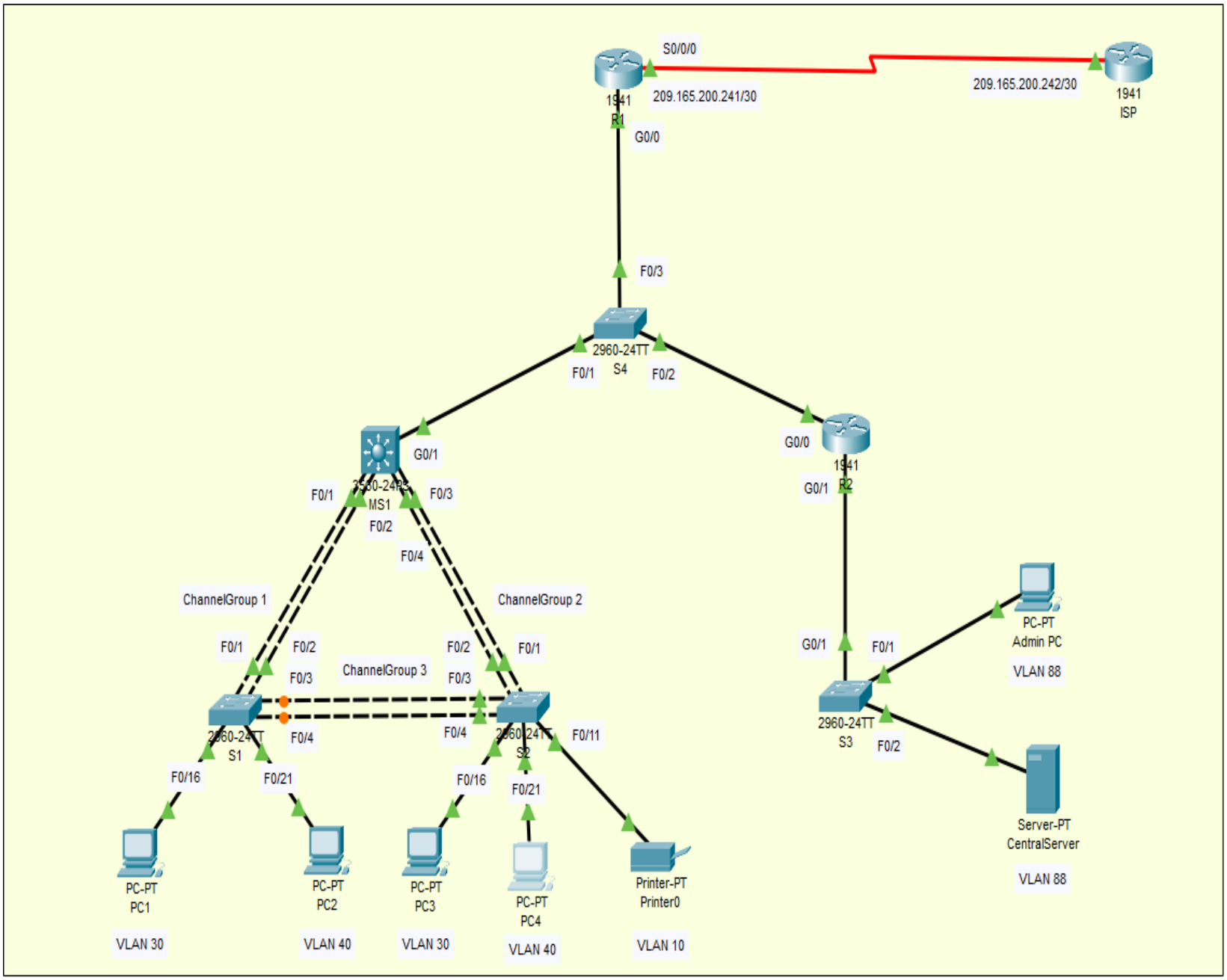
- Consider the network address as: 28.99.34.71/22
- The following table illustrates the needed host for each subnet associated with a different example of IP addresses.

VLSM Table

Subnet Name	Needed Size	Allocated Size	Address	Mask	Dec Mask	Assignable Range	Broadcast Address
VLAN 30	500	510	28.99.34.0	/23	255.255.254.0	28.99.34.1 - 28.99.35.254	28.99.35.255
VLAN 40	60	62	28.99.36.0	/26	255.255.255.192	28.99.36.1 - 28.99.36.62	28.99.36.63
VLAN 10	30	30	28.99.36.64	/27	255.255.255.224	28.99.36.65 - 28.99.36.94	28.99.36.95
Multiaccess	4	6	28.99.36.96	/29	255.255.255.248	28.99.36.97 - 28.99.36.102	28.99.36.103
VLAN 88	4	6	28.99.36.104	/29	255.255.255.248	28.99.36.105 - 28.99.36.110	28.99.36.111
VLAN 99	4	6	28.99.36.112	/29	255.255.255.248	28.99.36.113 - 28.99.36.118	28.99.36.119

Device	Interface	IP Address	Subnet Mask	Default Gateway
S1	**VLAN 99**	28.99.36.114	255.255.255.248	28.99.36.113
S2	**VLAN 99**	28.99.36.115	255.255.255.248	28.99.36.113
S3	**VLAN 88**	28.99.36.106	255.255.255.248	28.99.36.105
S4	**Multiaccess**	28.99.36.98	255.255.255.248	28.99.36.97
MS1	**G0/1**	28.99.36.97	255.255.255.248	N/A
	VLAN 10	28.99.36.65	255.255.255.224	N/A
	VLAN 30	28.99.34.1	255.255.254.0	N/A
	VLAN 40	28.99.36.1	255.255.255.192	N/A
	VLAN 99	28.99.36.113	255.255.255.248	N/A
R1	**S0/0/0**	209.165.200.241	255.255.255.252	N/A
	G0/0	28.99.36.99	255.255.255.248	N/A
R2	**G0/0**	28.99.36.100	255.255.255.248	N/A
	G0/1	28.99.36.105	255.255.255.248	N/A
Admin PC	**NIC**	28.99.36.107	255.255.255.248	28.99.36.105
CentralServer	**NIC**	28.99.36.108	255.255.255.248	28.99.36.105
PC1	**NIC**	28.99.34.2	255.255.254.0	28.99.34.1
PC2	**NIC**	28.99.36.2	255.255.255.192	28.99.36.1
PC3	**NIC**	28.99.34.3	255.255.254.0	28.99.34.1
PC4	**NIC**	28.99.36.3	255.255.255.192	28.99.36.1
Printer	**NIC**	28.99.36.66	255.255.255.224	28.99.36.65

