

INSTITUTE OF COMPUTER TECHNOLOGY

B-TECH COMPUTER SCIENCE ENGINEERING 2025-26

SUBJECT:COMPUTER NETWORKS

NAME: Rahul Prajapati

ENRLL NO: 23162171020

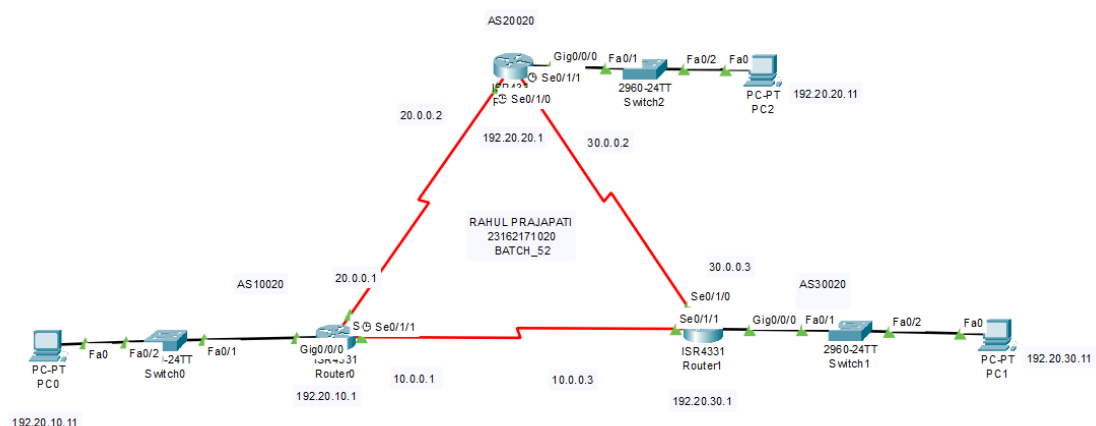
BRANCH: CYBER SECURITY

BATCH: 52

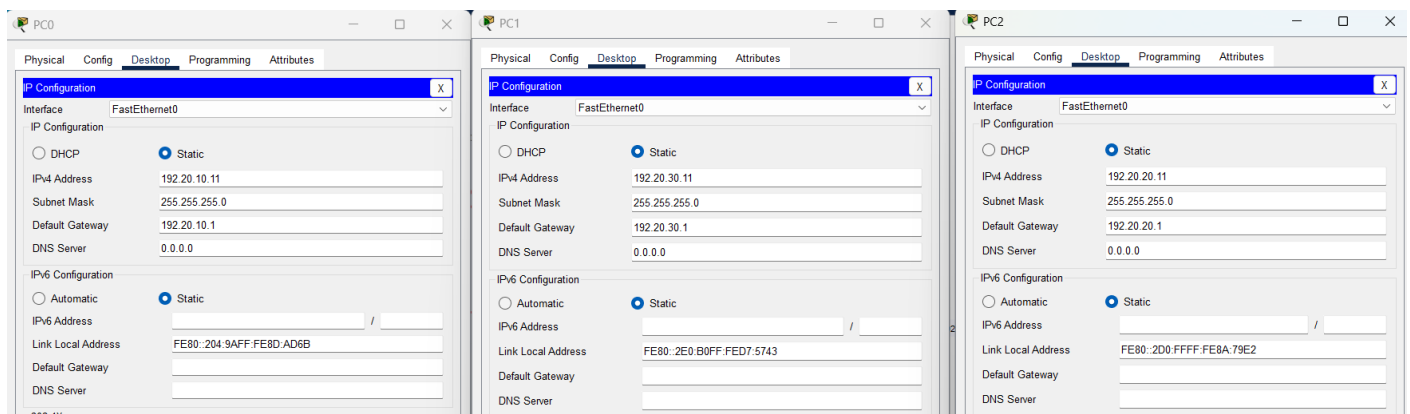
PRACTICAL_09

Aim: To design a network using BGP (Border Gateway Protocol).

