Networking Protocols

**1.RIP (Routing Information Protocol):**

RIP is a dynamic routing protocol used to help routers share routing information with each other.

Network Topology:

PC1, PC2 -----SW1----- Router1 ----- Router2 ----- SW2 ----- PC3 PC4

Router = C2911, Ethernet Switch = C2960, PCS

Networks:

PC (1-2) ↔ Router1 = 192.168.1.0/24

Router1 ↔ Router2 = 192.168.2.0/30

PC (3-4) ↔ Router2 = 192.168.3.0/24

Configuration Steps:

1. Set IP addresses for all PCs

PC1–PC2: 192.168.1.2 → 192.168.1.3 (Gateway: 192.168.1.1)

PC6–PC10: 192.168.3.2 → 192.168.3.3 (Gateway: 192.168.3.1)

2. Configure Router1:

switch to privileged EXEC mode

go into global configuration mode

interface g0/1

ip address 192.168.1.1 255.255.255.0

activate the port using 'no shutdown'

interface g0/0

ip address 192.168.3.1 255.255.255.252

activate the port using 'no shutdown'

router rip

version 2

no auto-summary

network 192.168.1.0

network 192.168.3.0

3. Apply similar settings on Router2

4. Check interface status and routing table

interface: show ip interface brief

route: show ip route

5. Perform ping connectivity test between PCs

**2.EIGRP (Enhanced Interior Gateway Routing Protocol):**

EIGRP is a hybrid routing protocol known for its efficiency and scalability in managing network routing information. It combines features of both distance-vector and link-state routing protocols.

Network Topology:

PC1, PC2 -----SW1----- Router1 ----- Router2 ----- SW2 ----- PC3 PC4

Router = C2911, Ethernet Switch = C2960, PCS

Networks:

PC (1-2) ↔ Router1 = 192.168.1.0/24

Router1 ↔ Router2 = 192.168.2.0/30

PC (3-4) ↔ Router2 = 192.168.3.0/24

Configuration Steps:

1. Set IP addresses for all PCs

PC1–PC2: 192.168.1.2 → 192.168.1.3 (Gateway: 192.168.1.1)

PC3–PC4: 192.168.3.2 → 192.168.3.3 (Gateway: 192.168.3.1)

2. Configure Router1:

switch to privileged EXEC mode

go into global configuration mode

interface g0/1

ip address 192.168.1.1 255.255.255.0

activate the port using 'no shutdown'

interface g0/1

ip address 192.168.3.1 255.255.255.252

activate the port using 'no shutdown'

router eigrp 100

network 192.168.1.0 0.0.0.255

network 192.168.3.0 0.0.0.3

3. Apply similar settings on Router2

4. Check interface status and routing table

interface: show ip interface brief

route: show ip route

5. Perform ping connectivity test between PCs

**3. OSPF (Open Shortest Path First):**

OSPF a link-state routing protocol used in IP networks to determine the most efficient path for data transmission within an autonomous system.

Network Topology:

PC1, PC2 -----SW1----- Router1 ----- Router2 ----- SW2 ----- PC3 PC4

Router = C2911, Ethernet Switch = C2960, PCS

Networks:

PC (1-2) ↔ Router1 = 192.168.1.0/24

Router1 ↔ Router2 = 192.168.2.0/30

PC (3-4) ↔ Router2 = 192.168.3.0/24

Configuration Steps:

1. Set IP addresses for all PCs

PC1–PC2: 192.168.1.2 → 192.168.1.3 (Gateway: 192.168.1.1)

PC3–PC4: 192.168.3.2 → 192.168.3.3 (Gateway: 192.168.3.1)

2. Configure Router1:

switch to privileged EXEC mode

go into global configuration mode

interface g0/1

ip address 192.168.1.1 255.255.255.0

activate the port using 'no shutdown'

interface g0/1

ip address 192.168.3.1 255.255.255.252

activate the port using 'no shutdown'

router ospf 1

network 192.168.1.0 0.0.0.255 area 0

network 92.168.3.0 0.0.0.3 area 0

3. Apply similar settings on Router2

4. Check interface status and routing table

interface: show ip interface brief

route: show ip route

5. Perform ping connectivity test between PCs

**4. BGP (Border Gateway Protocol):**

BGP is a routing protocol that governs how networks communicate and exchange routing information on the internet.

Network Topology:

PC1, PC2, PC3, PC4, PC5 -----SW1----- Router1 ----- Router2 ----- SW2 ----- PC6, PC7, PC8, PC9, PC10

Router = C2911, Ethernet Switch = C2960, PCS

Networks:

PC (1-5) ↔ Router1 = 192.168.1.0/24

Router1 ↔ Router2 = 192.168.2.0/30

PC (6-10) ↔ Router2 = 192.168.3.0/24

Configuration Steps:

1. Set IP addresses for all PCs

PC1–PC5: 192.168.1.2 → 192.168.1.6 (Gateway: 192.168.1.1)

PC6–PC10: 192.168.3.2 → 192.168.3.6 (Gateway: 192.168.3.1)

2. Configure Router1:

switch to privileged EXEC mode

go into global configuration mode

interface g0/1

ip address 192.168.1.1 255.255.255.0

activate the port using 'no shutdown'

interface g0/1

ip address 192.168.3.1 255.255.255.252

activate the port using 'no shutdown'

router bpg 65002

network 192.168.1.0 mask 255.255.255.0

network 192.168.3.0 mask 255.255.255.252

neighbor 192.168.3.2 remote-as 65003

3. Configure Router2:

switch to privileged EXEC mode

go into global configuration mode

interface g0/1

ip address 192.168.2.1 255.255.255.0

activate the port using 'no shutdown'

interface g0/1

ip address 192.168.3.2 255.255.255.252

activate the port using 'no shutdown'

router bpg 65003

network 192.168.2.0 mask 255.255.255.0

network 192.168.3.0 mask 255.255.255.252

neighbor 192.168.3.1 remote-as 65002

4. Check interface status and routing table

interface: show ip interface brief

route: show ip route

5. Perform ping connectivity test between PCs