Task 2: Cable the network as shown in the topology



Task 3: Configure host PCs

Configure all PCs with IP addresses and default gateways according to your addressing table.

```
Device Name: PC1
Device Model: PC-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     28.99.34.2/23     <not set>                               0003.E468.7604
Bluetooth       Down   <not set>         <not set>                               000A.41D7.E595

Gateway: 28.99.34.1
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > PC1
```

```
Device Name: PC2
Device Model: PC-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     28.99.36.2/26     <not set>                               00D0.BC6D.83CC
Bluetooth       Down   <not set>         <not set>                               0002.4AEC.D09D

Gateway: 28.99.36.1
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > PC2
```

```
Device Name: PC4
Device Model: PC-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     28.99.36.3/26     <not set>                               0040.0BCE.85CB
Bluetooth       Down   <not set>         <not set>                               0090.2BE0.E4E0

Gateway: 28.99.36.1
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > PC4
```

```
Device Name: Printer0
Device Model: Printer-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     28.99.36.66/27    <not set>                               0060.2F10.0148

Gateway: 28.99.36.65
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > Printer0
```

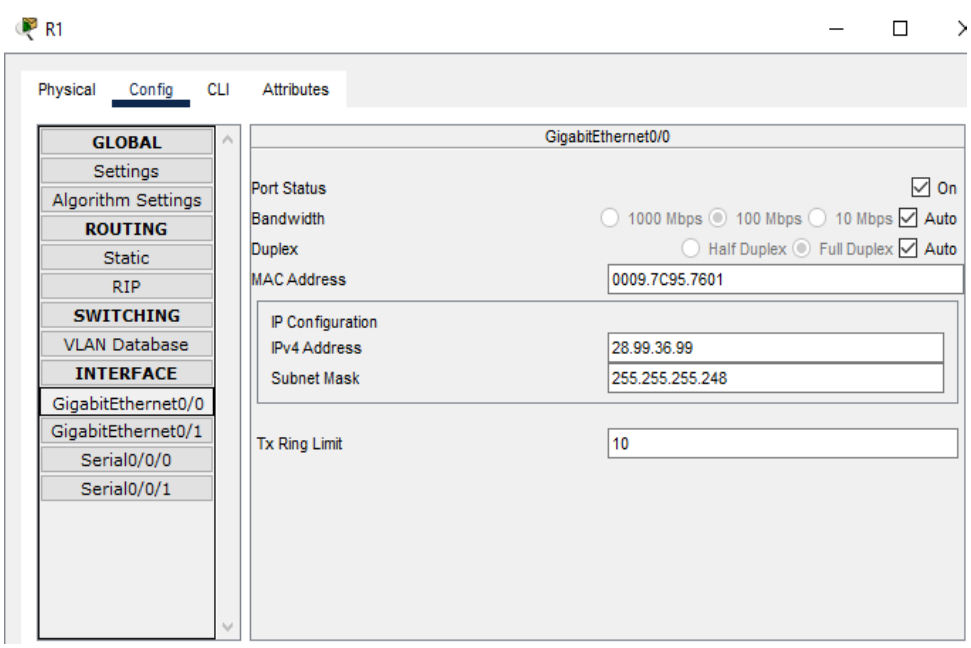
```
Device Name: CentralServer
Device Model: Server-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     28.99.36.108/29   <not set>                               0060.7087.C812

Gateway: 28.99.36.105
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > Main Wiring Closet > Rack > CentralServer
```

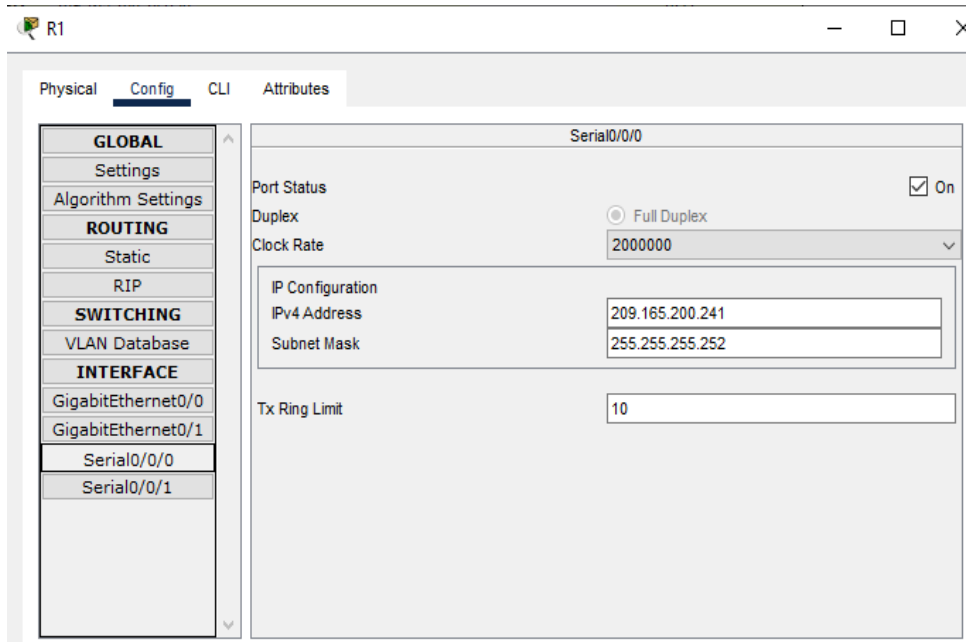
```
Device Name: Admin PC
Device Model: PC-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     28.99.36.107/29   <not set>                               0030.F29E.1656
Bluetooth       Down   <not set>         <not set>                               00D0.FF6C.3D75

Gateway: 28.99.36.105
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > Admin PC
```

