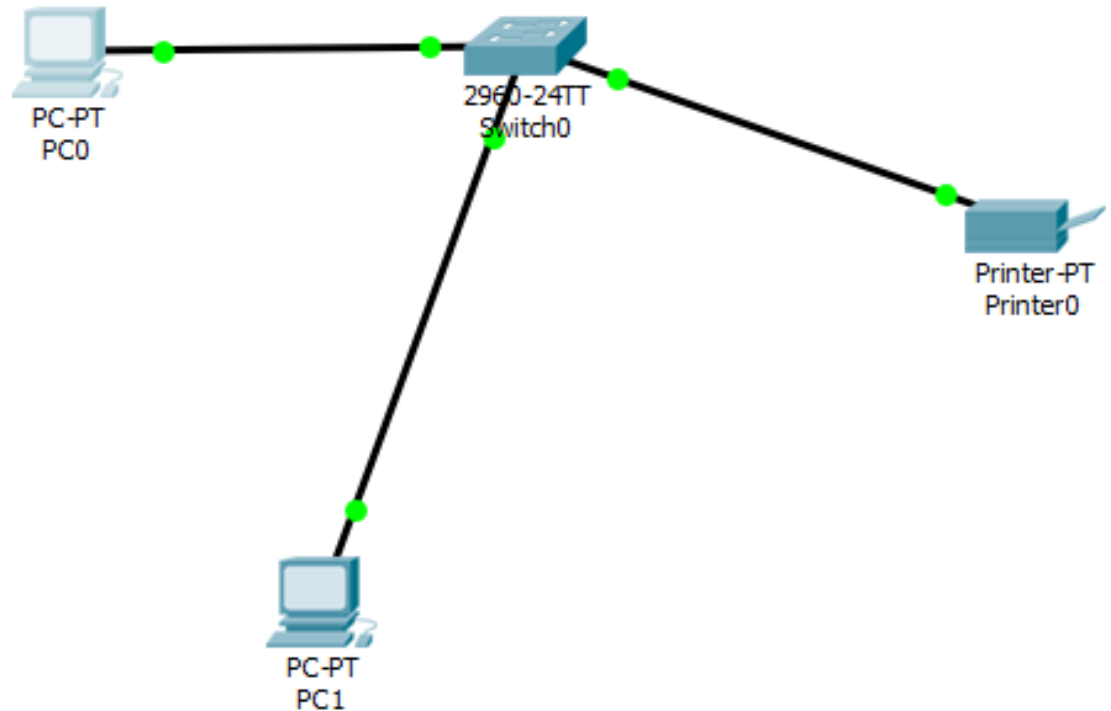


Cloud Computing and Virtualization Lab

Presented by:
Saurabh Singhal
Assistant Professor

Print Server

- 2 PC
- 1 Switch
- 1 Printer



Print Server

PC0

Physical Config Desktop Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IP Address 192.168.1.1

Subnet Mask 255.255.255.0

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

IPv6 Configuration

PC0

PC1

Physical Config Desktop Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IP Address 192.168.1.2

