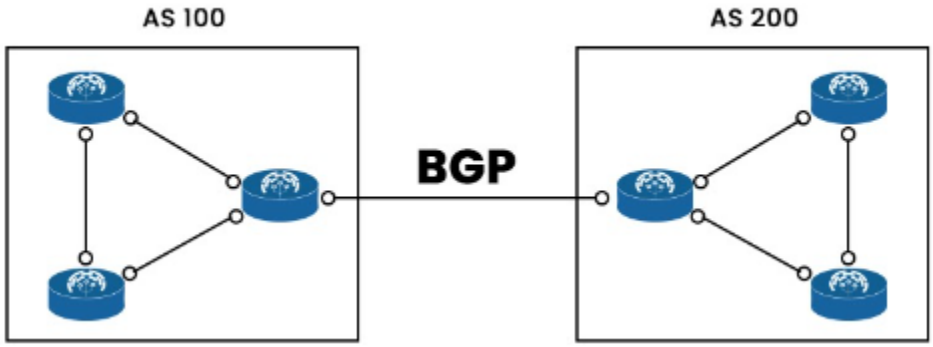
Introduction to BGP Protocol

Border Gateway Protocol (BGP) is a critical protocol used in the internet routing infrastructure to facilitate communication between different autonomous systems (AS). Unlike interior gateway protocols (IGP) such as OSPF or EIGRP, which focus on routing within a single autonomous system, BGP is an exterior gateway protocol designed for routing between autonomous systems. It plays a crucial role in ensuring efficient and reliable routing across the global internet.



Key Features of BGP:

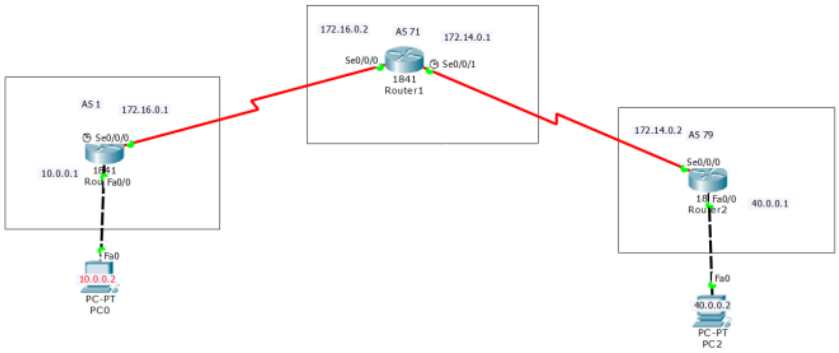
Path Vector Protocol: BGP is a path vector protocol, which means it makes routing decisions based on the path attributes (such as AS path, next hop, etc.) rather than just the shortest path to a destination. This enables BGP to make complex routing decisions and support policy-based routing.