1. NETWORK DESIGN:



2. PCs_IP:



3. ROUTERS_IP_CONFIGURATION:

Router0	Router1	Router2
<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>	<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>	<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>
<p>Port Status</p> <p>Bandwidth <input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> On</p> <p>Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto</p> <p>MAC Address 0010.11C8.8E48</p> <p>IP Configuration</p> <p>IPv4 Address 192.20.10.1</p> <p>Subnet Mask 255.255.255.0</p> <p>Tx Ring Limit 10</p>	<p>Port Status</p> <p>Bandwidth <input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> On</p> <p>Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto</p> <p>MAC Address 000B.BEB0.880E</p> <p>IP Configuration</p> <p>IPv4 Address 192.20.30.1</p> <p>Subnet Mask 255.255.255.0</p> <p>Tx Ring Limit 10</p>	<p>Port Status</p> <p>Bandwidth <input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> On</p> <p>Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto</p> <p>MAC Address 0001.4365.513B</p> <p>IP Configuration</p> <p>IPv4 Address 192.20.20.1</p> <p>Subnet Mask 255.255.255.0</p> <p>Tx Ring Limit 10</p>
Equivalent IOS Commands		

Router0	Router1	Router2
<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>	<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>	<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>
<p>Port Status</p> <p>Duplex <input checked="" type="radio"/> Full Duplex <input type="radio"/> Half Duplex <input checked="" type="checkbox"/> On</p> <p>Clock Rate 2000000</p> <p>IP Configuration</p> <p>IPv4 Address 10.0.0.1</p> <p>Subnet Mask 255.0.0.0</p> <p>Tx Ring Limit 10</p>	<p>Port Status</p> <p>Duplex <input checked="" type="radio"/> Full Duplex <input type="radio"/> Half Duplex <input checked="" type="checkbox"/> On</p> <p>Clock Rate 1200</p> <p>IP Configuration</p> <p>IPv4 Address 30.0.0.3</p> <p>Subnet Mask 255.0.0.0</p> <p>Tx Ring Limit 10</p>	<p>Port Status</p> <p>Duplex <input checked="" type="radio"/> Full Duplex <input type="radio"/> Half Duplex <input checked="" type="checkbox"/> On</p> <p>Clock Rate 2000000</p> <p>IP Configuration</p> <p>IPv4 Address 20.0.0.2</p> <p>Subnet Mask 255.0.0.0</p> <p>Tx Ring Limit 10</p>
Equivalent IOS Commands		

Router0	Router1	Router2
<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>	<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>	<p>GLOBAL</p> <p>Settings</p> <p>Algorithm Settings</p> <p>ROUTING</p> <p>Static</p> <p>RIP</p> <p>SWITCHING</p> <p>VLAN Database</p> <p>INTERFACE</p> <p>GigabitEthernet0/0/0</p> <p>GigabitEthernet0/0/1</p> <p>GigabitEthernet0/0/2</p> <p>Serial0/1/0</p> <p>Serial0/1/1</p>
<p>Port Status</p> <p>Duplex <input checked="" type="radio"/> Full Duplex <input type="radio"/> Half Duplex <input checked="" type="checkbox"/> On</p> <p>Clock Rate 2000000</p> <p>IP Configuration</p> <p>IPv4 Address 20.0.0.1</p> <p>Subnet Mask 255.0.0.0</p> <p>Tx Ring Limit 10</p>	<p>Port Status</p> <p>Duplex <input checked="" type="radio"/> Full Duplex <input type="radio"/> Half Duplex <input checked="" type="checkbox"/> On</p> <p>Clock Rate 1200</p> <p>IP Configuration</p> <p>IPv4 Address 10.0.0.3</p> <p>Subnet Mask 255.0.0.0</p> <p>Tx Ring Limit 10</p>	<p>Port Status</p> <p>Duplex <input checked="" type="radio"/> Full Duplex <input type="radio"/> Half Duplex <input checked="" type="checkbox"/> On</p> <p>Clock Rate 2000000</p> <p>IP Configuration</p> <p>IPv4 Address 30.0.0.2</p> <p>Subnet Mask 255.0.0.0</p> <p>Tx Ring Limit 10</p>
Equivalent IOS Commands		

