جامعة الانبار

كلية علوم الحاسوب وتكنولوجيا المعلومات

قسم تكنولوجيا المعلومات

مبادئ شبكات الحاسوب (عملي)

principles of computer network (LAB)

LAB (2)

المرحلة الثالثة

اسم التدريسي : م.م براء سعد عبد الحكيم

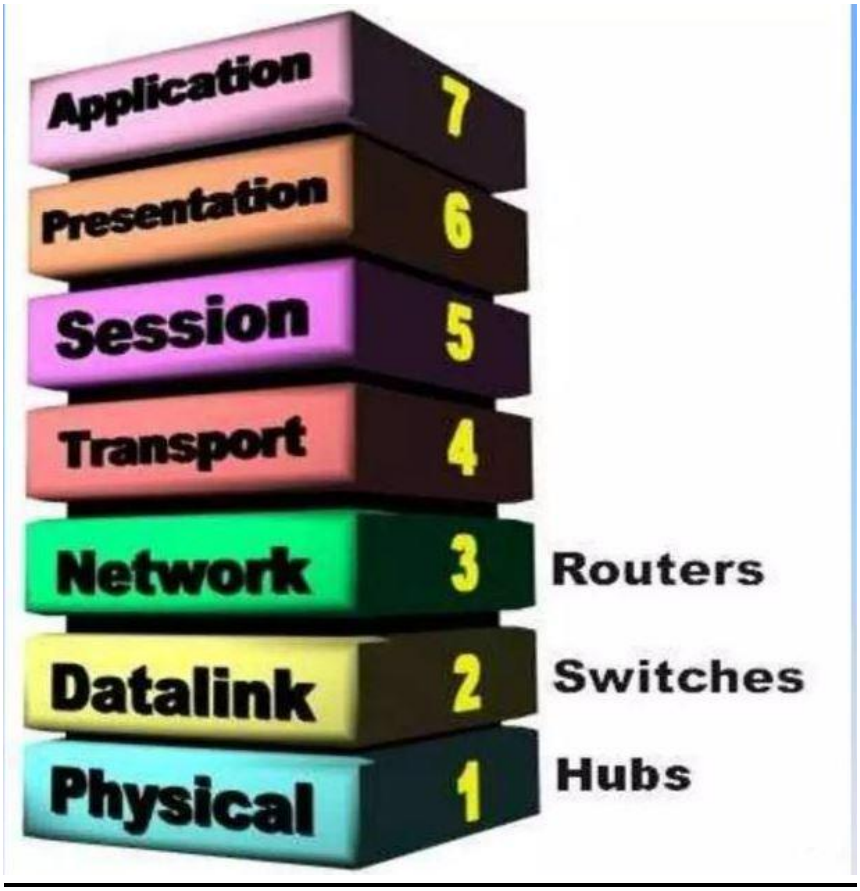
Router

- A router is a fundamental device in computer networking that operates at the network layer (Layer 3) of the OSI model .

- Its primary function is to connect different networks and determine the most efficient path for data to travel between them . Router make intelligent decisions about how to forward data packets based on destination IP address .

- It contains a routing table in which all information about the address of connected networks .

Router operates in network layer of OSI model



Advantage of routers

- Router limits the collision domain.
- Router can function on LAN & WAN
- Router can determine best path/route for data to reach the destination.
- Security features many routers have built-in firewall capabilities and security features that protect the network from external threats

