



Network **Project**

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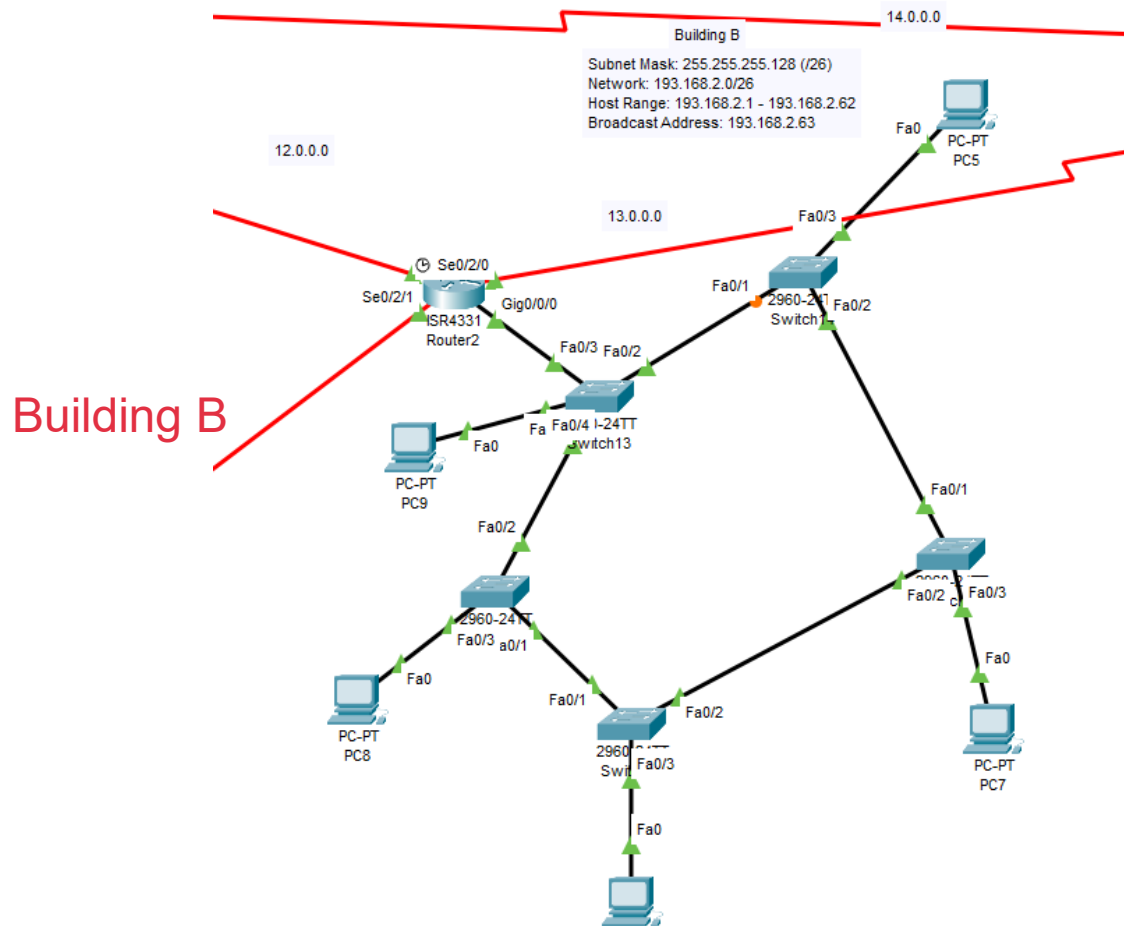
Team

Yehia Tarek
Sara Ahmed
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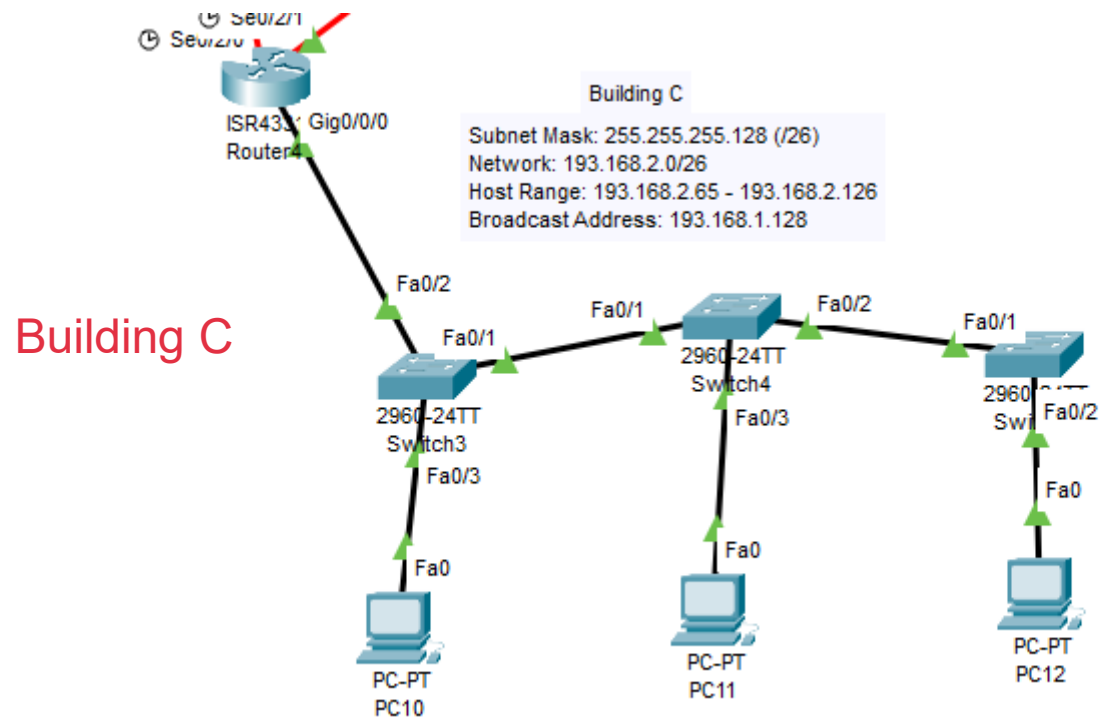
An abstract geometric composition featuring a series of parallel diagonal lines in blue, red, and grey. The lines are arranged in a way that creates a sense of depth and movement, with some lines appearing to recede into the background while others come forward. The colors are vibrant and distinct, creating a high-contrast visual effect. The overall shape is irregular, with sharp angles and a dynamic, non-representational feel.



Ring



Bus



An abstract geometric composition featuring a series of parallel diagonal lines in blue, red, and grey. The lines are arranged in a way that creates a sense of depth and movement, with some lines appearing to recede into the background and others coming forward. The colors are vibrant and contrasting, creating a dynamic visual effect.



Subnetting Table

These are the 4 buildings IPs:

Building	Network IP	Subnet Mask	Host IP range	Usable Hosts	Broadcast IP
A	193.168.1.0	255.255.255.0	193.168.1.1-193.168.1.254	254	193.168.1.255
B	193.168.2.0	255.255.255.128	193.168.2.1-193.168.2.62	62	193.168.2.63
C	193.168.2.0	255.255.255.128	193.168.2.65-193.168.2.126	62	193.168.2.128
D	193.168.2.0	255.255.255.192	193.168.2.129-193.168.2.254	126	193.168.2.255

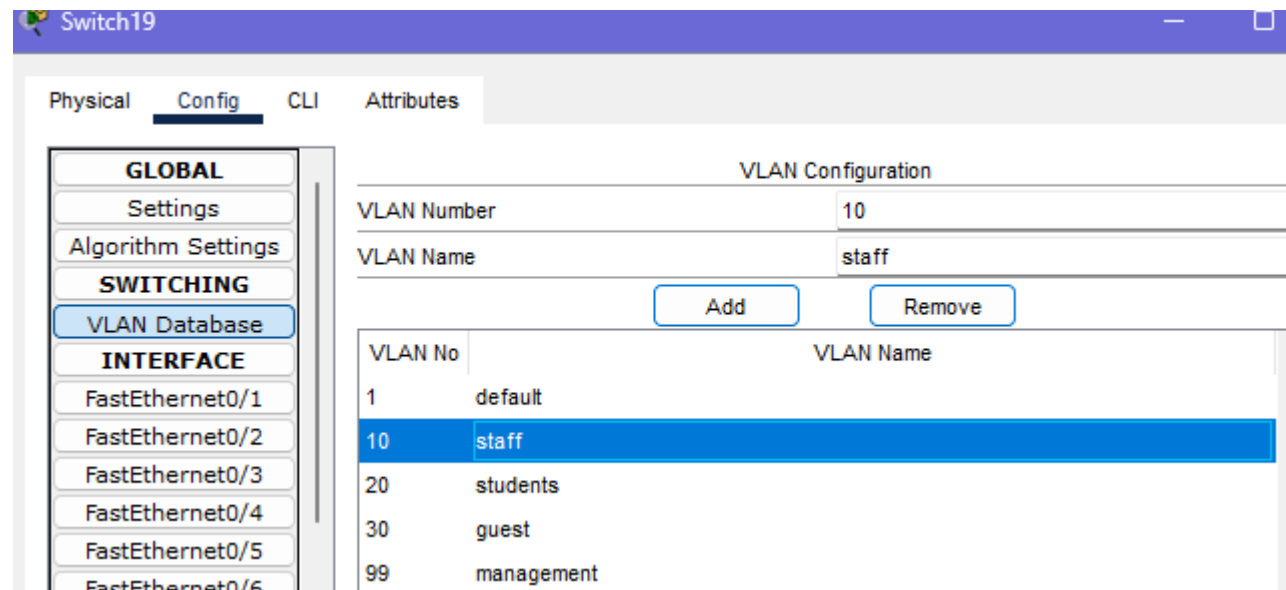
Subnetting Table

Data center Building:

Building	Network IP	Subnet Mask	Host IP range	Usable hosts	Broadcast IP
Data center	172.125.0.0	255.255.0.0	No range	——	——

Virtual LANs (VLANs)

We assign any unused number and name:

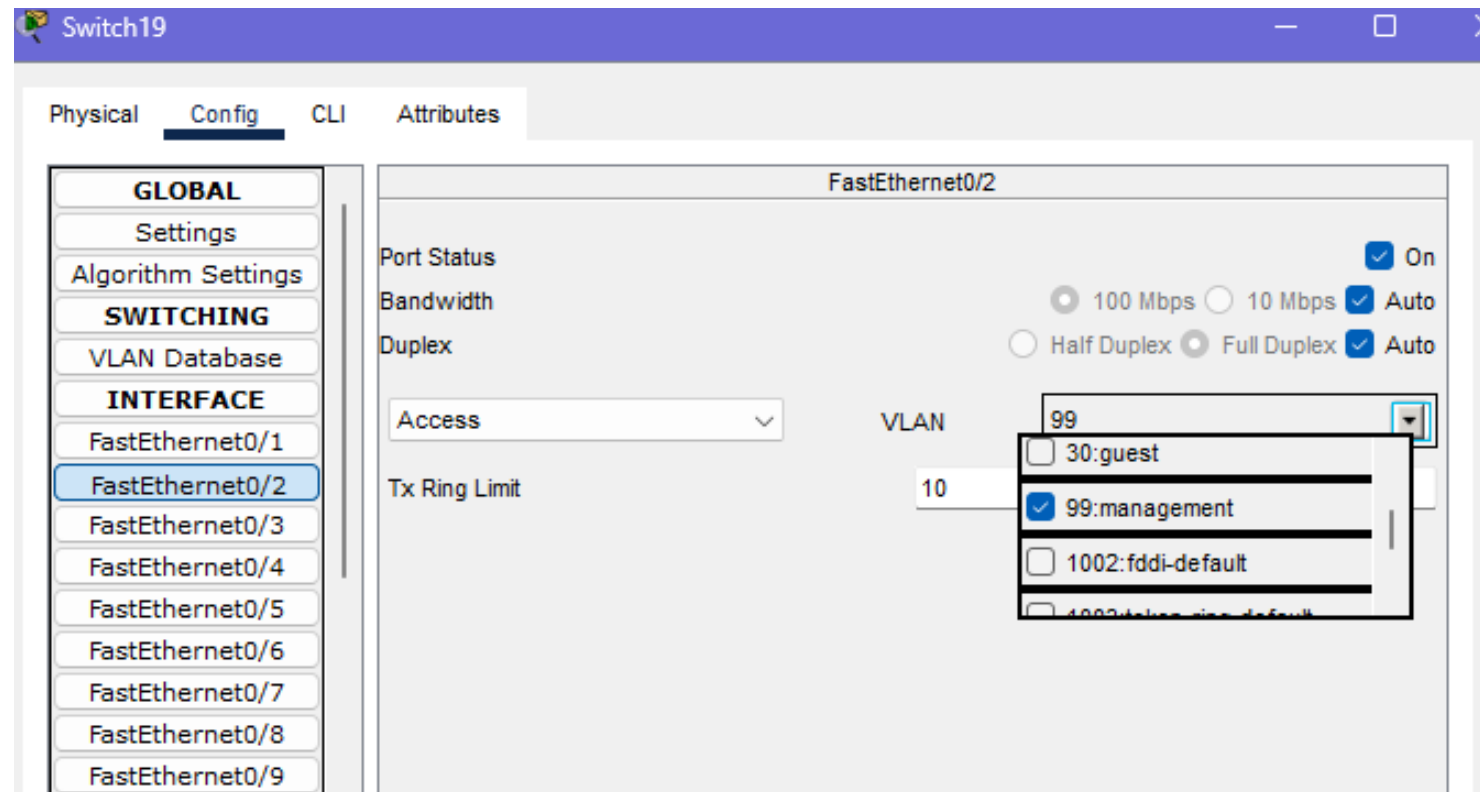


The screenshot shows the 'Switch19' configuration window with the 'Config' tab selected. The left sidebar contains a tree view with categories: GLOBAL (Settings, Algorithm Settings), SWITCHING (VLAN Database), and INTERFACE (FastEthernet0/1 through FastEthernet0/6). The 'VLAN Database' is selected, showing a table of existing VLANs. On the right, the 'VLAN Configuration' section allows adding a new VLAN with a number of 10 and a name of 'staff'. Below this, a table lists the current VLAN database.

VLAN No	VLAN Name
1	default
10	staff
20	students
30	guest
99	management

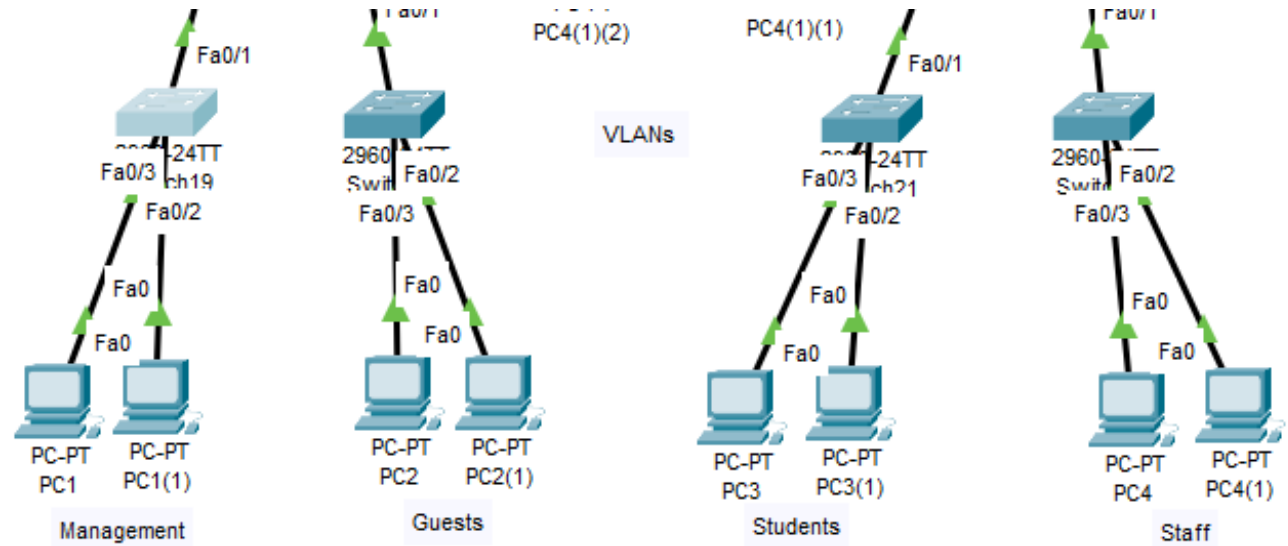
Virtual LANs (VLANs)

We choose which VLAN we need for every interface:



Virtual LANs (VLANs)

Do the same for all switches:



Routers

Routers has their internal interface to connect with their building with IPv4 address and Subnet Mask in via Gbit:

Building A

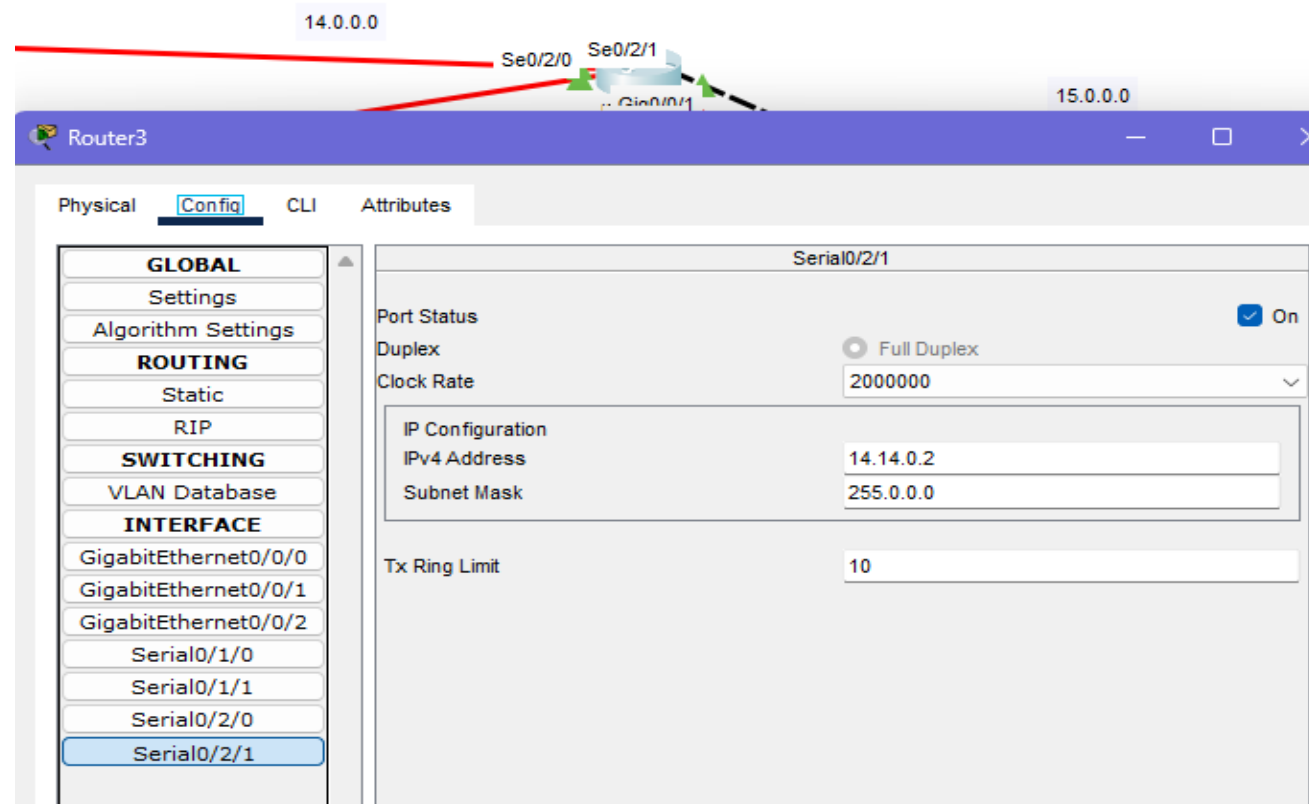
GigabitEthernet0/0/0	
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	<input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
Duplex	<input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
MAC Address	000D.BDC5.8A01
IP Configuration	
IPv4 Address	193.168.1.1
Subnet Mask	255.255.255.0
Tx Ring Limit	10