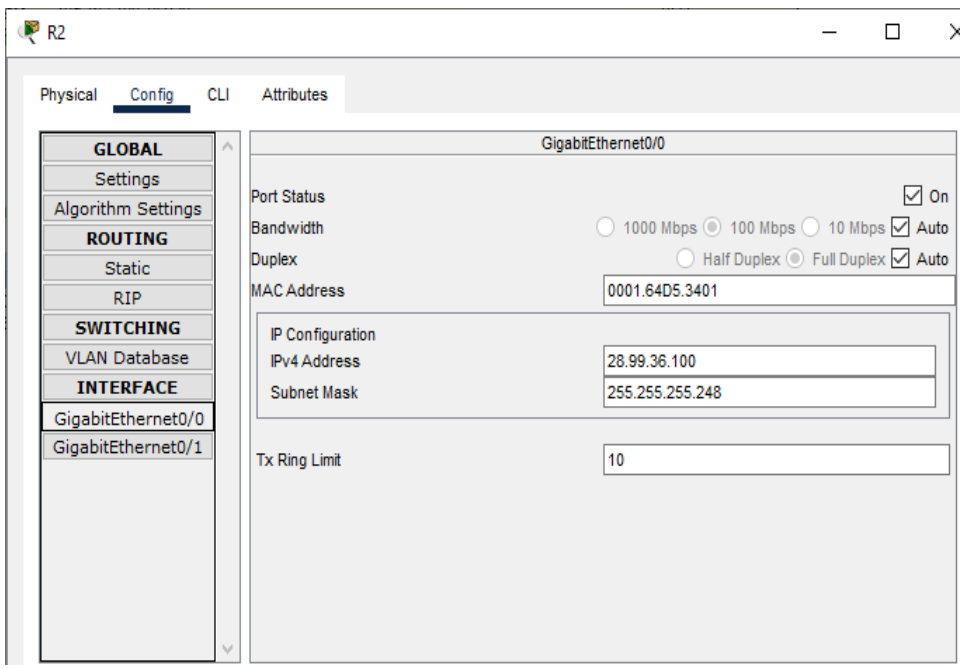
```
Device Name: PC3
Device Model: PC-PT

Port            Link   IP Address        IPv6 Address                            MAC Address
FastEthernet0   Up     28.99.34.3/23     <not set>                               0030.A391.68AD
Bluetooth       Down   <not set>         <not set>                               0001.9639.AA09

Gateway: 28.99.34.1
DNS Server: <not set>
Line Number:  <not set>

Physical Location: Intercity > Home City > Corporate Office > PC3
```

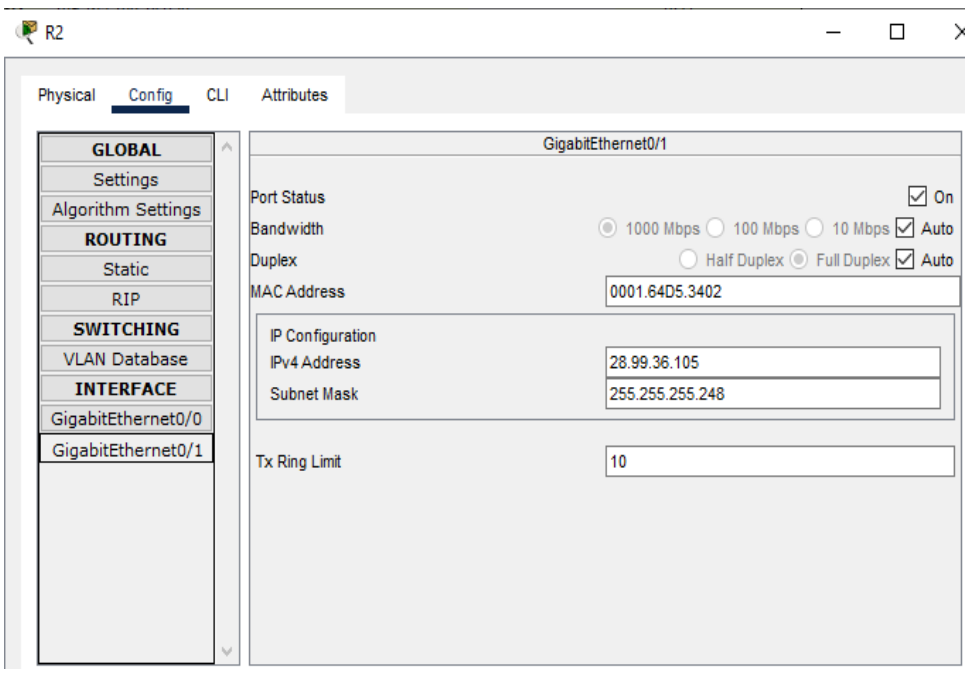
Task 4: Configure device basic settings (Switches, Routers)

a. Configure device names as shown in the topology.
   `Commands: enable; configure terminal; hostname S1, S2, S3, S4, R1, R2, MS1;`
b. Configure the IP address and default gateway listed in your addressing table for SVIs on switches.
c. Configure routers' interfaces.









Task 5: Configure VLANs on Switches

a. Create the VLANs on switches.

S1

Physical Config CLI Attributes

IOS Command Line Interface

```
Password:
S1>enable
Password:
S1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#
S1(config)#ex
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#show vlan status
               ^
% Invalid input detected at '^' marker.

S1#show vlan ?
  brief  VTP all VLAN status in brief
  id     VTP VLAN status by VLAN id
  name   VTP VLAN status by VLAN name
  <cr>
S1#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active
10   V10                              active    Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15
30   V30                              active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20
40   V40                              active    Fa0/21, Fa0/22, Fa0/23, Fa0/24
99   V99                              active    Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S1#
```

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S2

Physical Config CLI Attributes

IOS Command Line Interface

```
User Access Verification

Password:
S2>enable
Password:
S2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#
S2(config)#show vlan breif
               ^
% Invalid input detected at '^' marker.

S2(config)#show vlan brief
               ^
% Invalid input detected at '^' marker.

S2(config)#ex
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gig0/1, Gig0/2
10   V10                              active    Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15
30   V30                              active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20
40   V40                              active    Fa0/21, Fa0/22, Fa0/23, Fa0/24
99   V99                              active    Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S2#
```

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S3

Physical Config CLI Attributes

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up



User Access Verification

Password:
S3>enable
Password:
S3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#
S3(config)#ex
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active
88   V88                              active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, 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
                                                Gig0/1, Gig0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S3#
```

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S4

Physical Config CLI Attributes

IOS Command Line Interface

```
User Access Verification

Password:
S4>enable
Password:
S4#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S4(config)#
S4(config)#
S4(config)#ex
S4#
%SYS-5-CONFIG_I: Configured from console by console