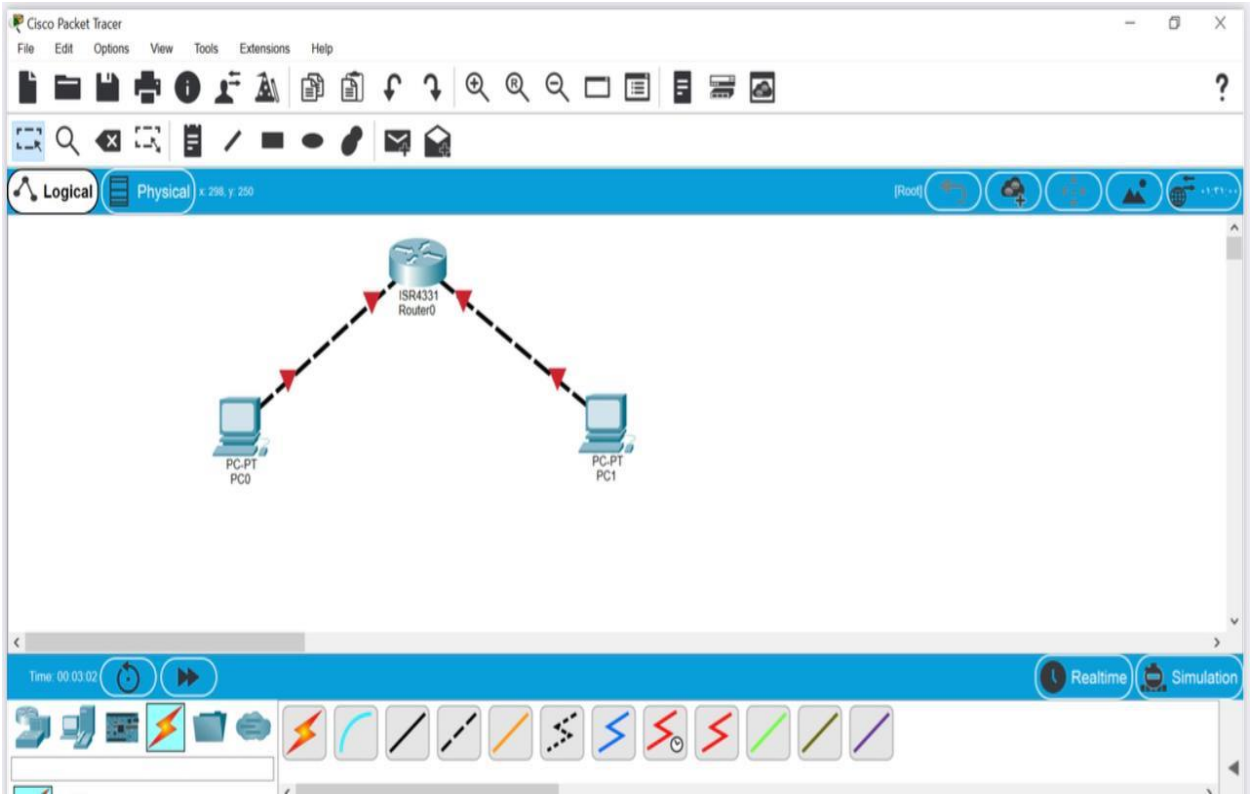
Disadvantage of routers

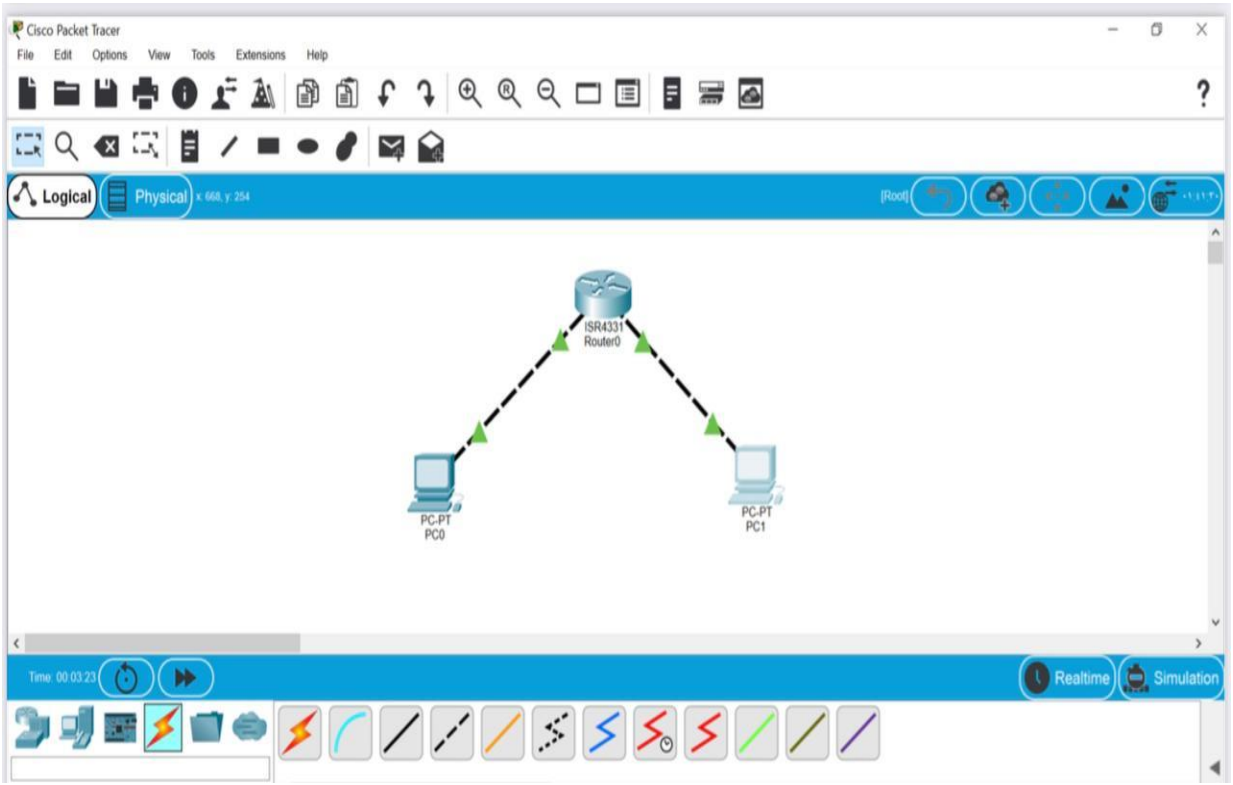
- Router is more expensive than Hub, Bridge & Switch.
- Configuration and managing router can be complex, often requiring knowledge of network protocols and setting, which maybe challenging for non-technical users
- Single Point of Failure: Routers can be single points of failure in a network. If a router malfunctions, it can disrupt network connectivity.
- Updates and Maintenance Routers require regular updates and maintenance to ensure security and optimal performance, which can be a time-consuming task.

