ROUTING PROTOCOLS

- On the basis of Autonomous System

  -> Interior Gateway Protocol (IGP) – RIPv1/2, OSPF, EIGRP – These protocols can operate only in a particular autonomous system.

  -> Exterior Gateway Protocol (EGP) – These protocols can operate between multiple autonomous systems.

- On the basis of best route decision (routing principle)

  -> Distance Vector – RIPv1/2 – Route cost is calculated on Hop counts

  -> Link State – OSPF – Route cost is calculated on interface bandwidth

  -> Hybrid – EIGRP – Route cost is calculated on path bandwidth (lowest), total delay, etc

  -> Path Vector – BGP – Route cost is calculated on specified path vectors

ROUTING PROTOCOLS

- On the basis of subnet mask advertisements

  -> Classful – RIPv1 – Protocol can only work with Fixed Length Subnet Mask (FLSM) AutoSummarises classless subnets

  -> Classless – Ripv2, OSPF, EIGRP, BGP – Protocol can work with both FLSM and VLSM (Variable Length Subnet Mask). No auto summarization for classless subnets

ROUTING TOPOLOGY
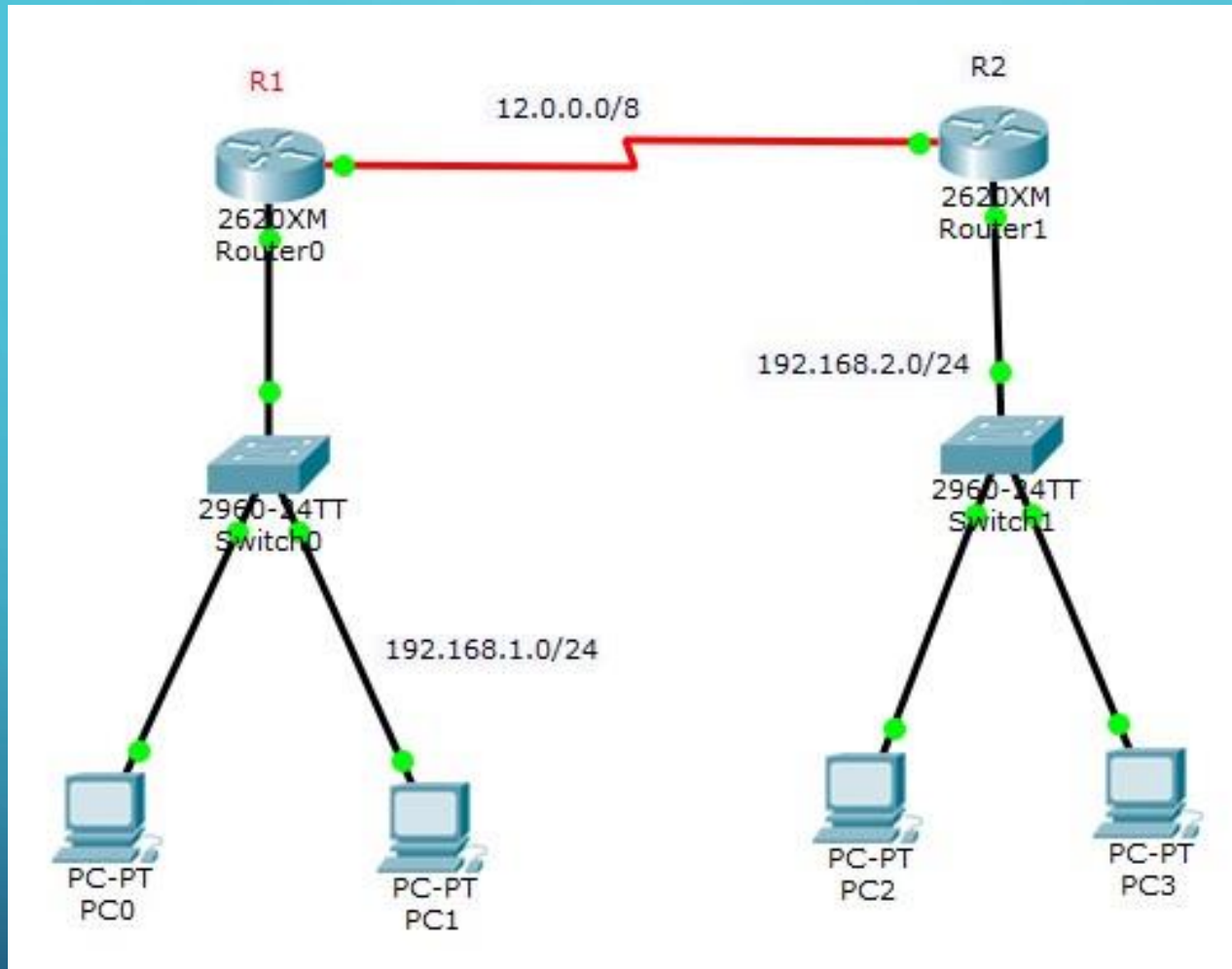
ROUTING TOPOLOGY

- Static Route configuration via next hop ip address

  R1(config)#ip route 192.168.2.0 255.255.255.0 12.0.0.2

  R2(config)#ip route 192.168.1.0 255.255.255.0 12.0.0.1

- Static Route configuration via exit inteface (R1)