S4#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Fa0/11, 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
                                                Gig0/1, Gig0/2
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S4#
```

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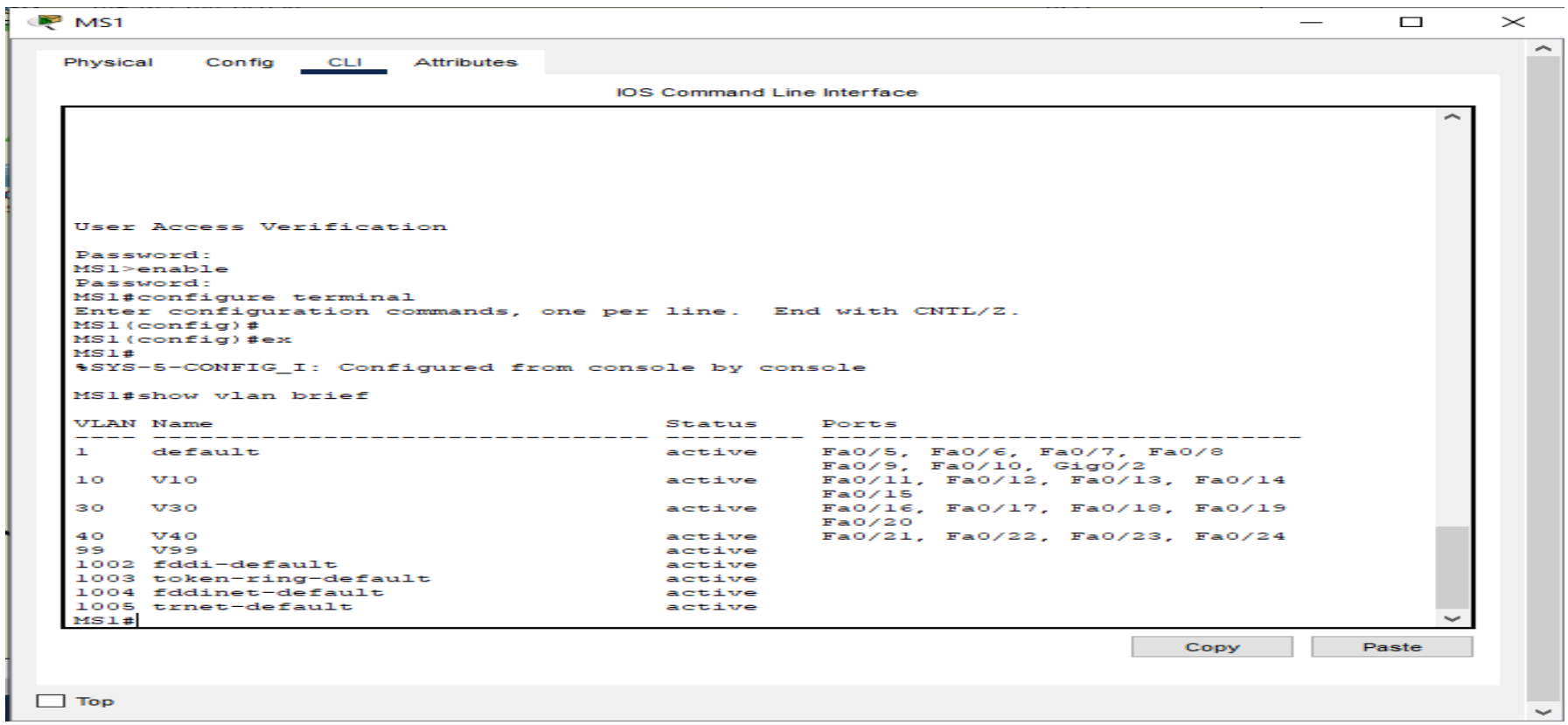


Task 6: Configure VLAN ports and trunk ports on the switches

a. Configure the access ports on switches.
b. Configure the trunk ports on switches.
c. Shut down all interfaces that will not be used.

Phase 2

Task 7: Configure Inter-VLAN Routing on MS1

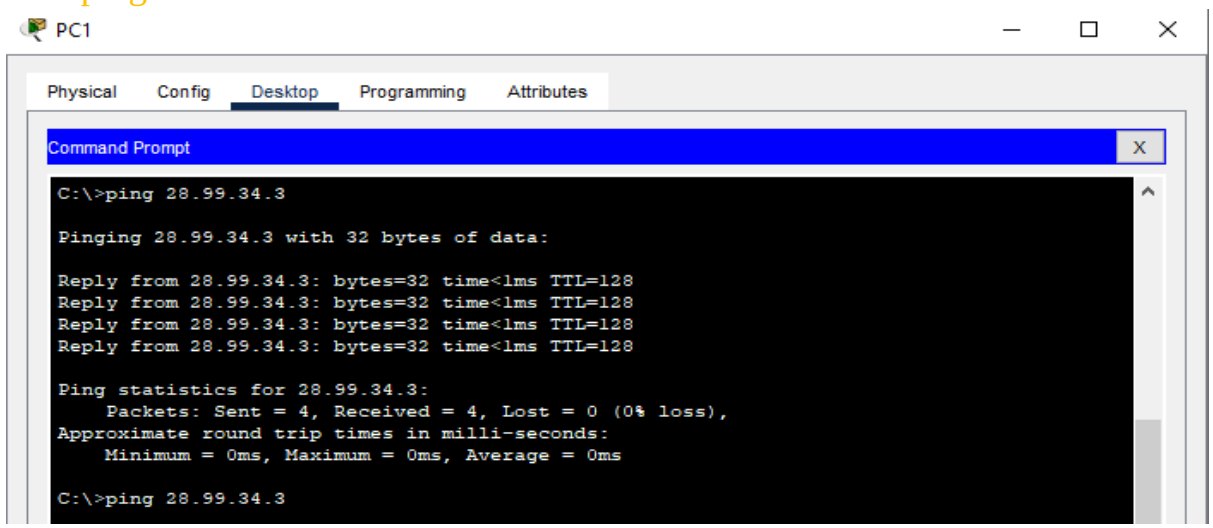
a. Configure the sub-interfaces IP addresses listed in your addressing table.

```
MS1#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                Fa0/9, Fa0/10, Gig0/2
10   V10                              active    Fa0/11, Fa0/12, Fa0/13, Fa0/14
                                                Fa0/15
30   V30                              active    Fa0/16, Fa0/17, Fa0/18, Fa0/19
                                                Fa0/20
40   V40                              active    Fa0/21, Fa0/22, Fa0/23, Fa0/24
99   V99                              active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
MS1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     28.0.0.0/8 is variably subnetted, 6 subnets, 4 masks
C       28.99.34.0/23 is directly connected, Vlan30
C       28.99.36.0/26 is directly connected, Vlan40
C       28.99.36.64/27 is directly connected, Vlan10
C       28.99.36.96/29 is directly connected, GigabitEthernet0/1
O       28.99.36.104/29 [110/2] via 28.99.36.100, 02:11:49, GigabitEthernet0/1
C       28.99.36.112/29 is directly connected, Vlan99