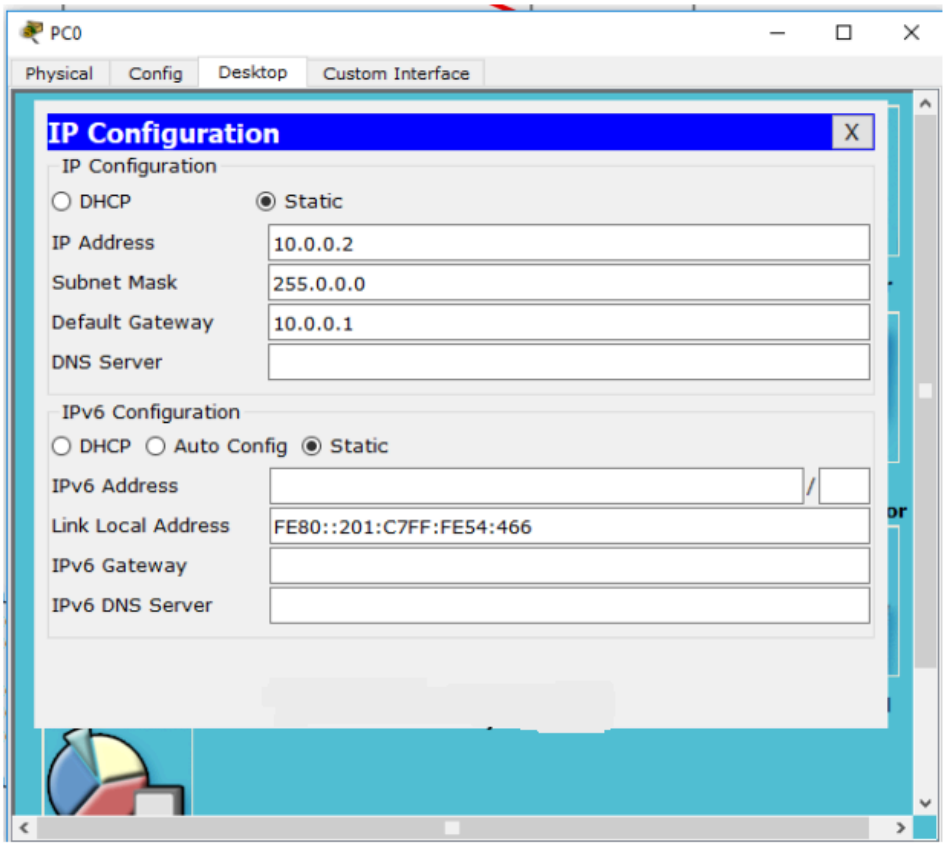
Policy-Based Routing: BGP allows network administrators to implement sophisticated routing policies. These policies can control how routes are learned, advertised, and manipulated based on various criteria like AS paths, prefix lengths, communities, and local preferences.

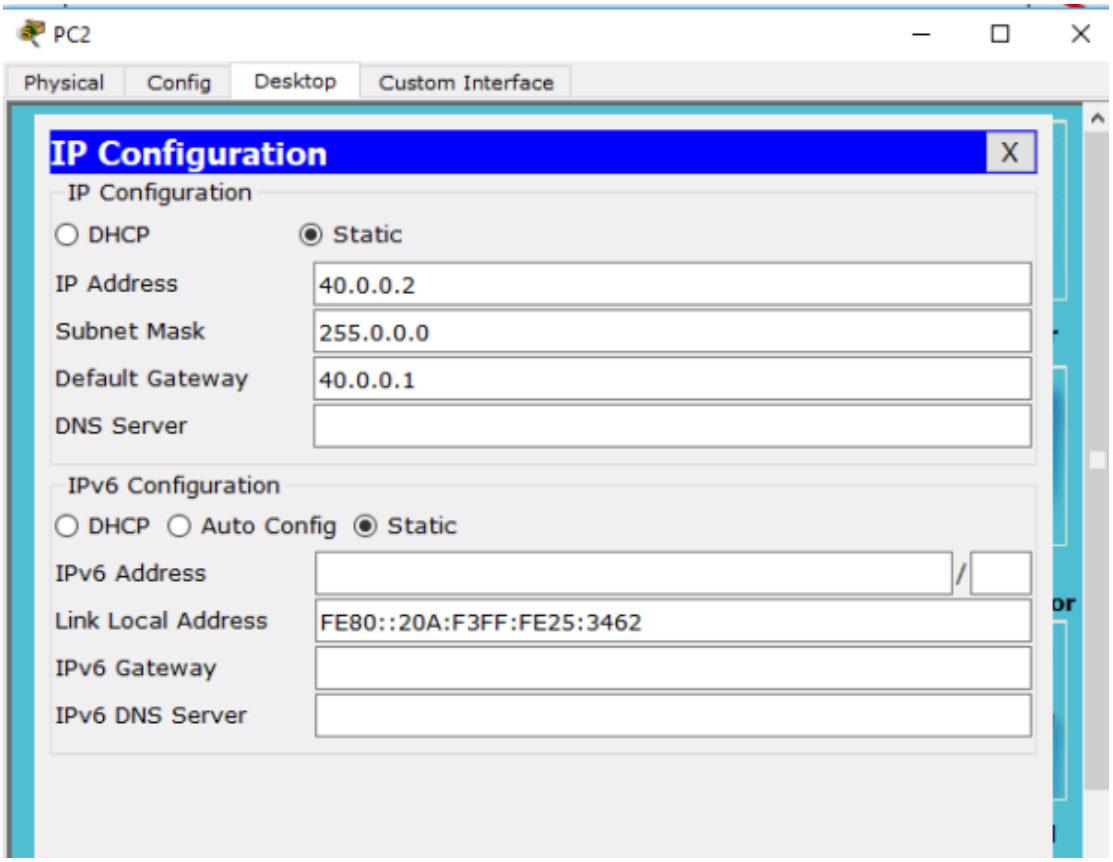
Reliability and Scalability: BGP is designed to handle the scale and complexity of the global internet. It can manage a large number of routes and adapt to changes in network topology dynamically while maintaining stable routing tables.