Connect Router with Computer

- Connect between all devices.
- Click on the devices to make configuration to all devices.
- Enter IP address (192.168.0.1) and subnet (2555.255.255.0) to all devices and close the window.
- Enter IP address (192.168.0.2) and subnet (2555.255.255.0) and close the window.
- To test the connection, use the 'ping' command followed by the IP address of another device, such as

  (ping 192.168.0.1) or (ping 192.168.0.2)


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
ISR4331
Router0
PC-PT
PC0
PC-PT
PC1
Realtime
Simulation


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
ISR4331
Router0
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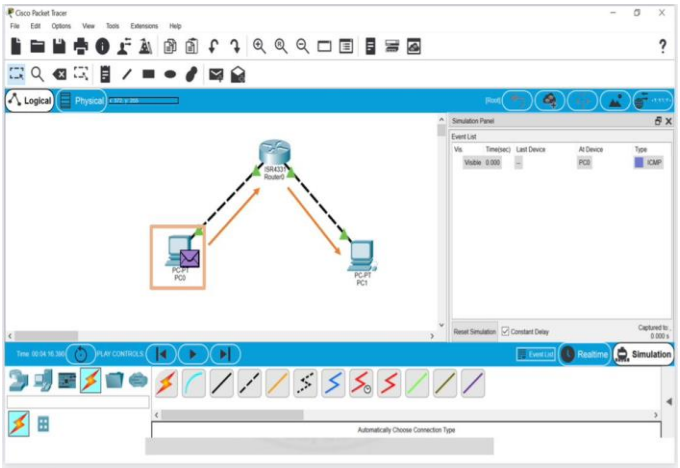
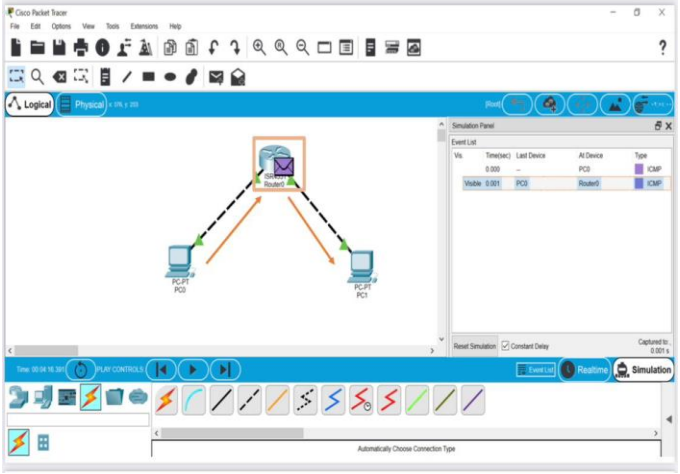
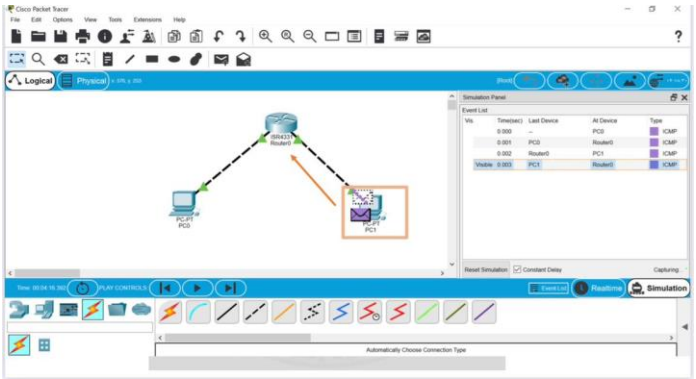
Simulation

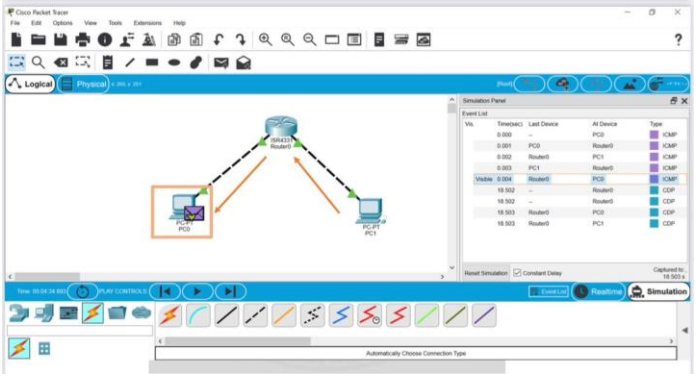
Real-time and Simulation

On the right side of the packet tracer, there are two options: real-time and simulation. Real-time closely mimics real-life network behavior, while simulation lets you observe communication processes. you can examine messages at each network layer. if you select simulation and then the simulation panel, you will find an event list showing message exchanges between devices. The source device indicates the message source, and the device shows the message destination. clicking on an entry reveals details like the message, IP address, and more