Routers

Routers also has their external interface to connect with other routers in other buildings with IPv4 address and Subnet Mask via serial:

Used for routing like OSPF

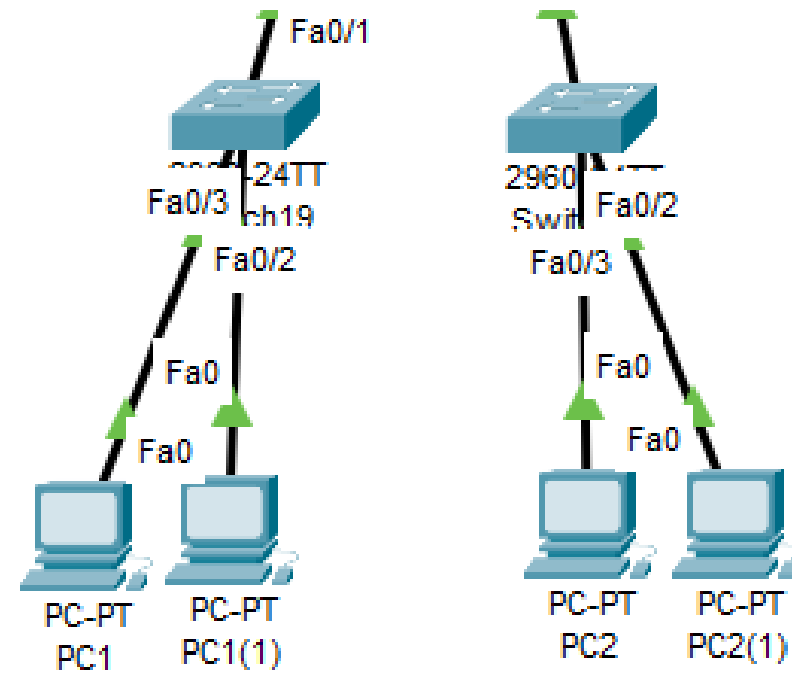
Building A



Switches

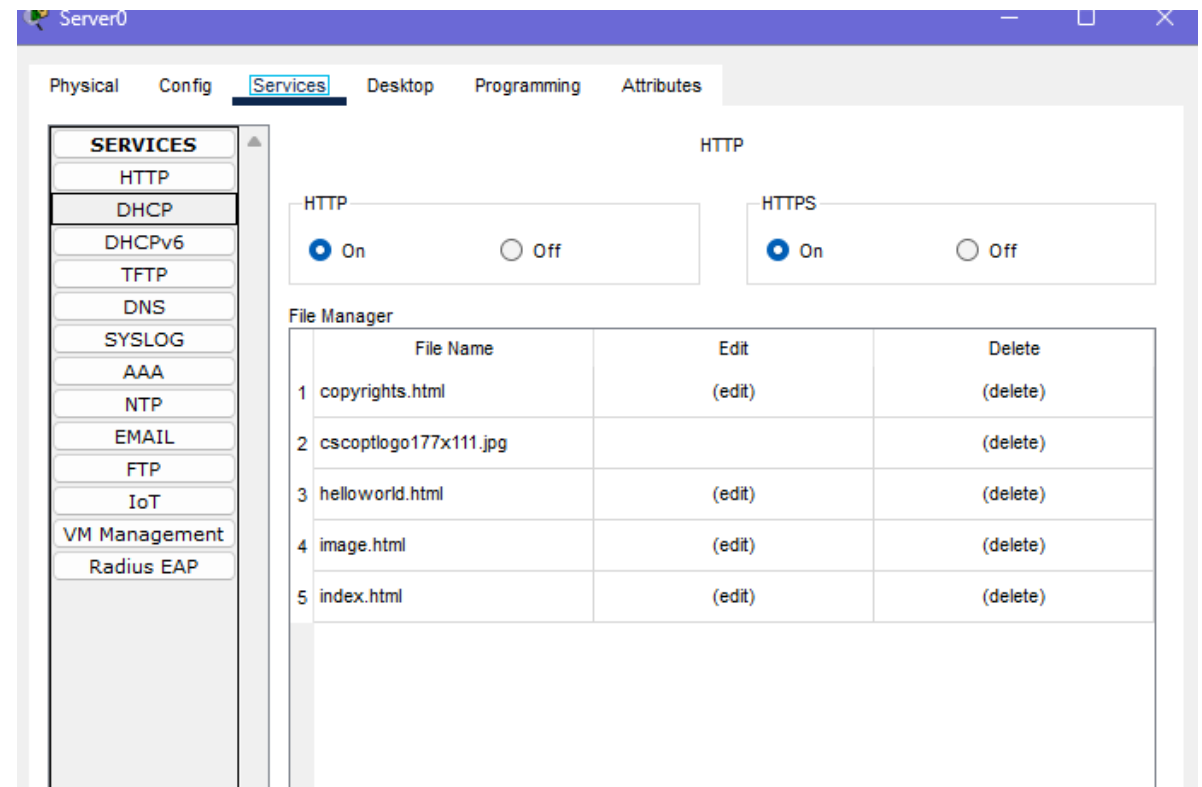
Switches is used to connect multiple devices with each other:

Building A



Servers

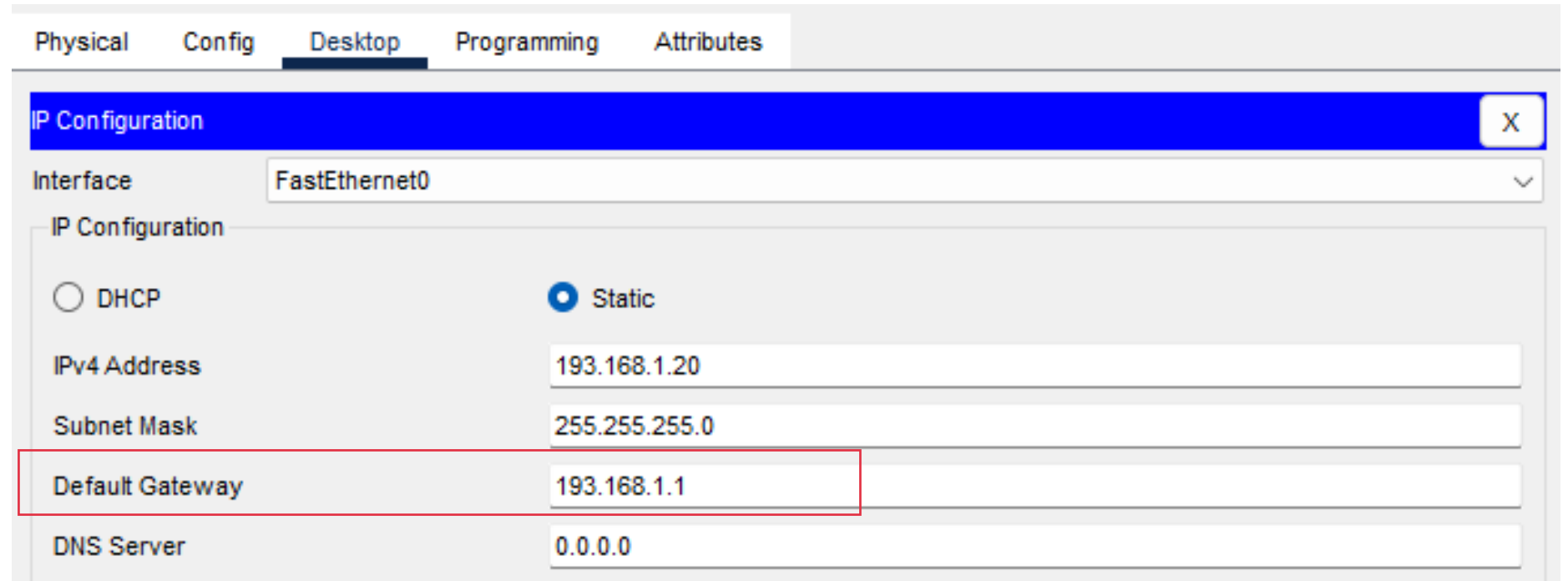
Servers offer a list of services to assign to any network:



Internal interface

To connect a pc to a router we must set the gateway of the pc = the IPv4 of the router:

Building A



The screenshot shows a network configuration window titled "IP Configuration" with a blue header bar and a close button (X). The window has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Desktop" currently selected. Below the tabs, the "Interface" is set to "FastEthernet0". Under the "IP Configuration" section, the "Static" radio button is selected, and the "DHCP" radio button is unselected. The "IPv4 Address" is set to "193.168.1.20", the "Subnet Mask" is "255.255.255.0", the "Default Gateway" is "193.168.1.1" (highlighted with a red box), and the "DNS Server" is "0.0.0.0".

