**Networking Protocols**

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

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

**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

**Steps:**

**1. Assign IPs to 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:**

enable

configure terminal

interface g0/1

ip address 192.168.1.1 255.255.255.0

no shutdown

interface g0/0

ip address 192.168.3.1 255.255.255.252

no shutdown

router rip

version 2

no auto-summary

network 192.168.1.0

network 192.168.3.0

3. simple configuration to R2

4. Verify interfaces and route

**interface**: show ip interface brief

**route**: show ip route

5. ping pc's

**2.IGRP (Interior Gateway Routing Protocol)**

IGRP is a distance-vector routing protocol developed by Cisco, now considered obsolete (replaced by EIGRP). It uses hop count, bandwidth, delay, reliability, and load for metric calculation.

**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

**Steps:**

**1. Assign IPs to 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:**

enable

configure terminal

interface g0/0

ip address 192.168.1.1 255.255.255.0

no shutdown

interface g0/1

ip address 192.168.2.1 255.255.255.252

no shutdown

router igrp 100

network 192.168.1.0

network 192.168.2.0

exit

3. simple configuration to R2

4. Verify interfaces and route

**interface**: show ip interface brief

**route**: show ip route

5. ping pc’s

**3.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.

**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

**Steps:**

**1. Assign IPs to 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:**

enable

configure terminal

interface g0/1

ip address 192.168.1.1 255.255.255.0

no shutdown

interface g0/1

ip address 192.168.3.1 255.255.255.252

no shutdown

router eigrp 100

network 192.168.1.0 0.0.0.255

network 192.168.3.0 0.0.0.3

3. simple configuration to R2

4. Verify interfaces and route

**interface:** show ip interface brief

**route:** show ip route

5. ping pc's

**4. 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.

**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

**Steps:**

**1. Assign IPs to 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:**

enable

configure terminal

interface g0/1

ip address 192.168.1.1 255.255.255.0

no shutdown

interface g0/1

ip address 192.168.3.1 255.255.255.252

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. simple configuration to R2

4. Verify interfaces and route

**interface:** show ip interface brief

**route:** show ip route

5. ping pc's

**5. IS-IS (Intermediate System to Intermediate System)**

IS-IS is a **link-state** routing protocol used in large service provider networks. It uses a hierarchical structure with Level 1 (intra-area) and Level 2 (inter-area) routing.

It is an older version, so it will work in GNS3 and in older versions of Cisco Packet Tracer.

**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

**Steps:**

**1. Assign IPs to 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:**

enable

configure terminal

interface g0/0

ip address 192.168.1.1 255.255.255.0

no shutdown

interface g0/1

ip address 192.168.2.1 255.255.255.252

no shutdown

router isis

net 49.0001.0000.0000.0001.00

ip router isis

interface g0/0

ip router isis

interface g0/1

ip router isis

exit

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

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

**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

**Steps:**

**1. Assign IPs to 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:**

enable

configure terminal

interface g0/1

ip address 192.168.1.1 255.255.255.0

no shutdown

interface g0/1

ip address 192.168.3.1 255.255.255.252

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:**

enable

configure terminal

interface g0/1

ip address 192.168.2.1 255.255.255.0

no shutdown

interface g0/1

ip address 192.168.3.2 255.255.255.252

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. Verify interfaces and route

**interface:** show ip interface brief

**route:** show ip route

5. ping pc's