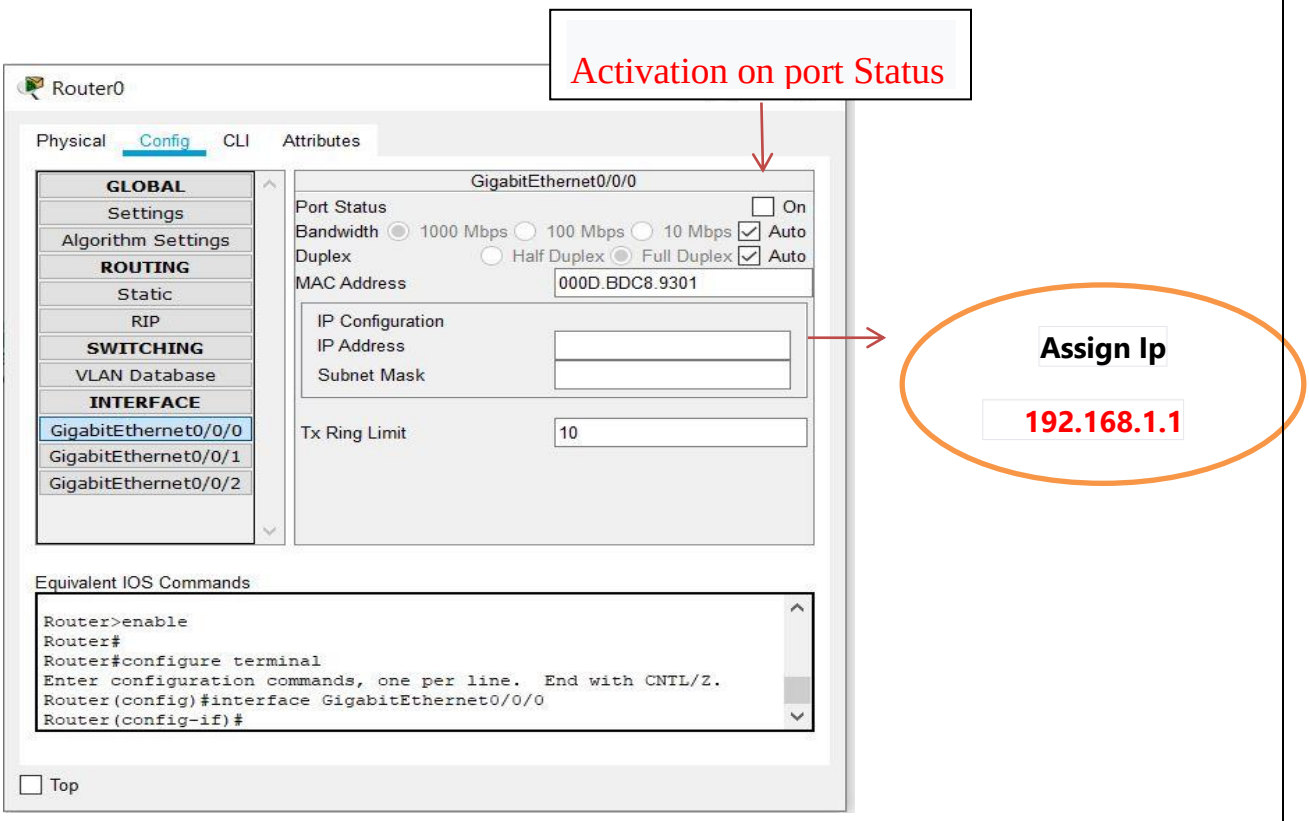




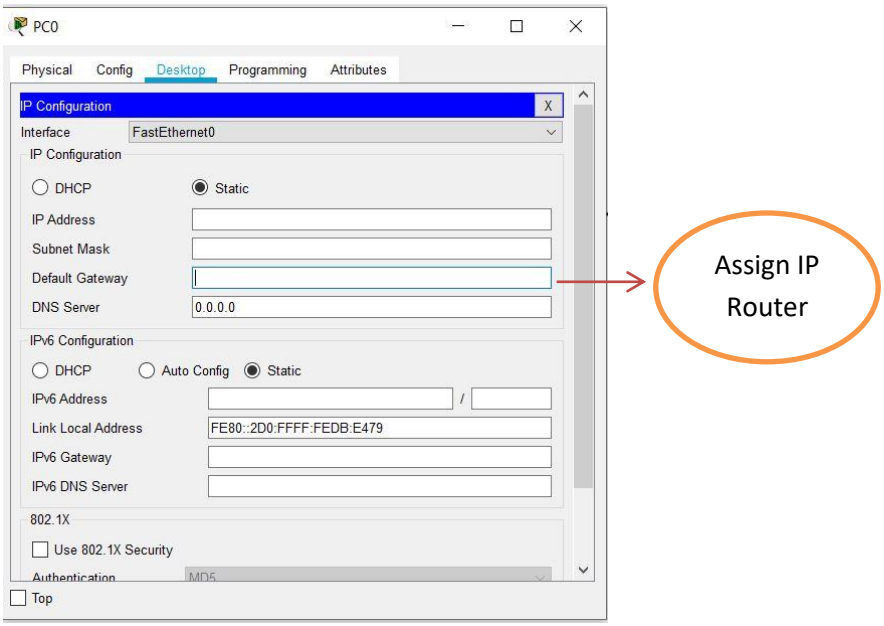


Connect Router with two Networks

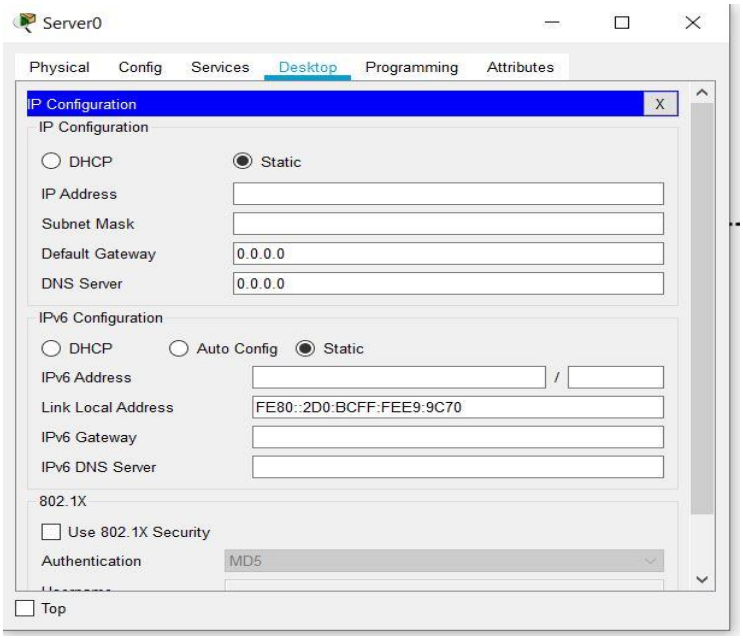
- Connect between all devices
- Click on the devices to make configuration to all devices
- Click on the router to make configuration interfaces: use the connection tool to connect one network to **gigabitethernet0/0** and the other to **gigabitethernet0/1** on the router.