MS1#MS1#
```

Task 8: Verify connectivity (screenshots)

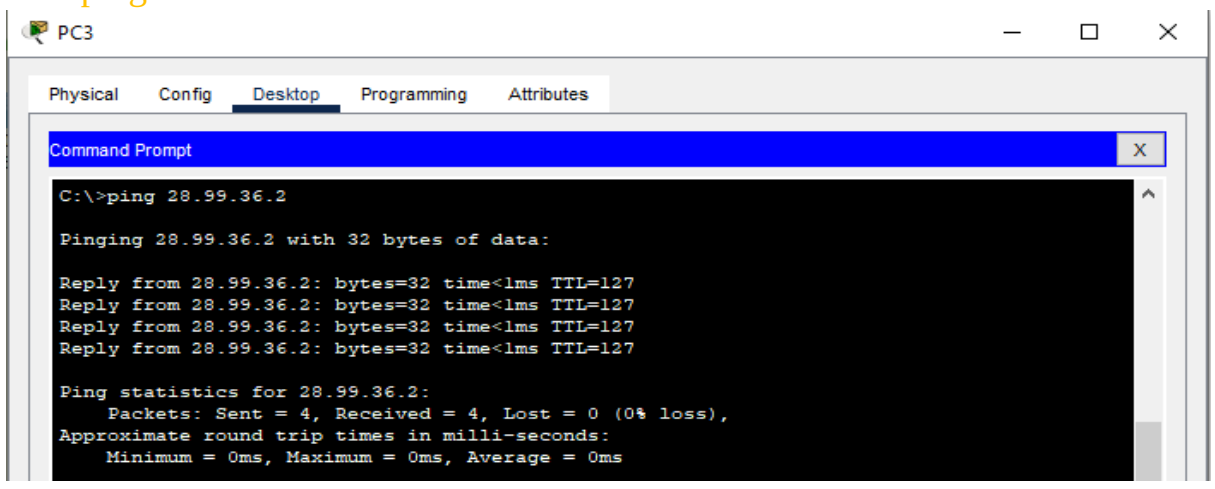
a. Verify connectivity between the same VLANs.

PC1 pings PC3



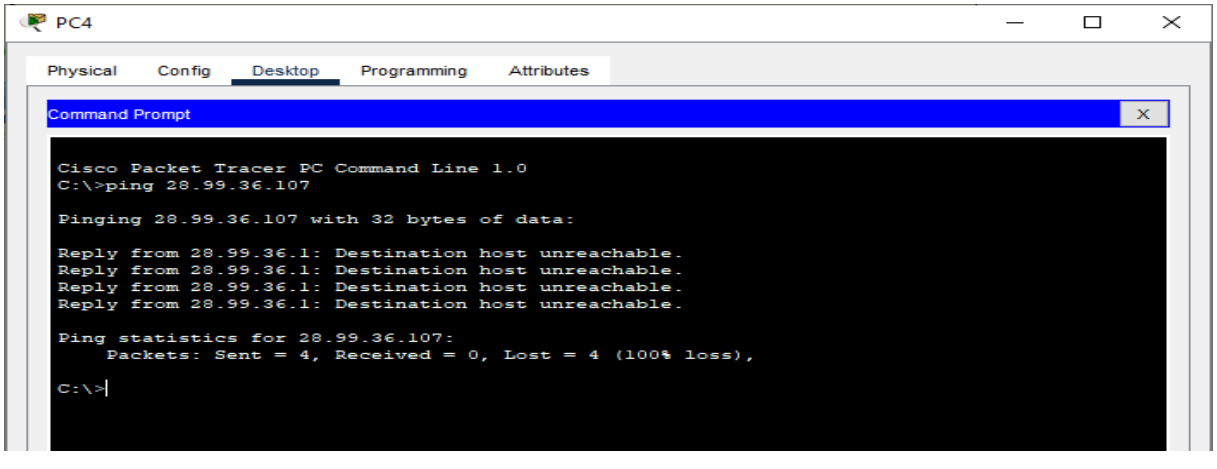
b. Verify connectivity between different VLANs.

PC3 pings PC2



c. Can PC4 ping AdminPC? Why?

No, it cannot ping because MS1 does not have route for VLAN 88 that is why we have received message as “destination host unreachable”.



Task 9: Configure EtherChannel

a. Configure the link aggregation with Etherchannel between switches with Cisco PAgP. Port Channel 1,2, and 3.

S1

Physical Config CLI Attributes

IOS Command Line Interface

```
 password Secret
 login
line vty 5 15
 password Secret
 login
!
!
!
!
end


S1#
S1#
S1#
S1#
S1#
S1#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: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

1      Po1(SU)           PAgP   Fa0/1(P) Fa0/2(P)
3      Po3(SU)           PAgP   Fa0/3(P) Fa0/4(P)
S1#
```

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S2

Physical Config CLI Attributes

IOS Command Line Interface

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Port-channel3, changed state to up



User Access Verification

Password: Password:
Password:
S2>enable
Password:
S2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#
S2(config)#ex
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#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: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

2      Po2(SU)           PAgP   Fa0/1(P) Fa0/2(P)
3      Po3(SU)           PAgP   Fa0/3(P) Fa0/4(P)
S2#
```

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MS1

Physical Config CLI Attributes

IOS Command Line Interface

```
!
line aux 0
!
line vty 0 4
 password Secret
 login
line vty 5 15
 password Secret
 login
!
!
!
!
end


MS1#
MS1#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: 2
Number of aggregators:           2

Group  Port-channel  Protocol    Ports
------+-------------+-----------+-----------------------------------------------

1      Po1(SU)           PAgP   Fa0/1(P) Fa0/2(P)
2      Po2(SU)           PAgP   Fa0/3(P) Fa0/4(P)
MS1#
```