Field	Value
Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	193.168.1.20
Subnet Mask	255.255.255.0
Default Gateway	193.168.1.1
DNS Server	0.0.0.0

Internal interface

Set IP from the available hosts range and set its Subnet Mask:

Building A

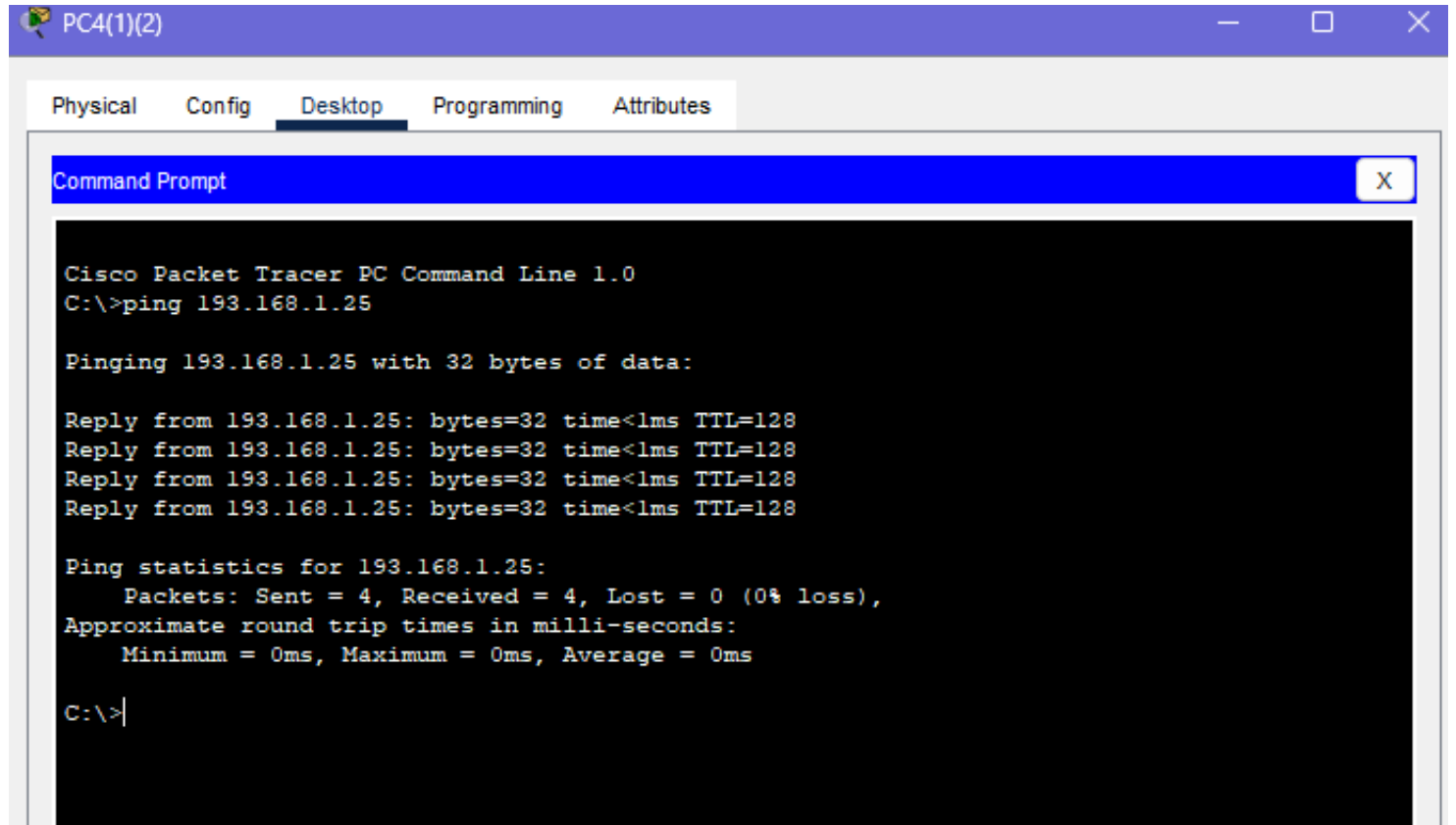
The screenshot shows a network configuration window titled "IP Configuration" with a blue header bar and a close button (X). The "Interface" dropdown is set to "FastEthernet0". Under the "IP Configuration" section, the "Static" radio button is selected. A red rectangular box highlights the "IPv4 Address" field (193.168.1.20) and the "Subnet Mask" field (255.255.255.0). Below these, the "Default Gateway" is set to 193.168.1.1 and the "DNS Server" is set to 0.0.0.0.

Field	Value
Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	
<input checked="" type="radio"/> Static	
IPv4 Address	193.168.1.20
Subnet Mask	255.255.255.0
Default Gateway	193.168.1.1
DNS Server	0.0.0.0

Internal interface

Testing connection using ping:

Building A



```
PC4(1)(2)
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 193.168.1.25

Pinging 193.168.1.25 with 32 bytes of data:

Reply from 193.168.1.25: bytes=32 time<1ms TTL=128
Reply from 193.168.1.25: bytes=32 time<1ms TTL=128
Reply from 193.168.1.25: bytes=32 time<1ms TTL=128
Reply from 193.168.1.25: bytes=32 time<1ms TTL=128

Ping statistics for 193.168.1.25:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

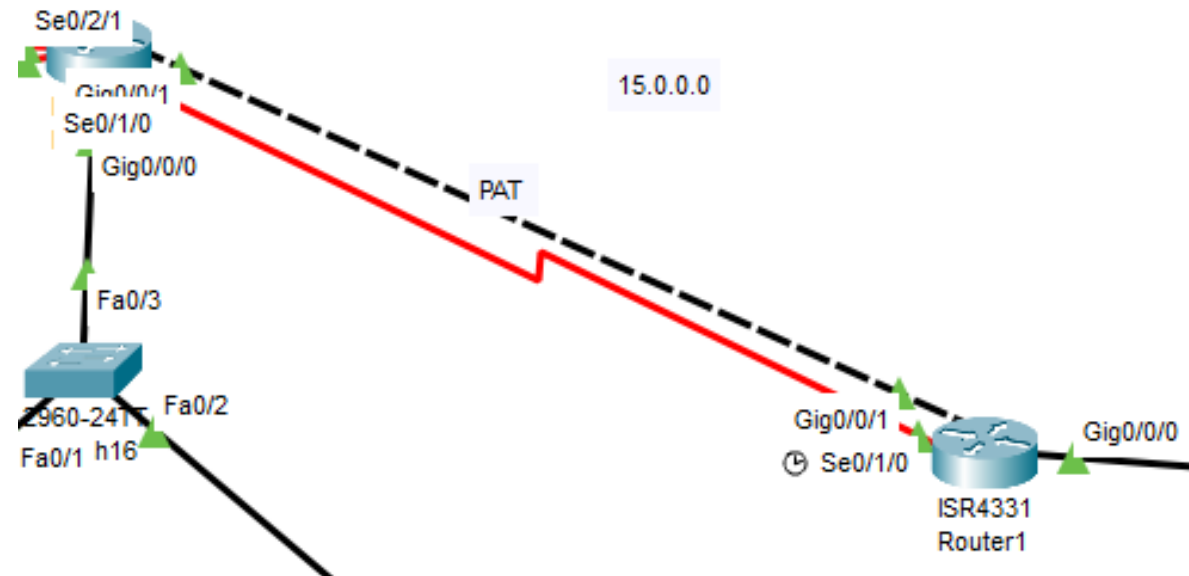
C:\>
```

External interface

Connection with a device from external network can not be established without PAT

To apply pat we need to connect the 2 routers via Gig:

Building A



External interface

Connection with a device from external network can not be established without PAT

To apply pat we need to connect the 2 routers via Gig then write this command:

Building A

```
RouterA(config)# access-list 1 permit 193.168.1.0 0.0.0.255
RouterA(config)# ip nat inside source list 1 interface GigabitEthernet0/1
overload
RouterA(config)# interface GigabitEthernet0/0
RouterA(config-if)# ip nat inside
RouterA(config-if)# exit
RouterA(config)# interface GigabitEthernet0/1
RouterA(config-if)# ip nat outside
RouterA(config-if)# exit
```

External interface

Now connection is on and PAT is applied we can test with ping connection between 2 pcs the cmd from pc in building A and the IP is a pc from the Data Center building:

Building A

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.125.12.10

Pinging 172.125.12.10 with 32 bytes of data:

Request timed out.
Reply from 172.125.12.10: bytes=32 time=1ms TTL=126
Reply from 172.125.12.10: bytes=32 time=13ms TTL=126
Reply from 172.125.12.10: bytes=32 time=1ms TTL=126

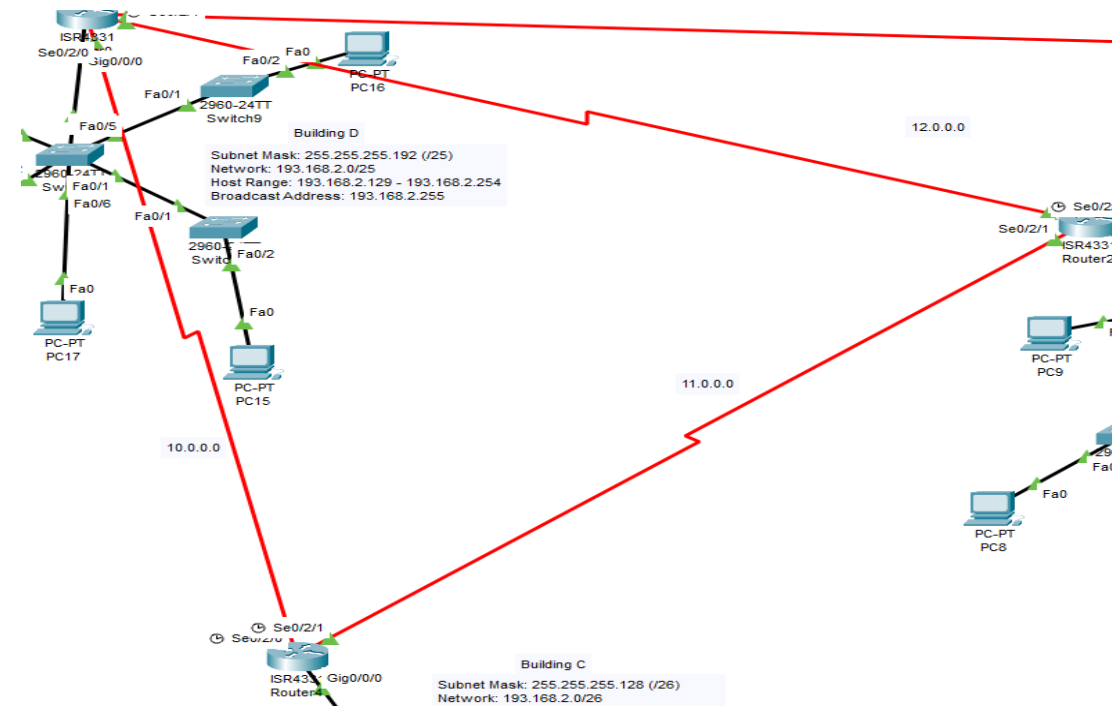
Ping statistics for 172.125.12.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 13ms, Average = 5ms