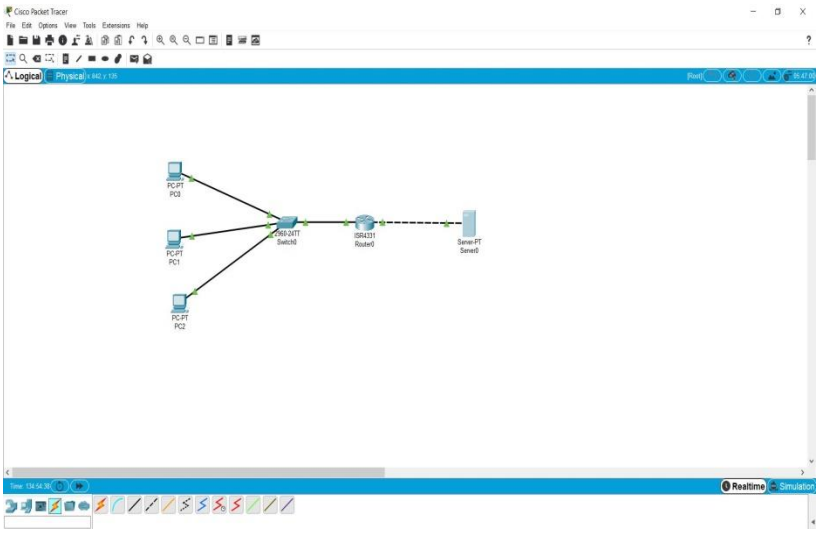


- Click on the Computer to make configuration to all devices



➢ Click on the Server to make configuration





Real-time and Simulation

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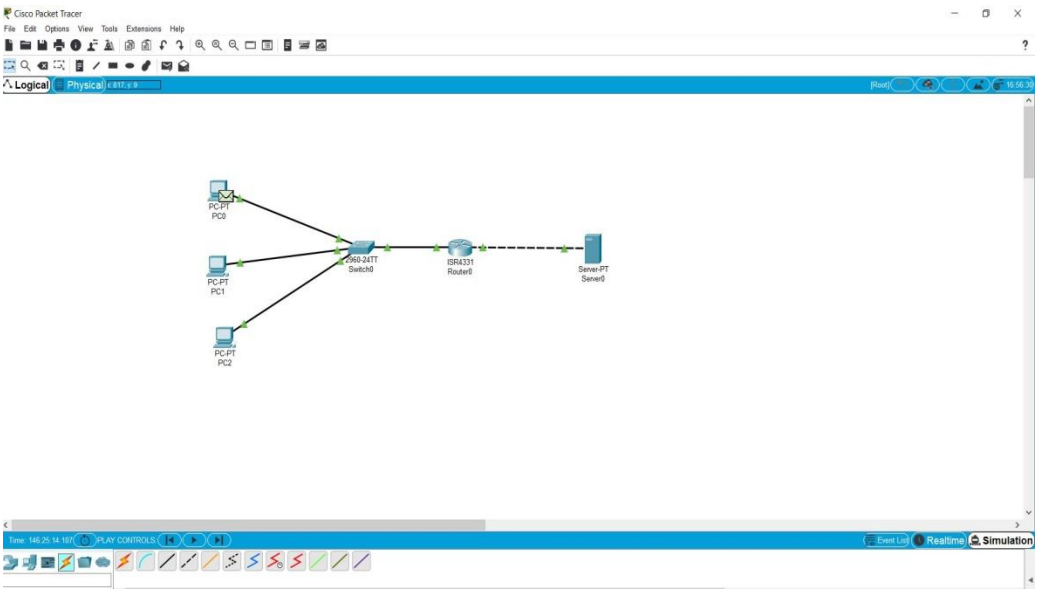
Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
PC-PT