Lab Task:

In this lab task we will configure bgp protocol using Cisco packet tracer. We will implement the following topology:




PC0
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
10.0.0.2
Subnet Mask
255.0.0.0
Default Gateway
10.0.0.1
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::201:C7FF:FE54:466
IPv6 Gateway
IPv6 DNS Server



Step 3: bgp configuration on Router R1:

R1(config)#router bgp 1

R1(config-router)#neighbor 172.16.0.2 remote-as 71

R1(config-router)#network 10.0.0.0 mask 255.0.0.0

R1(config-router)#exit

R1(config)#do write

Building configuration...[OK]

R1(config)#

Step 4: bgp configuration on Router R2:

R2(config)#router bgp 71

R2(config-router)#neighbor 172.16.0.1 remote-as 1

R2(config-router)#neighbor 172.14.0.2 remote-as 79

R2(config-router)#network 40.0.0.0 mask 255.0.0.0

R2(config-router)#exit

R2(config)#do write

Building configuration...[OK]

R2(config)#

Step 5: bgp configuration on Router R3:

R3(config)#router bgp 79

R3(config-router)#neighbor 172.14.0.1 remote-as 71

R3(config-router)#network 40.0.0.0 mask 255.0.0.0

R3(config-router)#exit

R3(config)#do write

Building configuration...[OK

R3(config)#

Step 6: bgp configuration Testing and troubleshooting.

For bgp testing we will ping both pc and check the network communication.

Now I am on PC2:

PC>ipconfig

PC>ping 10.0.0.2

Step 7: check bgp route on router R1:

R1#show ip route

Step 8: Check whether bgp protocols configure or not on Routre R1:

R1#show ip protocols

Step 9: Show BGP Status

R1#show ip bgp summary

Show bgp neighbors status:

R1#show ip bgp neighbors

Similarly we check bgp route on Router R2:

R2#show ip route

R2#show ip protocols

Similarly check bgp route on Router R3:

R3#show ip route

R3#show ip protocols

In lab Statement 2: [20]

You have to design a network solution for the Fast-NU three **Labs, Staff and Faculty members**.

- All the three Labs, Staff and faculty members should be on **different Sub networks.**
- There are total **15 computers** divided in this way
  - 3 for Staff
  - 3 for Faculty
  - 3 for Lab-1 ,
  - 3 for Lab-2 and
  - 3 for Lab-3.

- Assume that FAST-NU is given a **Network Class B** address having first two octets of IP address fixed as 172.19.X.X. You can change the next two octets in order to make the desired number of subnets and desired number of hosts in each subnet for the above given topology.

Make sure that you optimally design the network considering the number of devices (switches, routers etc.) used and how you are assigning the IP addresses to different subnets in your design. (You can consult the slides for sub netting provided to you in case you have no idea about subnetting or you have forgotten it)

1. Use wires (**straight through and crossover** where necessary and applicable) – no wireless LAN is required for this submission.
2. Use **2911 Router**
3. Use **2950-24 switches.**
4. **You can connect a maximum of two networks with a single router (except router-to-router connection)**

5. You have to assign IPs to the machines using **static IP allocation**.
6. Use ping from the command prompt of computers to check your network design is working.
7. Make your design as neat as possible and properly add the IPs of all the PCs and router **interfaces using comments** in your design to get the full credit. (You can insert comments in the design area using a sticky note sign in the right sidebar of Cisco Packet Tracer)

LINKS

https://www.youtube.com/watch?v=_ISu9f8ofZk
https://www.youtube.com/watch?v=DqU3KVCyFNg
https://www.youtube.com/watch?v=krM9GprN6qA
https://www.youtube.com/watch?v=oet-s1xDLOA