C:\>
```

Routing

Routing is essential for connecting all network with each other via routers to choose the best path via OSPF

We need to connect routers via serials and set IPs for every serial:



Routing

To apply OSPF we must write this commands for every router:

Enable

Configure terminal

Router ospf 1

Network (internal network IP) (Subnet mask) area (number)

Network (1st external network IP) (Subnet mask) area (same number)

Network (2nd internal network IP) (Subnet mask) area (same number)

Then save

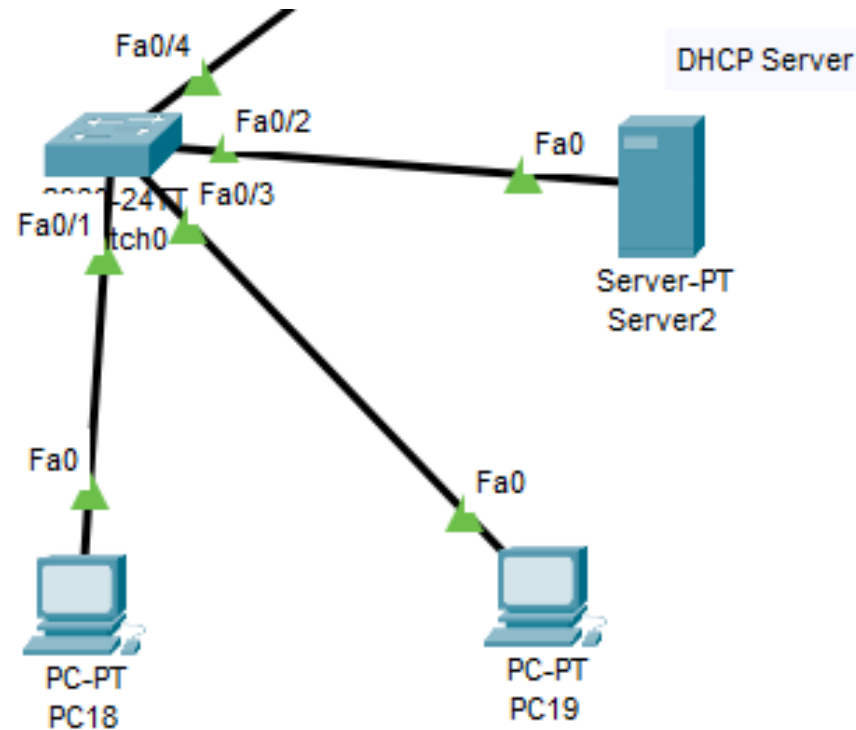
Routing

Now to test by sending message from a pc to other network router:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC10	Router0	ICMP		0.000	N	0	(edit)	

DHCP Server (Bonus)

Made a small with a server to test DHCP for automati addressing:



Connecting a static IP of a pc to another network:



Static NAT(Bonus)

The 2 routers are connected via Gig:

Router0

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0/0

GigabitEthernet0/0/1

GigabitEthernet0/0/2

Serial0/1/0

Serial0/1/1

Serial0/2/0

Serial0/2/1

GigabitEthernet0/0/1

Port Status ☒ On

Bandwidth ☒ 1000 Mbps ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0001.9647.6202

IP Configuration

IPv4 Address 209.165.184.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0/0
Router(config-if)#
Router(config-if)#exit
```

Router2

Physical

Config

CLI

Attributes

GLOBAL

Settings

Algorithm Settings

ROUTING

Static

RIP

SWITCHING

VLAN Database

INTERFACE

GigabitEthernet0/0/0

GigabitEthernet0/0/1

GigabitEthernet0/0/2

Serial0/1/0

Serial0/1/1

Serial0/2/0

Serial0/2/1

GigabitEthernet0/0/1

Port Status ☒ On

Bandwidth ☒ 1000 Mbps ☐ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0006.2AEC.4E02

IP Configuration

IPv4 Address 209.165.184.2

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```

Router#
?Bad filename
%Error parsing filename (Bad file number)
Router#
```

Static NAT(Bonus)

We write this command in the router of the desired static IP pc:

```
Interface G0/0/0  
Ip nat inside  
Int G0/0/1  
Ip nat ouside  
Exit  
Ip nat inside source static 193.168.2.9 209.165.184.3  
ex
```



Static NAT(Bonus)

We check nat:

```
Router#sh ip nat trans
```

Pro	Inside global	Inside local	Outside local	Outside global
---	209.165.184.3	193.168.2.9	---	---



Static NAT(Bonus)

We check nat:

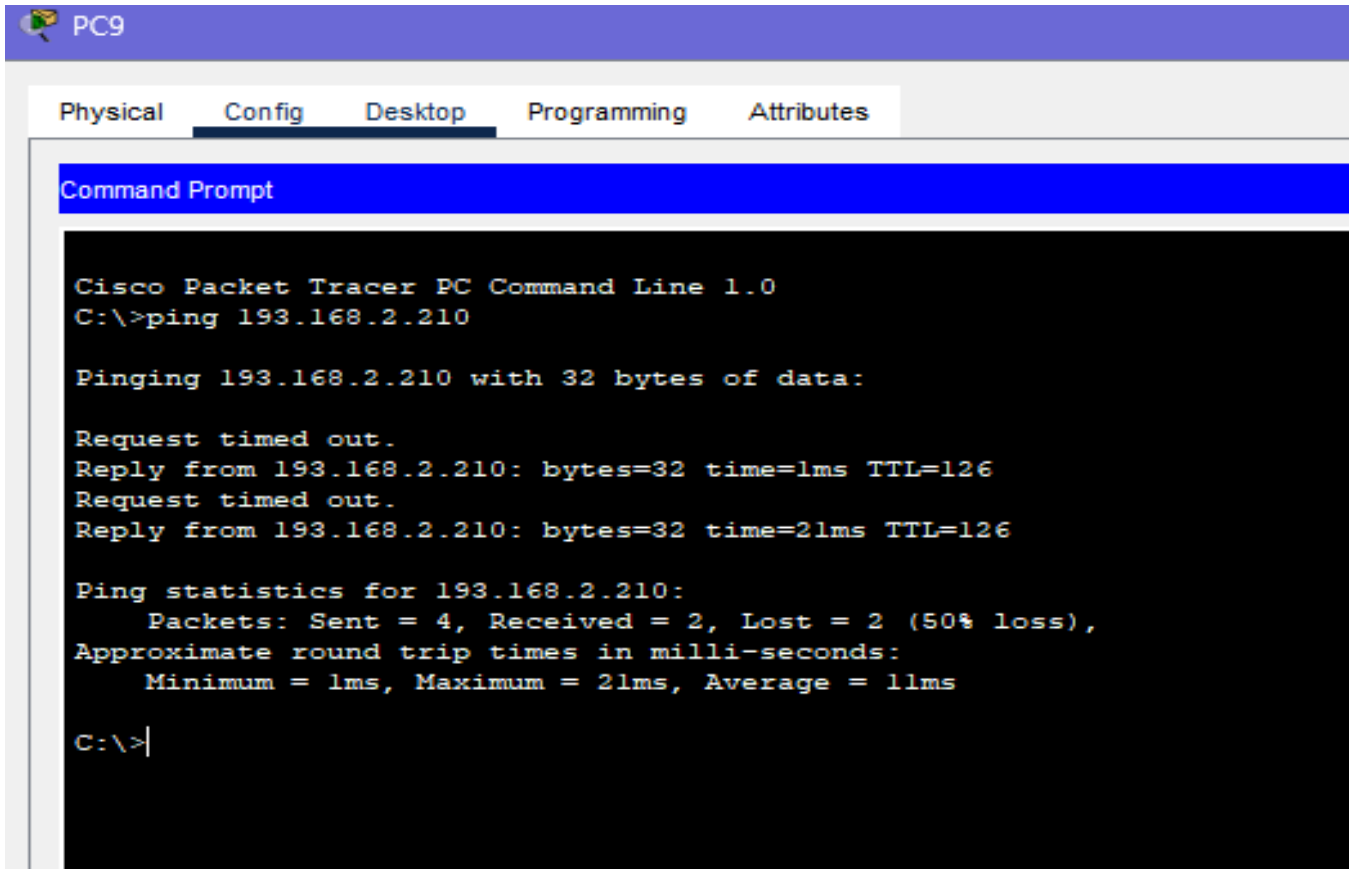
```
Router#sh ip nat trans
```

Pro	Inside global	Inside local	Outside local	Outside global
---	209.165.184.3	193.168.2.9	---	---



Static NAT(Bonus)

Ping the pc with other in the second network:



The screenshot shows the PC9 configuration window in Cisco Packet Tracer. The 'Config' tab is selected, and the 'Command Prompt' is open. The command prompt displays the output of a ping command from PC9 to PC10 (193.168.2.210). The output shows two successful replies and two request timeouts, resulting in a 50% loss.