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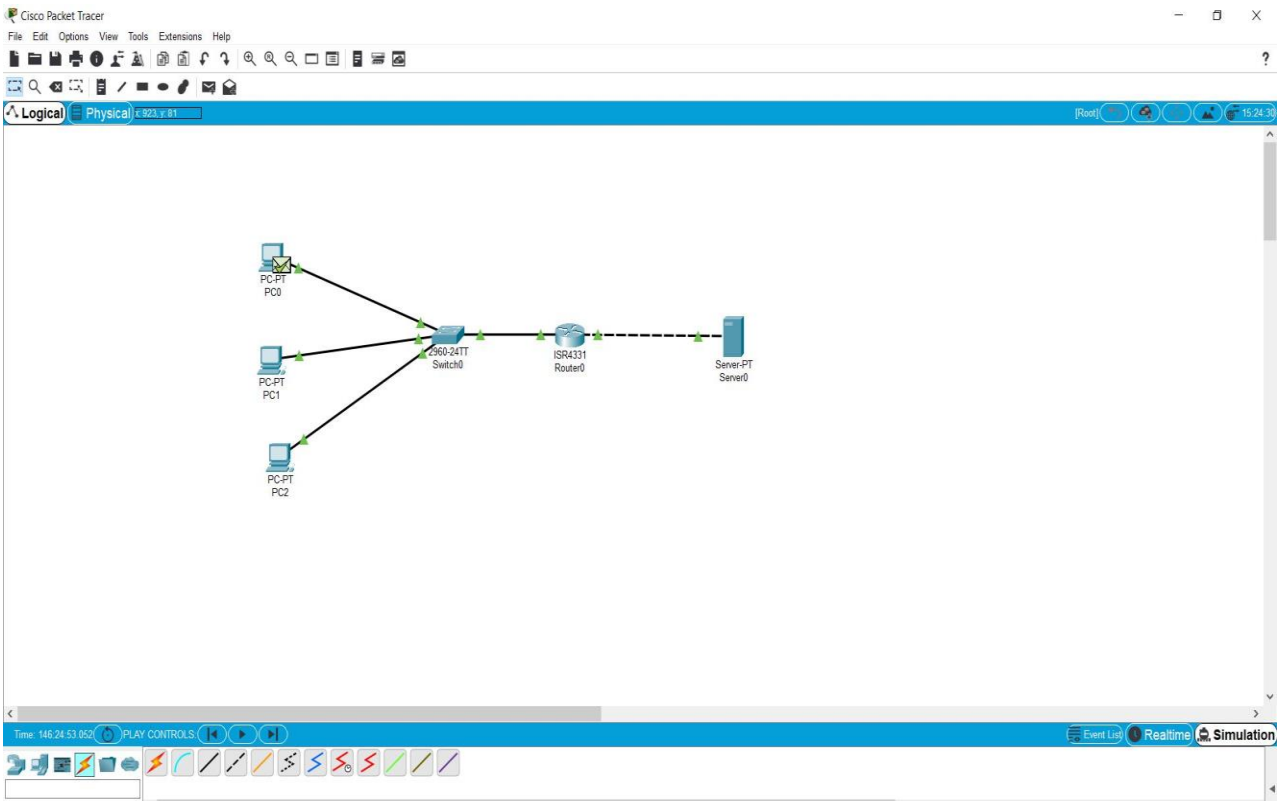
PC1
PC-PT
PC2
2960-24TT
Switch0
ISR4331
Router0
Server-PT
Server0
Realtime
Simulation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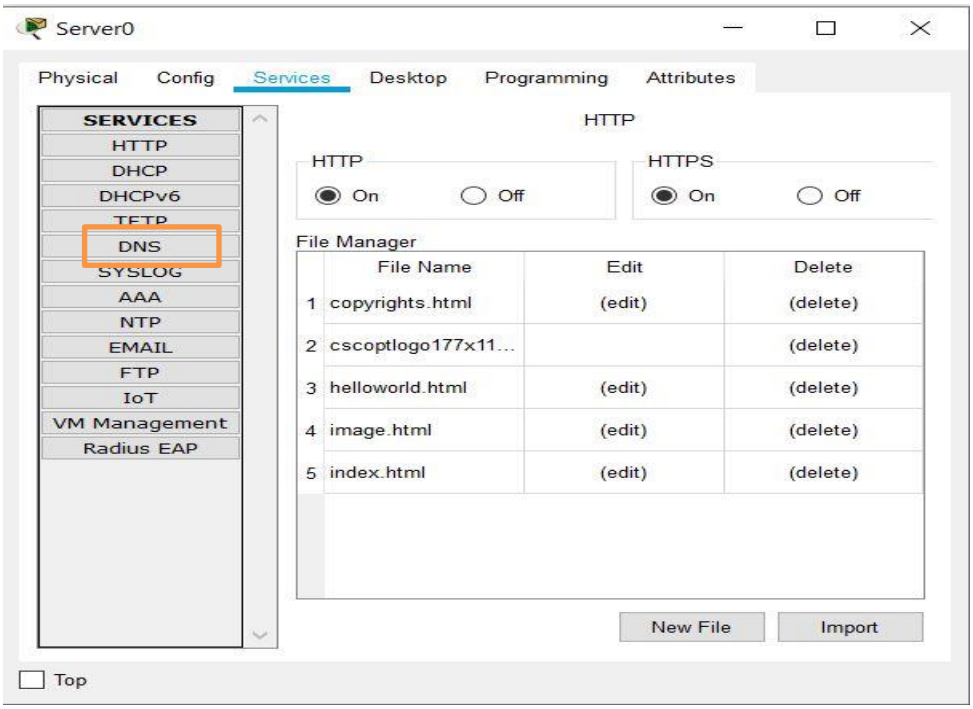
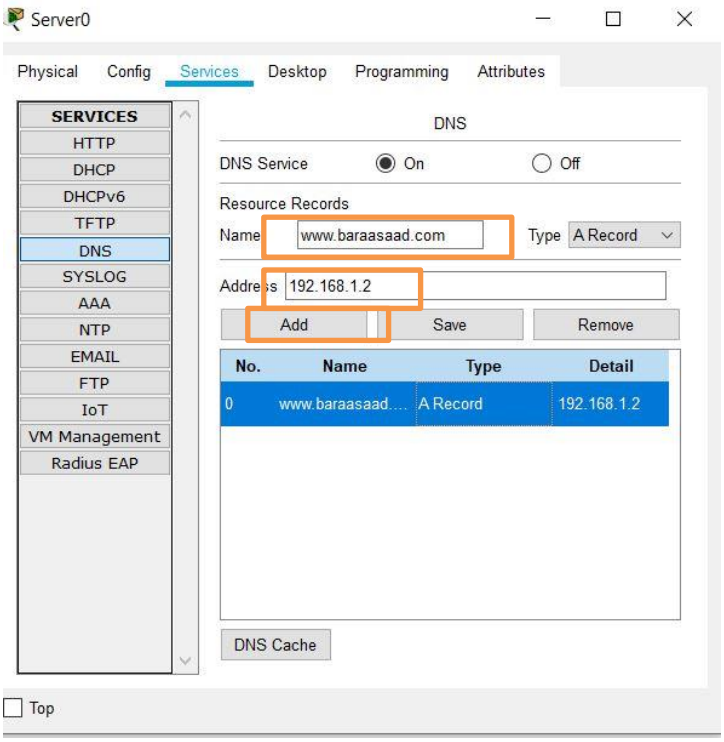
➢ Click on the Server to make services