  R1(config)#ip route 192.168.2.0 255.255.255.0 s0/0

  R2(config)#ip route 192.168.1.0 255.255.255.0 s0/0

ROUTING TOPOLOGY

- RIP (Routing Information Protocol) configuration

R1(config)# router rip

R1(config-router)# network 192.168.1.0

R1(config-router)# network 12.0.0.0

R2(config)# router rip

R2(config-router)# network 192.168.2.0

R2(config-router)# network 12.0.0.0

ROUTING TOPOLOGY

- OSPF (Open Shortest Path First) configuration

R1(config)# router ospf 1

R1(config-router)# network 192.168.1.0 0.0.0.255 area 0

R1(config-router)# network 12.0.0.0 0.255.255.255 area 0

R2(config)# router ospf 2

R2(config-router)# network 192.168.2.0 0.0.0.255 area 0

R2(config-router)# network 12.0.0.0 0.255.255.255 area 0

ROUTING TOPOLOGY

- EIGRP (Enhanced Interior Gateway Routing Protocol) configuration

R1(config)# router eigrp 12

R1(config-router)# network 192.168.1.0

R1(config-router)# network 12.0.0.0

R2(config)# router eigrp 12

R2(config-router)# network 192.168.2.0

R2(config-router)# network 12.0.0.0

ROUTING TOPOLOGY

- RIP

It is **distance vector protocol**. It depends on UDP. It has two versions – Version 1 and Version 2. Version 1 is always classful, version 2 is by default classful but we can make it classless. RIP uses hop counts to calculate route cost. It uses Bellman-Ford algorithm(checks nearest hop). RIP prevents routing loops by Split Horizon(two different router can not send update of a single network) and Poison Reverse method. RIP can use maximum 16 (0-15) hops. After 16th hops the route is rejected. The AD value of RIP is 120. RIP uses period routing updates (every 30 seconds) RIP version 1 uses broad cast address 255.255.255.255 and RIP V2 uses multicast address 224.0.0.9 for sending routing updates.

ROUTING TOPOLOGY

- RIP chooses the shortest path
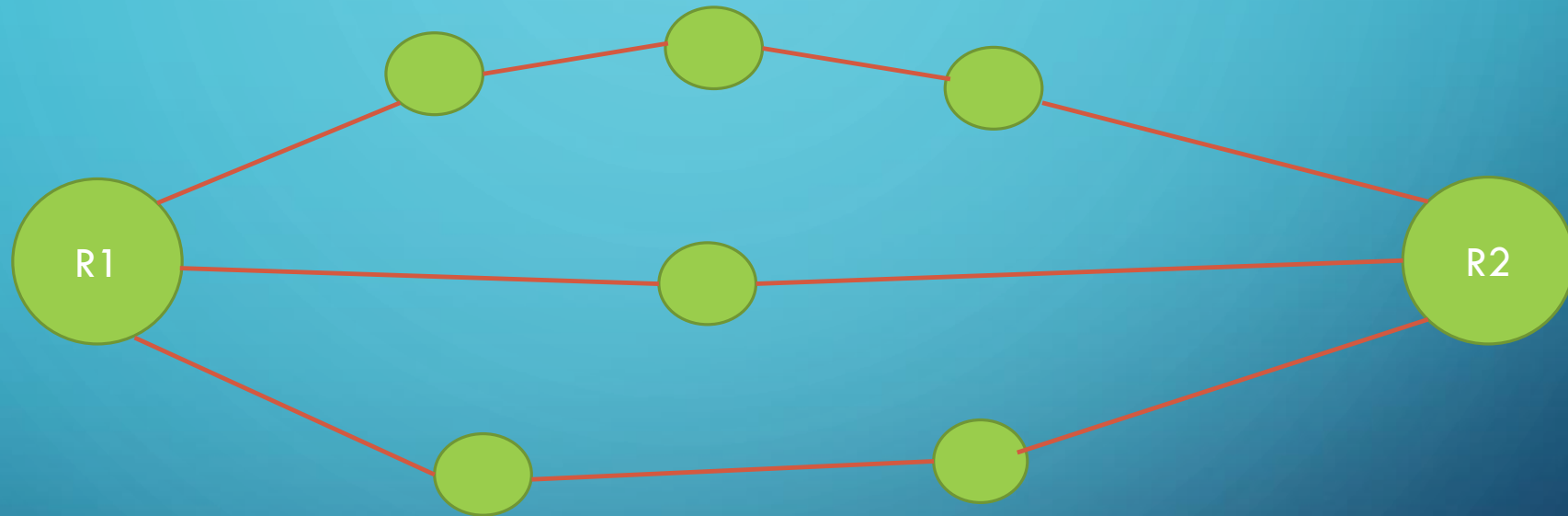
ROUTING TOPOLOGY

- RIP V1 : -

Open standard Protocol :- Can be implemented in other router.

Classful routing protocol :- Doesn't support VLSM

Broadcast the updates to all the connected router.

Administrative Value 120, so not reliable.

Metric – Hop count, Max hop – 15, so Max router – 16

Load Balancing : -

Good for small organizations

Exchange routing table after every 30 seconds.

ROUTING TOPOLOGY

- RIP timers

- Update Timer :- 30 seconds

- Invalid Timer :- 180 seconds

  Router waits to get update, then the router marked as unreachable if there is no updates before that time.

- Flush timer :- 240 seconds

  Deletes the router from the routing table.

ROUTING TOPOLOGY

- Advantages of RIP

  -> Easy to configure

  -> Not design specific

  -> No complexity

  -> Less overhead

- Disadvantage of RIP

  -> Bandwidth utilization is very high, because it broadcasts after every 30 seconds.

  -> Works only on hop count (Like, doesn't check which one has good bandwidth)

  ->Only works with 16 router, and takes too much time to find a new way, if any link is down.

END OF DAY 13

NETWORKING (CCNA TRAINING)

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