```
PC9
Physical Config Desktop Programming Attributes
Command Prompt

Cisco Packet Tracer PC Command Line 1.0
C:\>ping 193.168.2.210

Pinging 193.168.2.210 with 32 bytes of data:

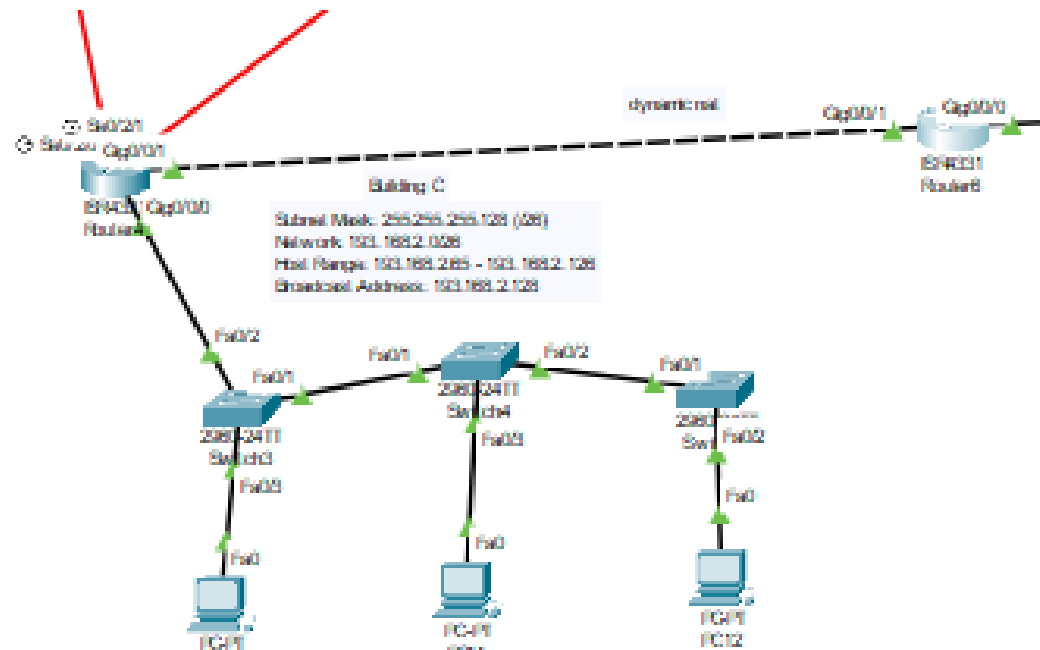
Request timed out.
Reply from 193.168.2.210: bytes=32 time=1ms TTL=126
Request timed out.
Reply from 193.168.2.210: bytes=32 time=21ms TTL=126

Ping statistics for 193.168.2.210:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 21ms, Average = 11ms

C:\>|
```


Dynamic NAT(Bonus)

Connecting a pool of IPs to another network:



Dynamic NAT(Bonus)

We set IPs for both routers and type this command:

```
Router(config)#ip nat pool ACCESS 209.165.184.4 209.165.184.9  
netmask 255.255.255.0
```

```
Router(config)#access-list 1 permit 193.168.2.0 0.0.0.255
```

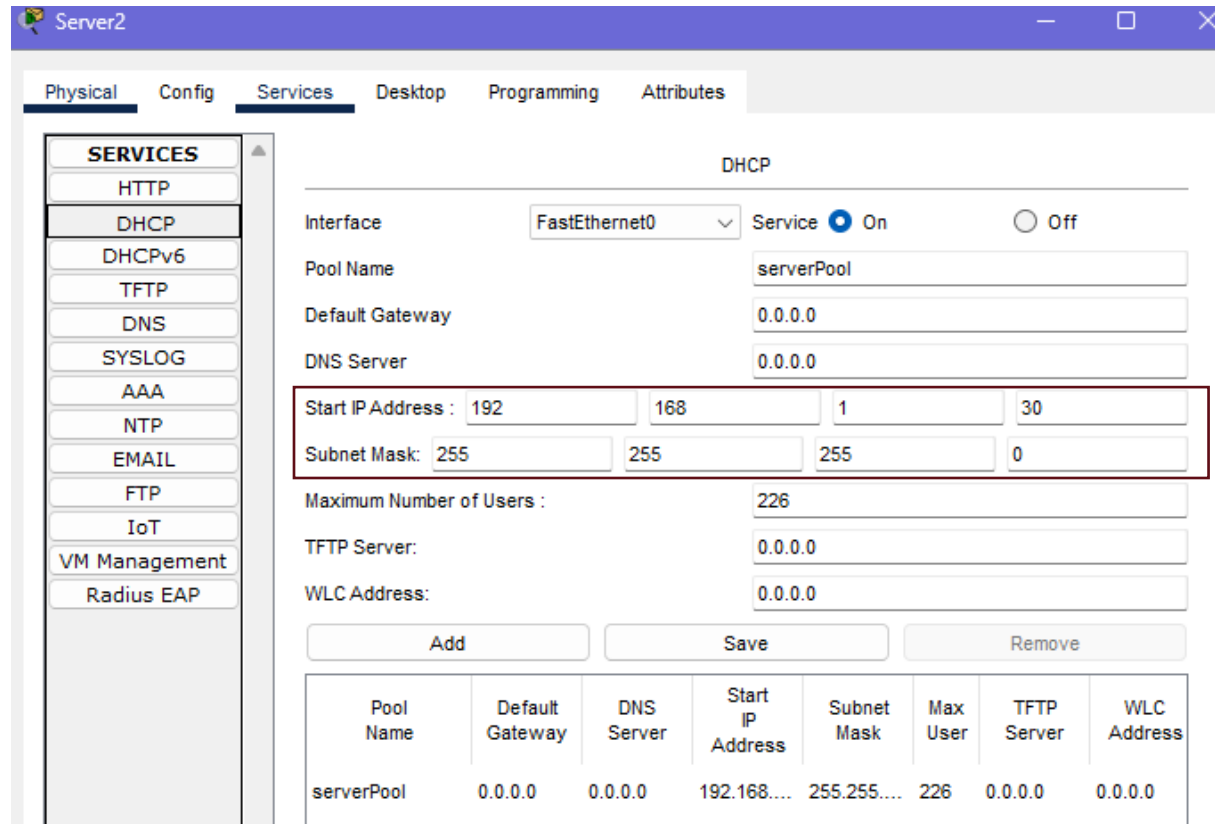
```
Router(config)#ip nat inside source list 1 pool ACCESS
```