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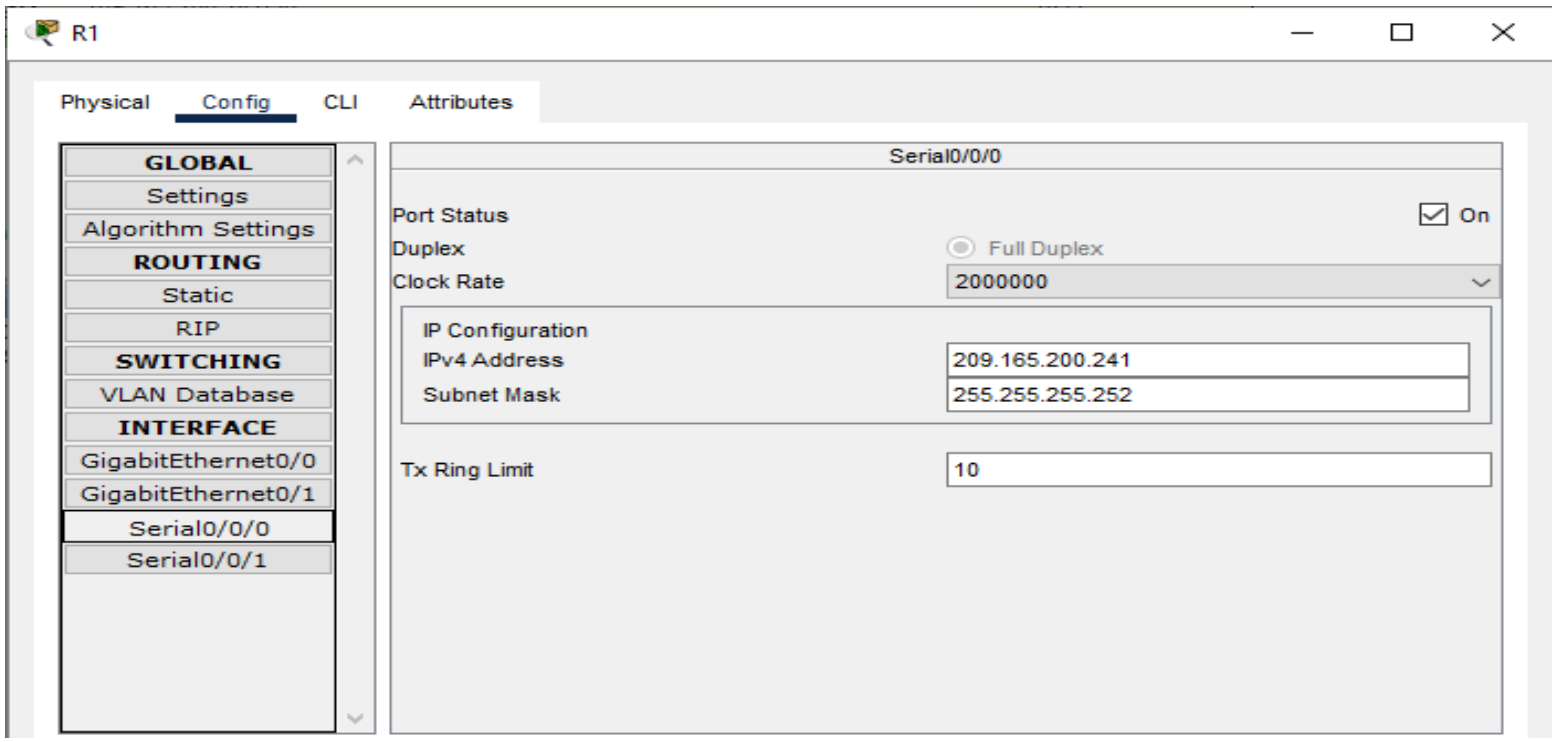
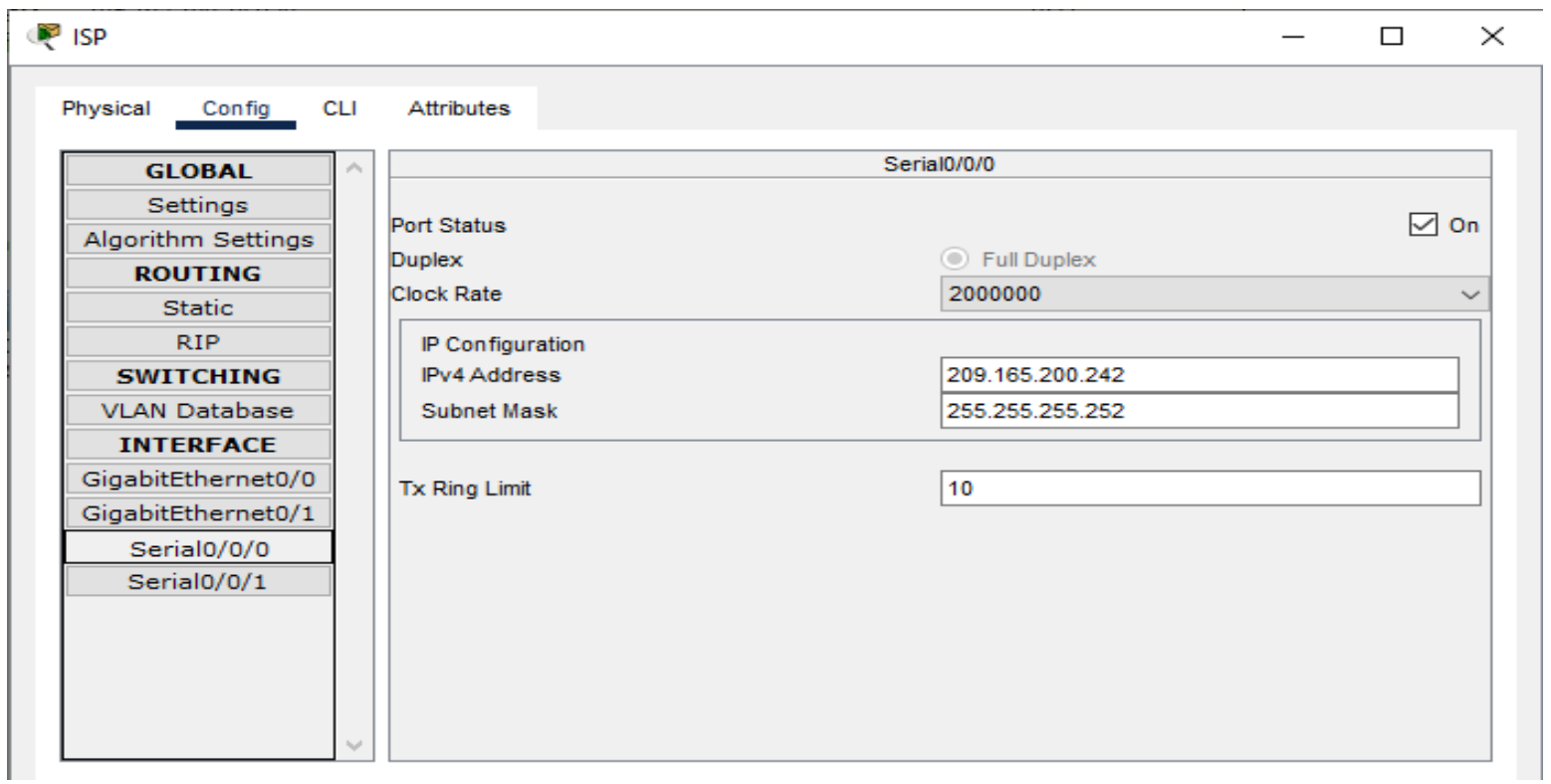
Task 10: Configure default static route between R1 and ISP