Domain Name Protocol (DNS) : it is used to translate human-readable domain names into numerical IP addresses.


Server0
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DNS
DNS Service
On
Off
Resource Records
Name
www.baraasaad.com
Type
A Record
Address
192.168.1.2
Add
Save
Remove
No.
Name
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Detail
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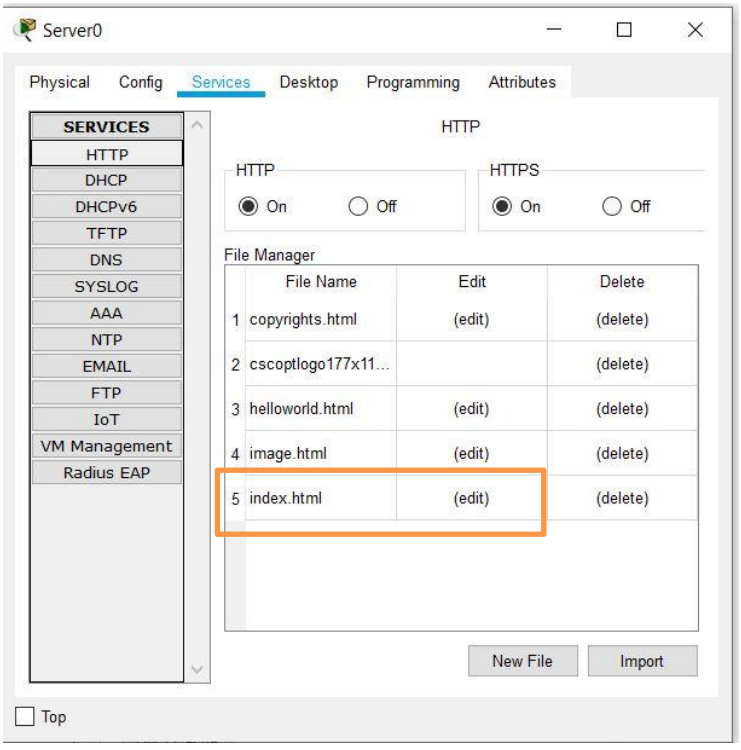
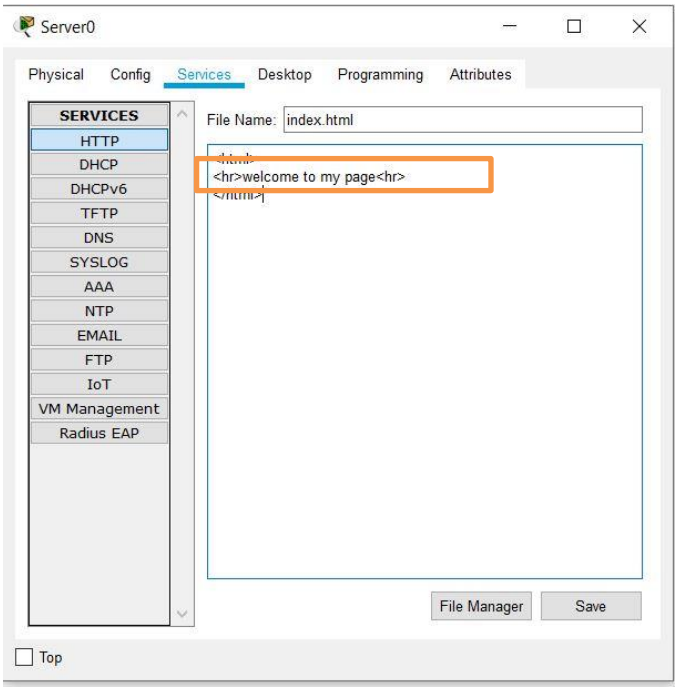
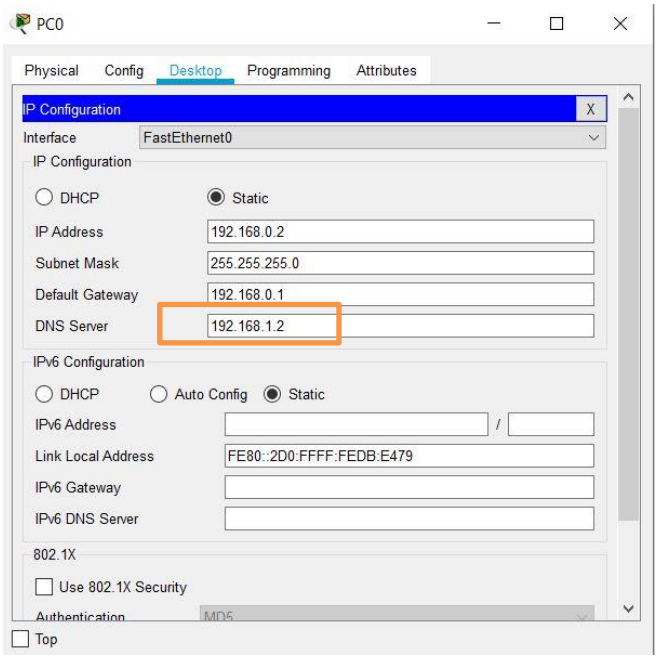
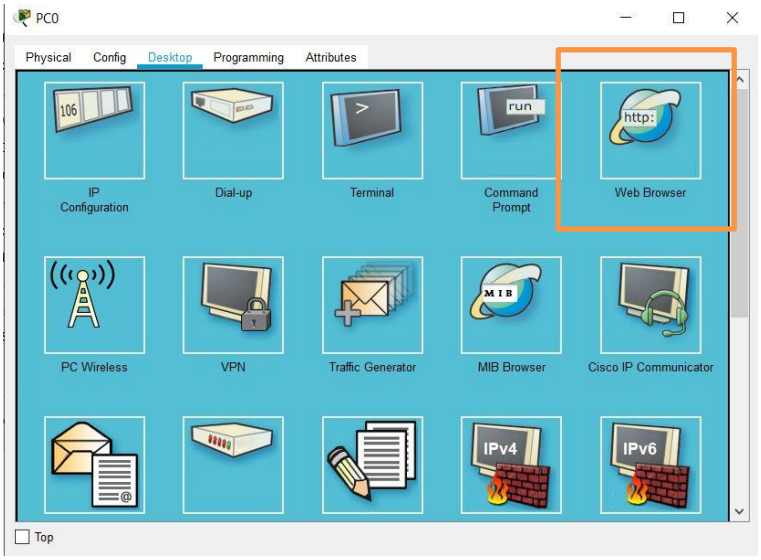
www.baraasaad....
A Record
192.168.1.2
DNS Cache
Top