4. IP_ROUTE & CONFIGURATION :

A. ROUTER_1:

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

Router>
Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router bgp 30020
Router(config-router)#neighbor 30.0.0.2 remote-as 20020
Router(config-router)#%BGP-5-ADJCHANGE: neighbor 30.0.0.2 Up

Router(config-router)#neighbor 10.0.0.1 remote-as 10020
Router(config-router)#network 192.20.30.0 mask 255.255.255.0
Router(config-router)#do show ip route
```

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

!
router bgp 30020
  bgp log-neighbor-changes
  no synchronization
  neighbor 30.0.0.2 remote-as 20020
  neighbor 10.0.0.1 remote-as 10020
  network 192.20.30.0
!
ip classless
.
```

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

Router(config-router)#do show ip route
Codes: L - local, C - connected, S - static, 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

  10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/8 is directly connected, Serial0/1/1
L       10.0.0.3/32 is directly connected, Serial0/1/1
  30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       30.0.0.0/8 is directly connected, Serial0/1/0
L       30.0.0.3/32 is directly connected, Serial0/1/0
B       192.20.20.0/24 [20/0] via 30.0.0.2, 00:00:00
  192.20.30.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.20.30.0/24 is directly connected, GigabitEthernet0/0/0
L       192.20.30.1/32 is directly connected, GigabitEthernet0/0/0
```

A. ROUTER_0:

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router bgp 10020
Router(config-router)#neighbor 10.0.0.3 remote-as 30020
Router(config-router)#neighbor 20.0.0.2 remote-as 20020
Router(config-router)#network 192.20.10.0 mask 255.255.255.0
Router(config-router)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
```

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
!
router bgp 10020
  bgp log-neighbor-changes
  no synchronization
  neighbor 10.0.0.3 remote-as 30020
  neighbor 20.0.0.2 remote-as 20020
  network 192.20.10.0
!
ip classless
```

Router0

Physical Config CLI Attributes

IOS Command Line Interface

```
Router(config)#do show ip route
Codes: L - local, C - connected, S - static, 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

 10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    10.0.0.0/8 is directly connected, Serial0/1/0
L    10.0.0.1/32 is directly connected, Serial0/1/0
 20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    20.0.0.0/8 is directly connected, Serial0/1/1
L    20.0.0.1/32 is directly connected, Serial0/1/1
 192.20.10.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.20.10.0/24 is directly connected, GigabitEthernet0/0/0
L    192.20.10.1/32 is directly connected, GigabitEthernet0/0/0
```

A. ROUTER_2:

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>enable
Router#conf ter
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router bgp 20020
Router(config-router)#neighbor 20.0.0.1 remote-as 10020
Router(config-router)#neighbor 30.0.0.3 remote-as 30020
Router(config-router)#network 192.20.20.0 mask 255.255.255.0
Router(config-router)#do show ip route
```

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
no ip address
shutdown
!
router bgp 20020
  bgp log-neighbor-changes
  no synchronization
  neighbor 20.0.0.1 remote-as 10020
  neighbor 30.0.0.3 remote-as 30020
  network 192.20.20.0
.
```

Router2

Physical Config CLI Attributes

IOS Command Line Interface

```
Router(config-router)#do show ip route
Codes: L - local, C - connected, S - static, 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

 20.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    20.0.0.0/8 is directly connected, Serial0/1/0
L    20.0.0.2/32 is directly connected, Serial0/1/0
 30.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C    30.0.0.0/8 is directly connected, Serial0/1/1
L    30.0.0.2/32 is directly connected, Serial0/1/1
192.20.20.0/24 is variably subnetted, 2 subnets, 2 masks
C    192.20.20.0/24 is directly connected, GigabitEthernet0/0/0
L    192.20.20.1/32 is directly connected, GigabitEthernet0/0/0
B    192.20.30.0/24 [20/0] via 30.0.0.3, 00:00:00
```

Conclusion:

BGP was successfully configured. After assigning IP addresses and enabling BGP on all routers, they exchanged routing information between different Autonomous Systems. This confirmed that BGP supports inter-domain routing and helps maintain stable and scalable communication across networks.