b. Change IP address for interface s0/0/0 on R1 to 209.165.200.241/30 and 209.165.200.242/30 for interface s0/0/0 on ISP

c. Configure default static route in R1



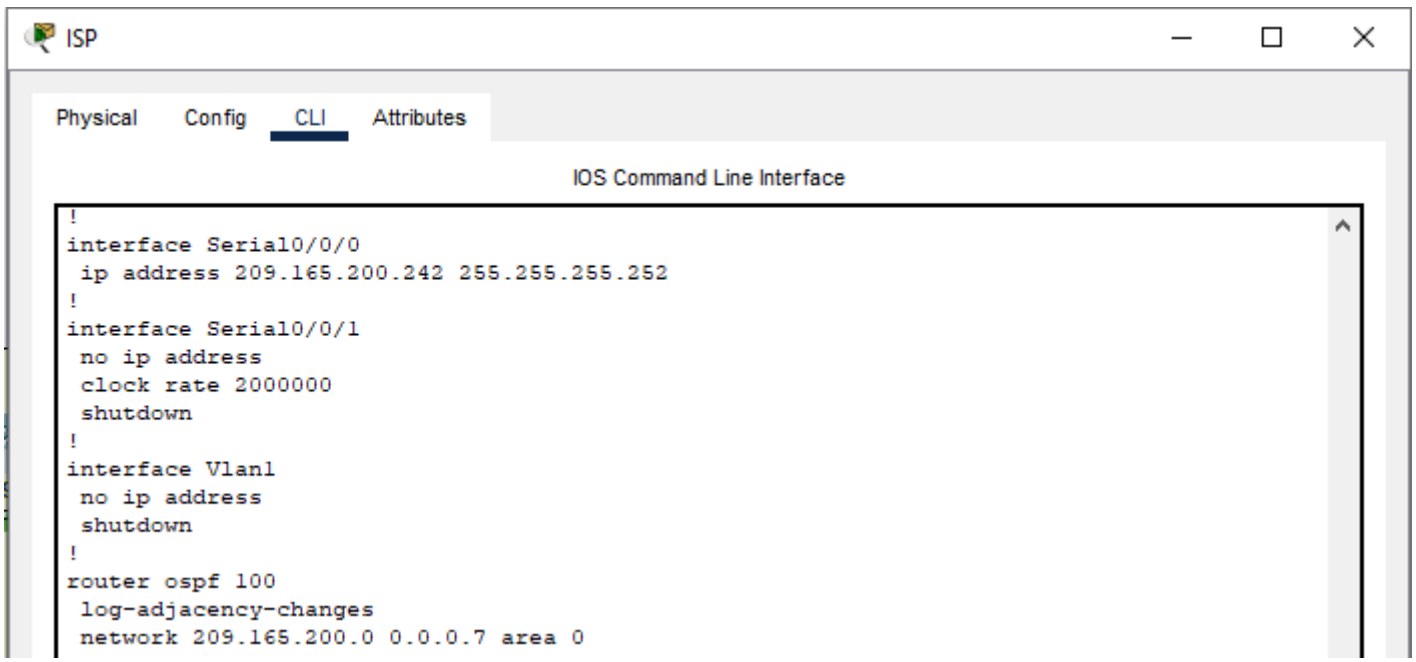


Task 11: Configure Single-Area OSPFv2

a. Configure OSPFv2 for the networks directly connected.

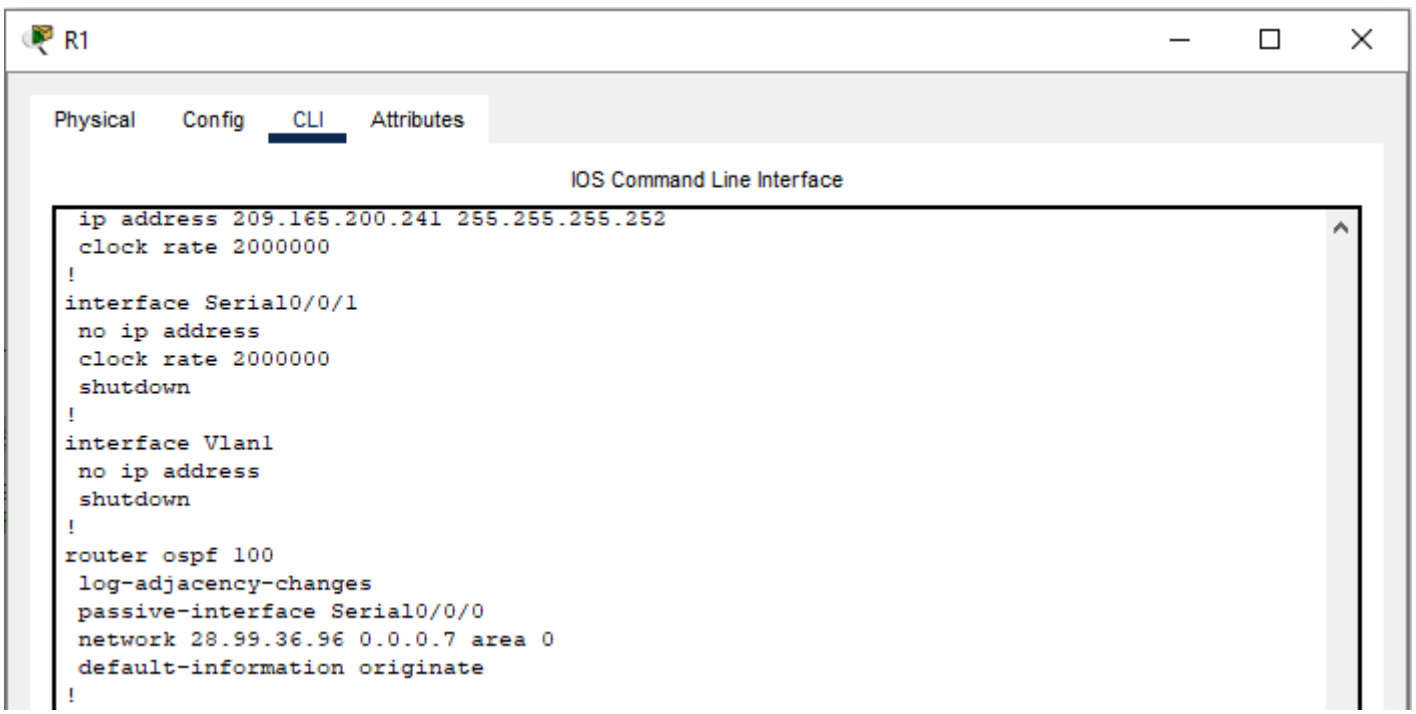
ISP:

```
router ospf 100
network 209.165.200.0 0.0.0.7 area 0
```