```
Router(config)#ex
```



DHCP Server (Bonus)

Made a small with a server to test DHCP for automatic addressing
Start IP from 192.168.1.30 and number of users and save:



Server2

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DHCP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

Start IP Address: 192 168 1 30

Subnet Mask: 255 255 255 0

Maximum Number of Users: 226

TFTP Server: 0.0.0.0

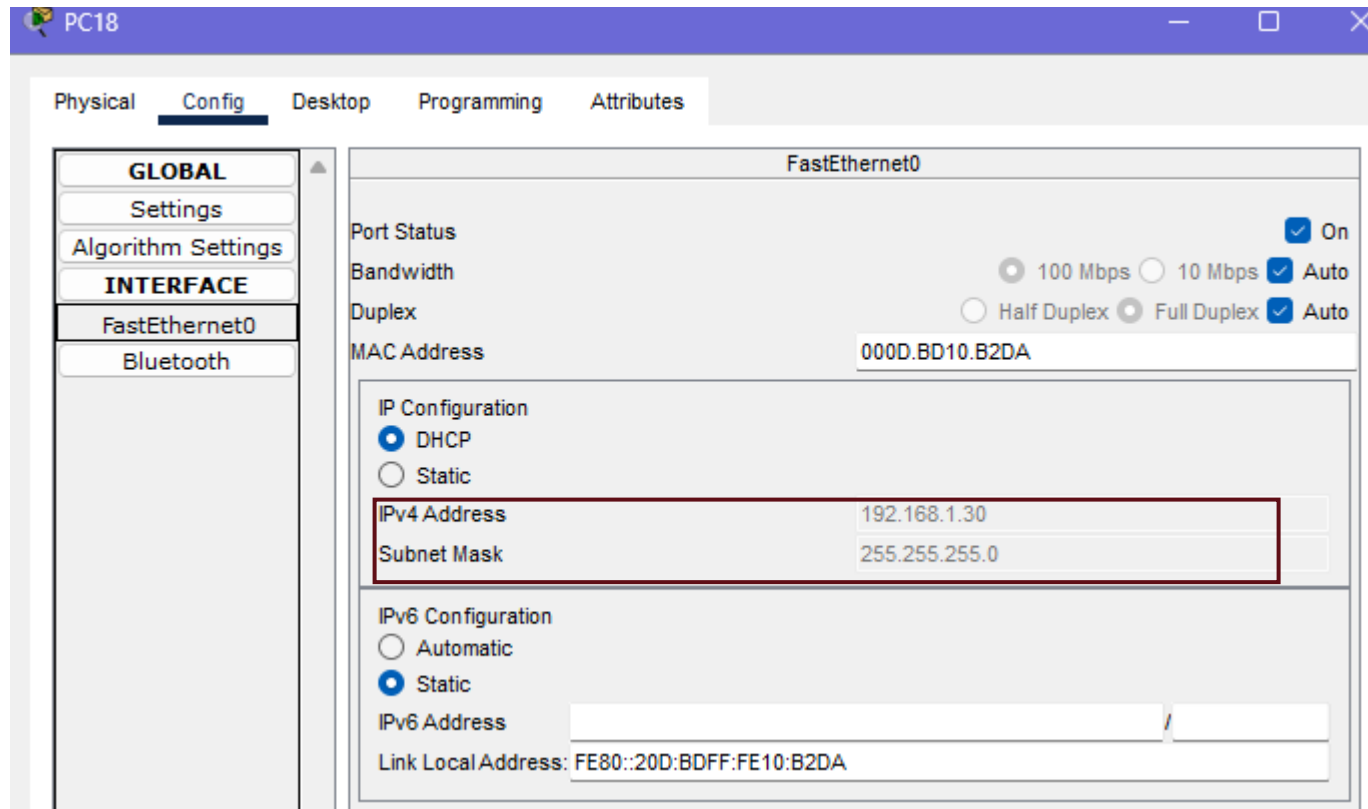
WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	192.168....	255.255....	226	0.0.0.0	0.0.0.0

DHCP Server (Bonus)

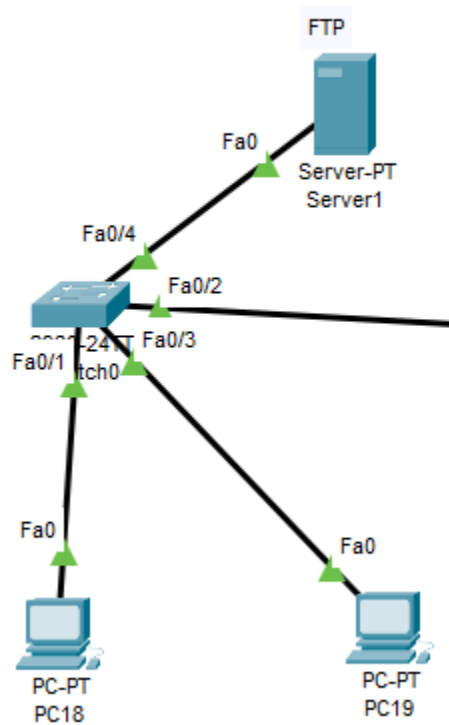
Check the DHCP box and the IP address is automated to 193.168.1.30 :



The screenshot shows the configuration window for PC18, specifically the 'Config' tab for the 'FastEthernet0' interface. The 'GLOBAL' section is expanded, showing 'Settings' and 'Algorithm Settings'. The 'INTERFACE' section is also expanded, showing 'FastEthernet0' and 'Bluetooth'. The 'FastEthernet0' configuration is displayed, including 'Port Status' (On), 'Bandwidth' (100 Mbps), 'Duplex' (Full Duplex), and 'MAC Address' (000D.BD10.B2DA). The 'IP Configuration' section shows 'DHCP' selected, and the 'IPv4 Address' is automatically set to 193.168.1.30. The 'Subnet Mask' is set to 255.255.255.0. The 'IPv6 Configuration' section shows 'Static' selected, and the 'IPv6 Address' is set to FE80::20D:BDFF:FE10:B2DA. The 'Link Local Address' is set to FE80::20D:BDFF:FE10:B2DA.

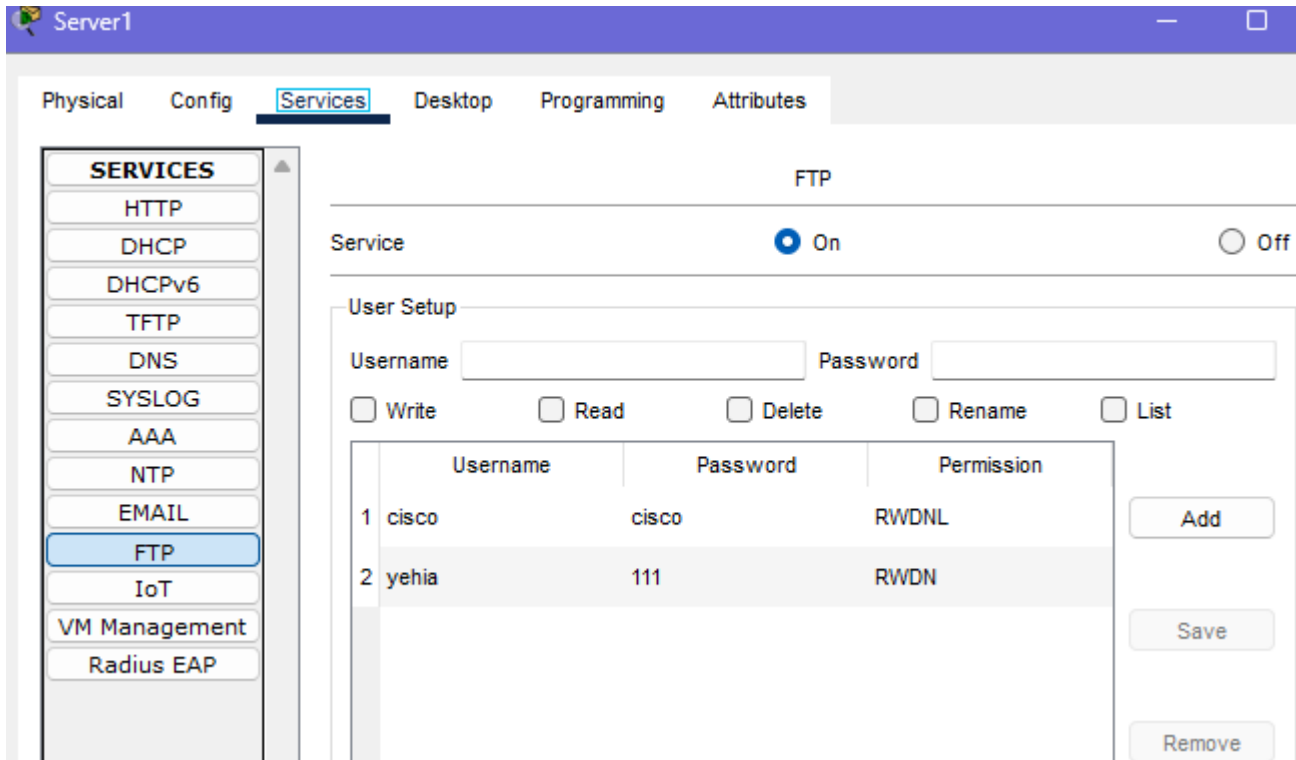
FTP Server (Bonus)

Added a FTP Server to transfer files:



FTP Server (Bonus)

Type username , password and choose permissions:



The screenshot shows the 'Server1' configuration window with the 'Services' tab selected. The 'FTP' service is highlighted in the left sidebar. In the main area, the 'FTP' service is set to 'On'. Below this, the 'User Setup' section contains input fields for 'Username' and 'Password', and checkboxes for 'Write', 'Read', 'Delete', 'Rename', and 'List'. A table lists two users: 'cisco' with password 'cisco' and 'yehia' with password '111', both having 'RWDNL' permissions. 'Add', 'Save', and 'Remove' buttons are on the right.

	Username	Password	Permission
1	cisco	cisco	RWDNL
2	yehia	111	RWDNL

FTP Server (Bonus)

Connect :