Subnet Mask 255.255.255.0

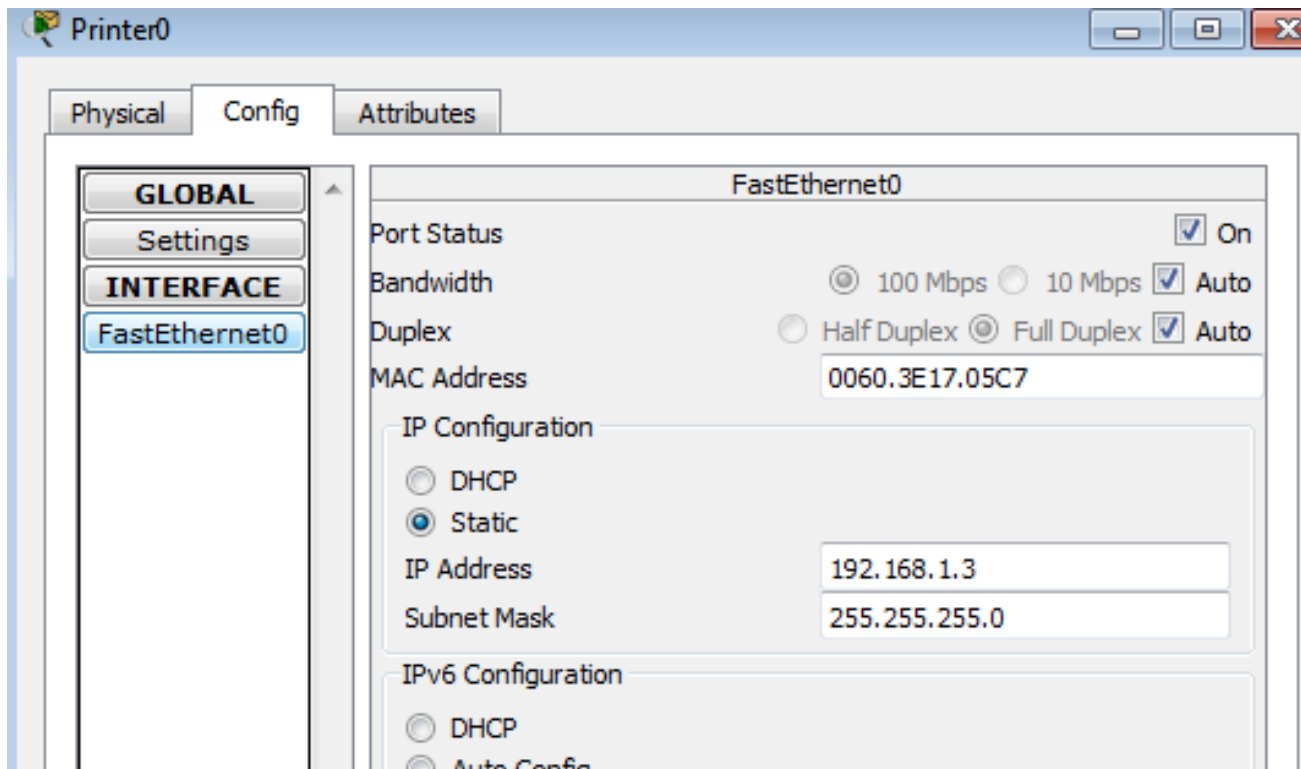
Default Gateway 0.0.0.0

DNS Server 0.0.0.0

PC1

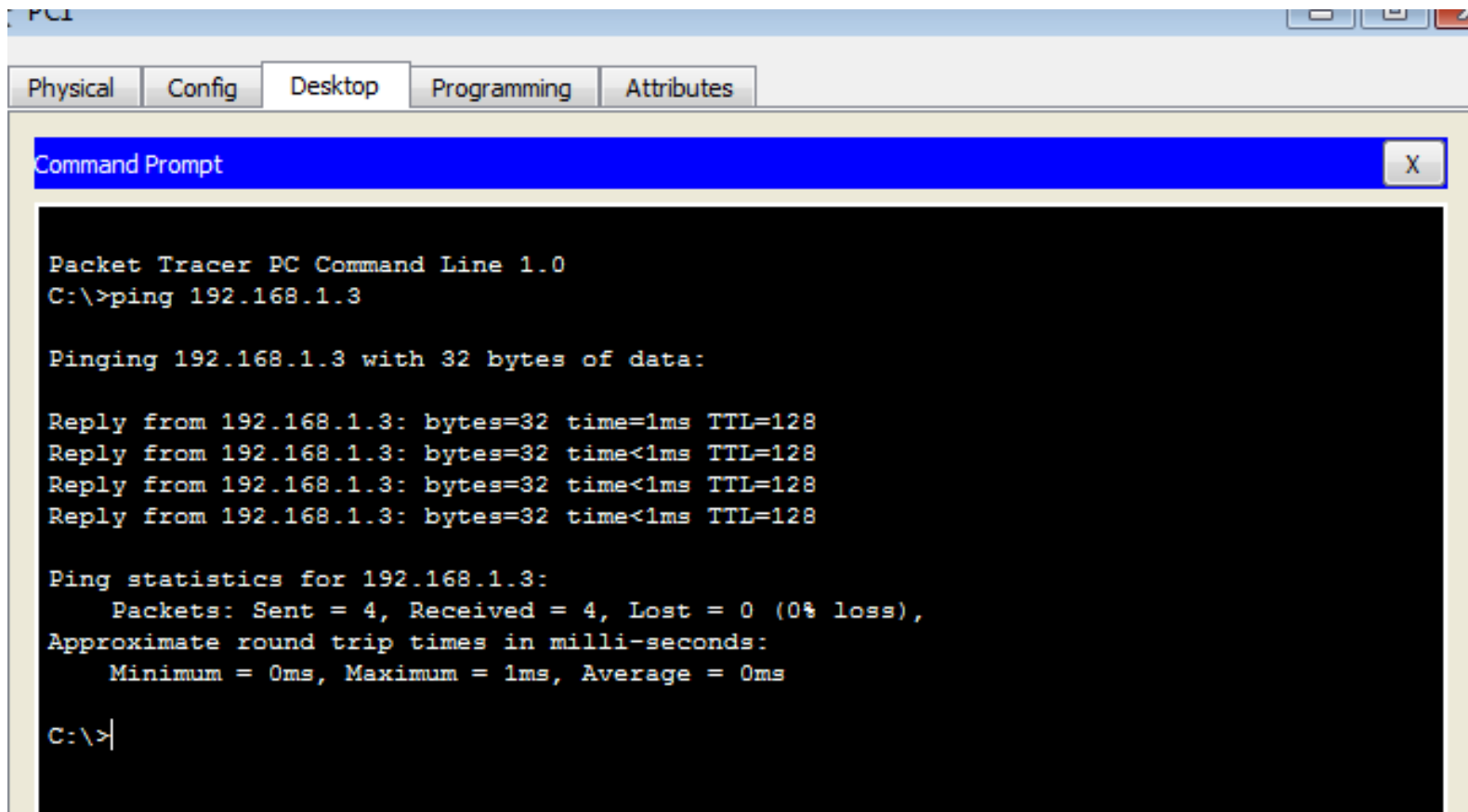
Print Server

- Assign the IP to printer



Print Server

- Click on PC and ping 192.168.1.3



The screenshot shows a Packet Tracer PC Command Line window. The window has tabs for Physical, Config, Desktop, Programming, and Attributes. The Command Prompt is open, displaying the output of a ping command to 192.168.1.3. The output shows four successful replies with 32 bytes of data, a time of 1ms, and a TTL of 128. The ping statistics show 4 packets sent, 4 received, and 0% loss.