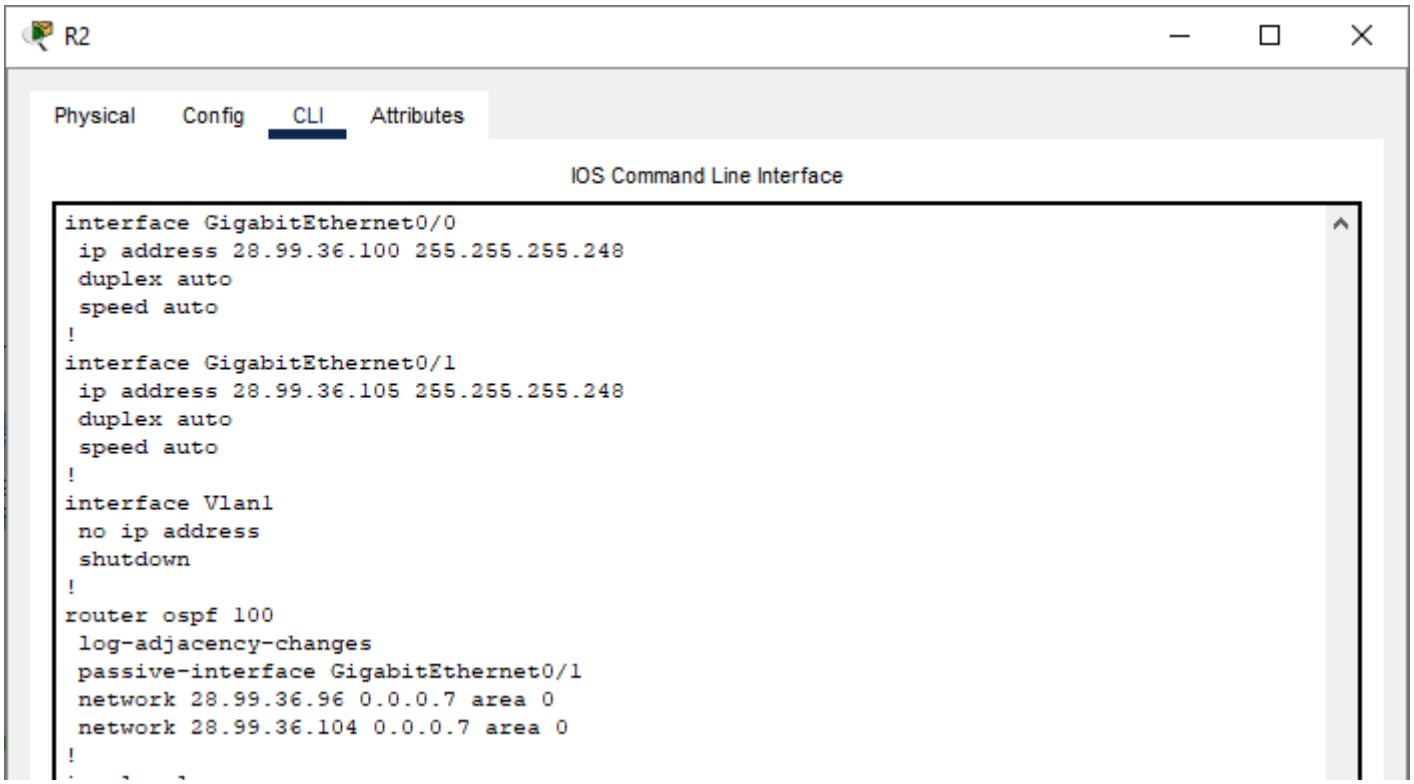
R1:

```
router ospf 100
network 28.99.36.96 0.0.0.7 area 0
```



R2:

```
router ospf 100
network 28.99.36.96 0.0.0.7 area 0
network 28.99.36.104 0.0.0.7 area 0
```



b. Configure the passive interface.

R1:

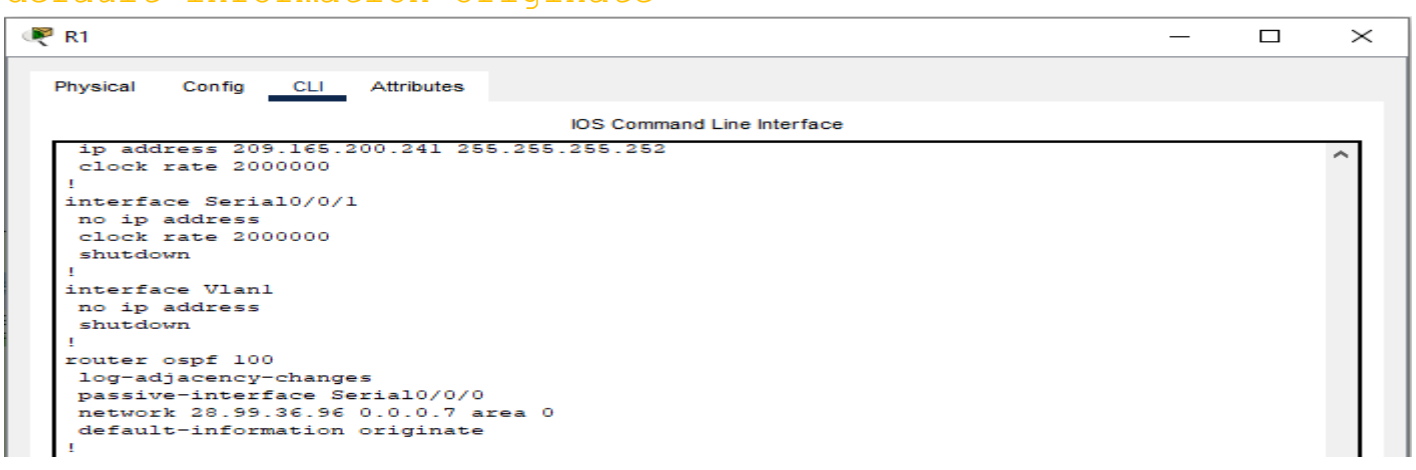
```
passive-interface Serial0/0/0
```

R2:

```
passive-interface GigabitEthernet0/1
```

c. On R1, automatically distribute the default route to all routers in the network.

```
default-information originate
```



Task 12: Verify connectivity

a. Can PC4 ping AdminPC? Why?

Yes, ping is successful because MS1 knows the route for VLAN 88 and R2 have path for MS1 VLANs.