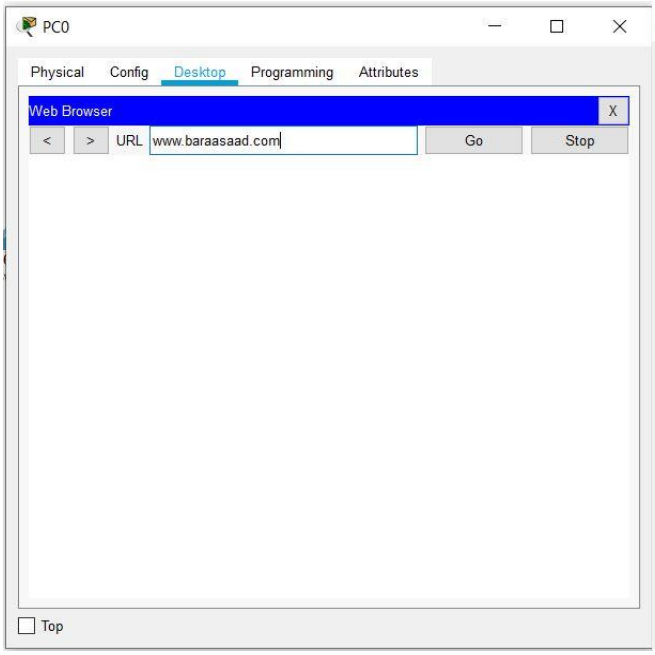

Server0
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
HTTP
HTTP
On
Off
HTTPS
On
Off
File Manager
File Name
Edit
Delete
1 copyrights.html (edit) (delete)
2 cscoptlogo177x11... (delete)
3 helloworld.html (edit) (delete)
4 image.html (edit) (delete)
5 index.html (edit) (delete)
New File
Import
Top

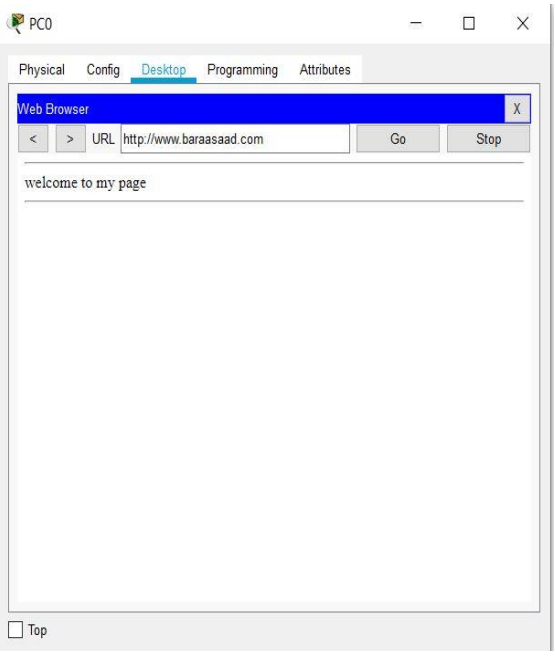


- Click on the computer Ip confguration to add DSN server




PC0
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Dial-up
Terminal
Command Prompt
Web Browser
PC Wireless
VPN
Traffic Generator
MIB Browser
Cisco IP Communicator
IPv4
IPv6
Top


PC0
Physical
Config
Desktop
Programming
Attributes
Web Browser
URL
www.baraasaad.com
Go
Stop
Top


PC0
Physical
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Desktop
Programming
Attributes
Web Browser
URL
http://www.baraasaad.com
Go
Stop
welcome to my page
Top