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

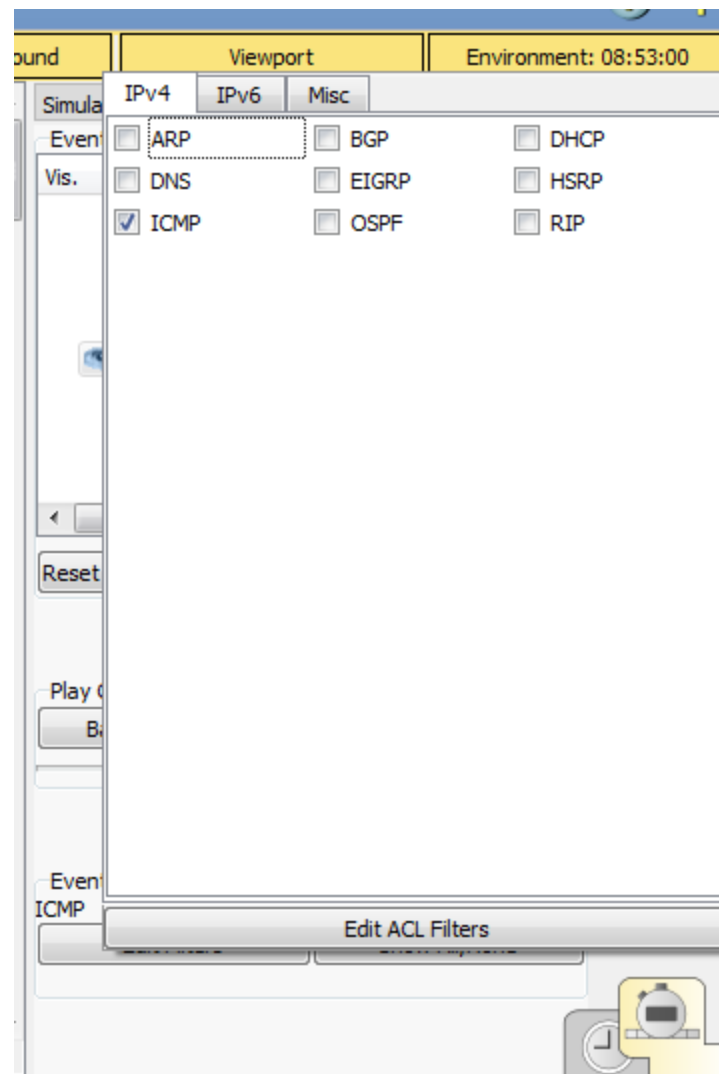
Reply from 192.168.1.3: bytes=32 time=1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128
Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

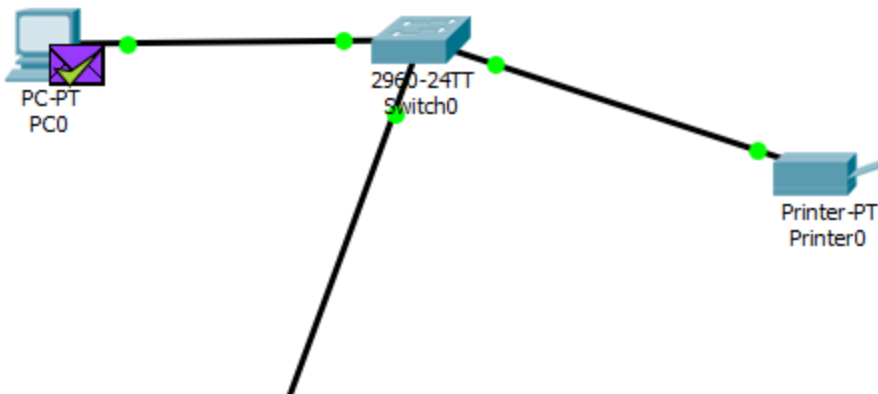
Print Server

- Click on simulation
- Click on show all/none
- Click on edit filters
- Select ICMP



Print Server

- Select PDU and first click on any PC and then on Printer.
- Trace the activity of packet using Auto



Event List

Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.000	--	PC0	ICMP	
	0.001	PC0	Switch0	ICMP	
	0.002	Switch0	Printer0	ICMP	
	0.003	Printer0	Switch0	ICMP	
	0.004	Switch0	PC0	ICMP	