```
C:\>ftp 192.168.1.2
Trying to connect...192.168.1.2
Connected to 192.168.1.2
220- Welcome to PT Ftp server
Username:cisco
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
```

Web page (Bonus)

Adding a server for a web page:

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

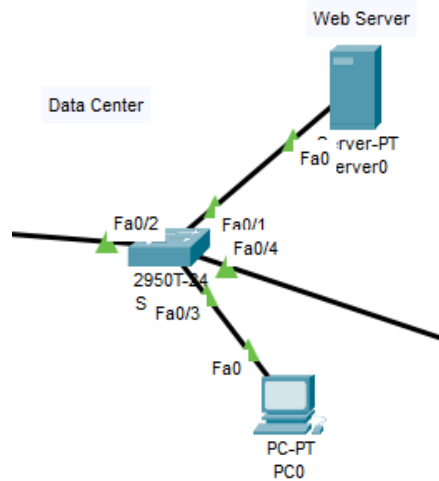
HTTP

HTTP ☒ On ☐ Off

HTTPS ☒ On ☐ Off

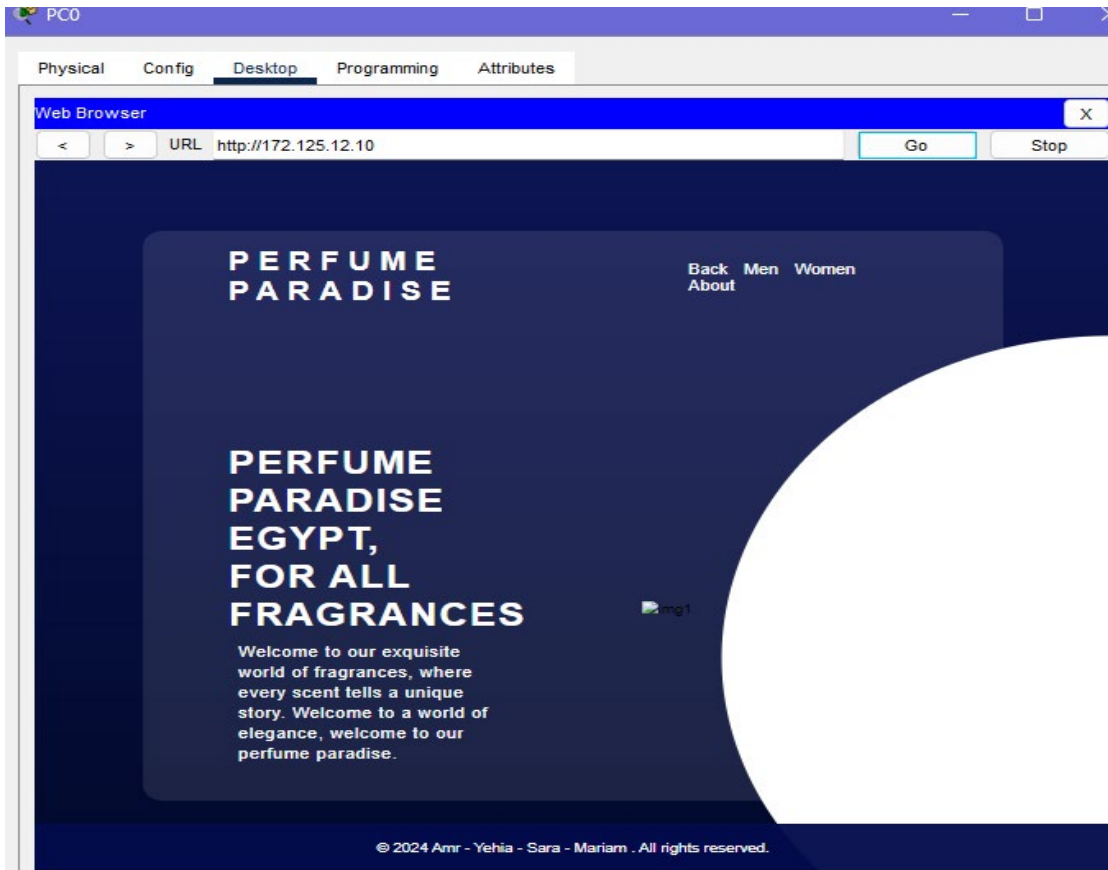
File Manager

	File Name	Edit	Delete
1	copyrights.html	(edit)	(delete)
2	cscoptlogo177x111.jpg		(delete)
3	helloworld.html	(edit)	(delete)
4	image.html	(edit)	(delete)
5	index.html	(edit)	(delete)



Web page (Bonus)

Navigating to the page using the server IP address:

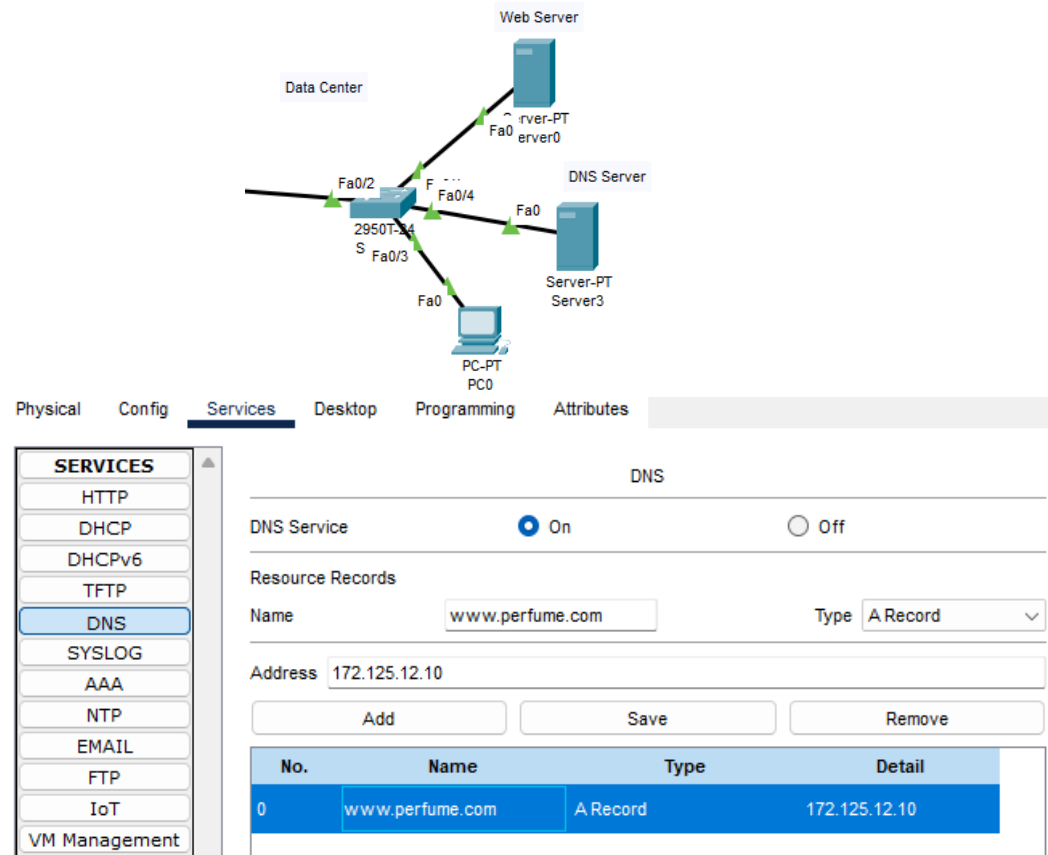


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DNS Server (Bonus)

Translating the previous web page IP address to its name:



The image displays a network diagram and a DNS configuration interface. The network diagram shows a central switch (2950T-24) connected to a Web Server (Server-PT server0), a DNS Server (Server-PT Server3), and a PC (PC-PT PC0). The switch has ports Fa0/2, Fa0/3, and Fa0/4. The Web Server is connected to Fa0/2, the DNS Server to Fa0/4, and the PC to Fa0/3. The DNS configuration interface is shown below the diagram, with the 'Services' tab selected. The 'DNS' service is enabled. The 'Resource Records' section shows a record for 'www.perfume.com' with an 'A Record' type and an address of '172.125.12.10'.

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS**
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management

DNS

DNS Service ☒ On ☐ Off

Resource Records

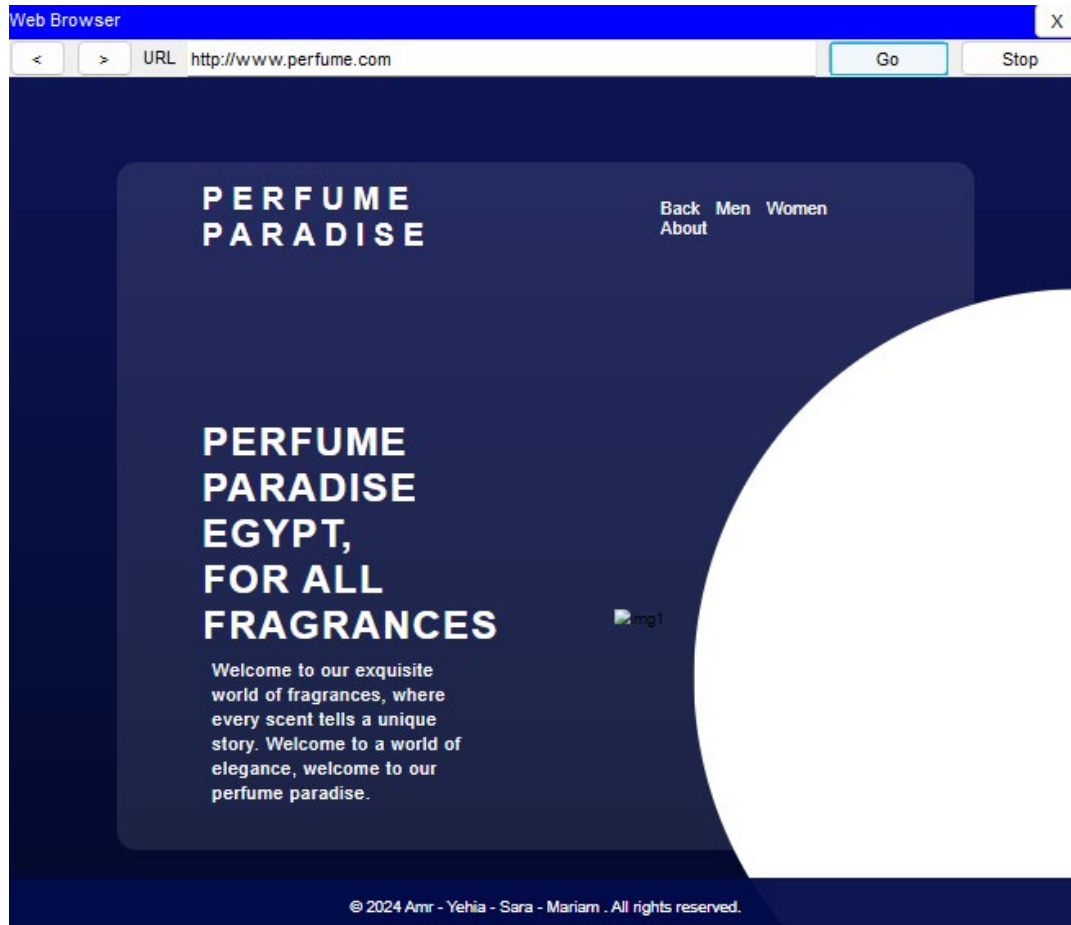
Name Type

Address

No.	Name	Type	Detail
0	www.perfume.com	A Record	172.125.12.10

DNS Server (Bonus)

Navigating by the domain name:

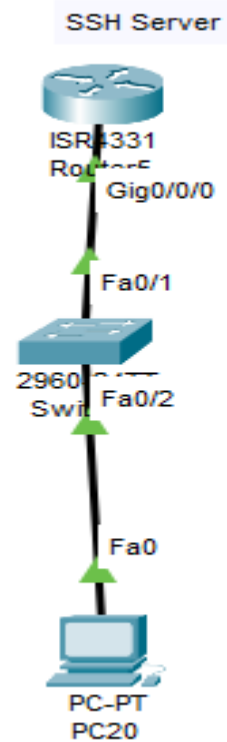


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SSH Server (Bonus)

Made a LAN for SSH server:



SSH Server (Bonus)

Command in the router cli:

```
Ip domain-name SSH1  
Crypto key generate rsa  
Line vty 0 15  
Transport input ssh  
Login local  
Ip ssh ver 2  
Username yehia privilege 15 [assword 111  
Do wr
```



SSH Server (Bonus)

Now we can control the router from the pc cmd:

```
Command Prompt

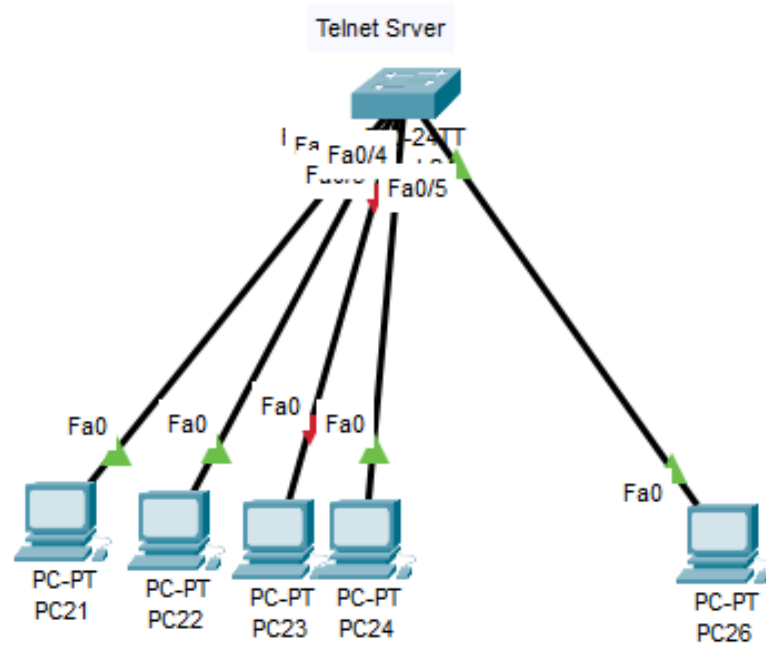
Cisco Packet Tracer PC Command Line 1.0
C:\>ssh -l yehia 192.168.1.50

Password:

yehia#conf
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
yehia(config)#
```

Telnet Server (Bonus)

Made a LAN for the Telnet server:



Telnet Server (Bonus)

Use this command in the switch cli:

```
Interface clan 1
Ip address 192.168.10.100 255.255.255.0
No shutdown
Exit
Line vty 0 15
Password yehia@111
Login
Exit
Exit
Then save
```



Telnet Server (Bonus)

From the cmd from any pc we can access the switch:

```
C:\>telnet 192.168.10.100
Trying 192.168.10.100 ...Open

User Access Verification

Password:
Switch>\
```



Team

Yehia Tarek 2205062

Sara Ahmed 2205094

Nada Mohamed 2205173



End..