Reset Simulation ☒ Constant Delay Captured to: 0.004 s

Play Controls
 Back Auto Capture / Play Capture / Forward

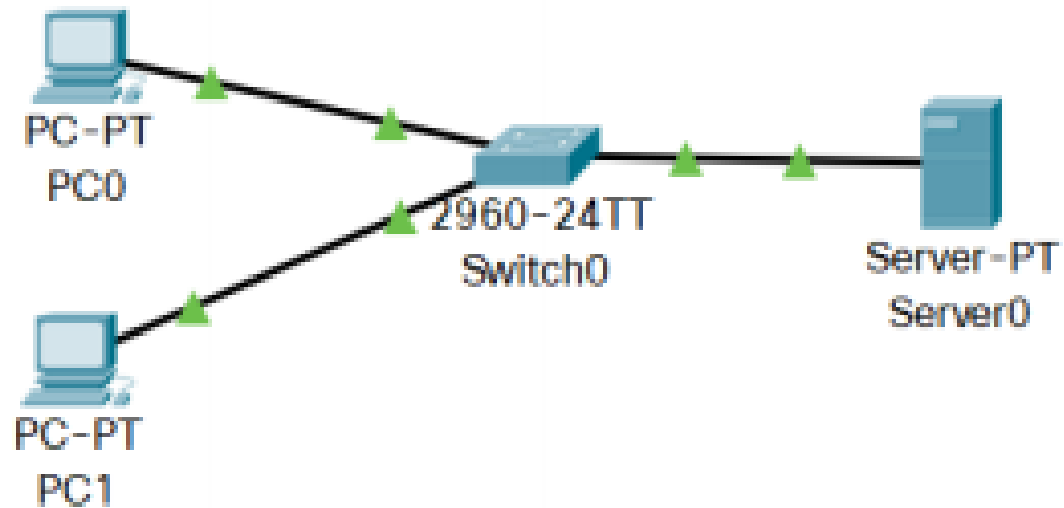
FTP

- The File Transfer Protocol is a standard network protocol used for the transfer of computer files between a client and server on a computer network.
- FTP is built on a client-server model architecture using separate control and data connections between the client and the server

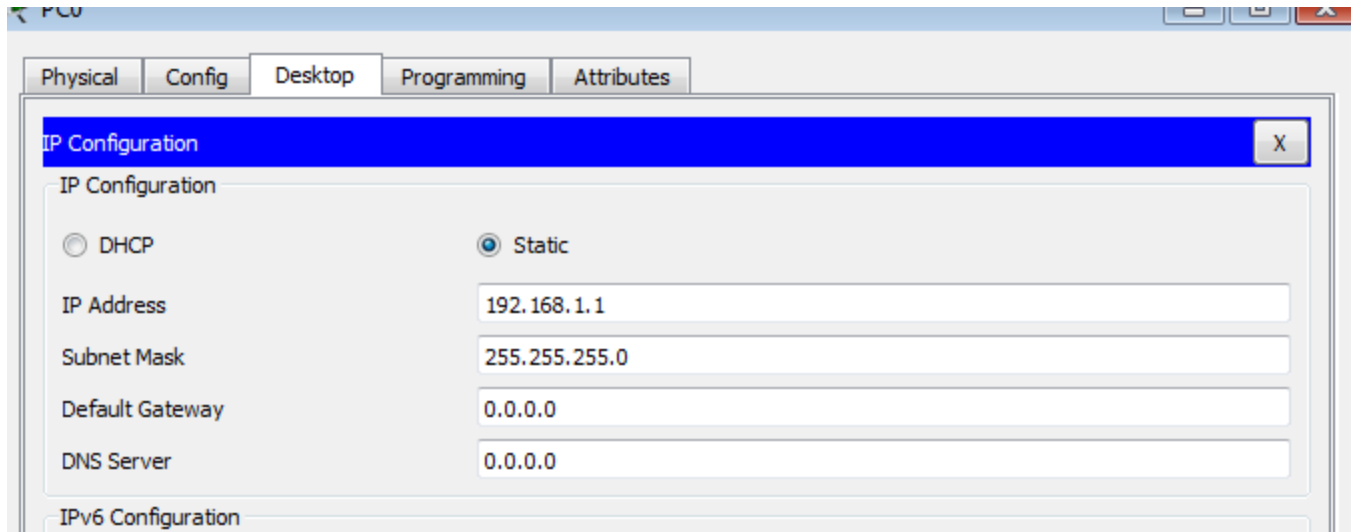
FTP Server

- An **FTP Server** is a piece of software that is running on a computer and uses the File Transfer Protocol to store and share files.
- Remote computers can connect anonymously, if allowed, or with a user name and password in order to download files from this **server** using a piece of software called a **FTP Client**

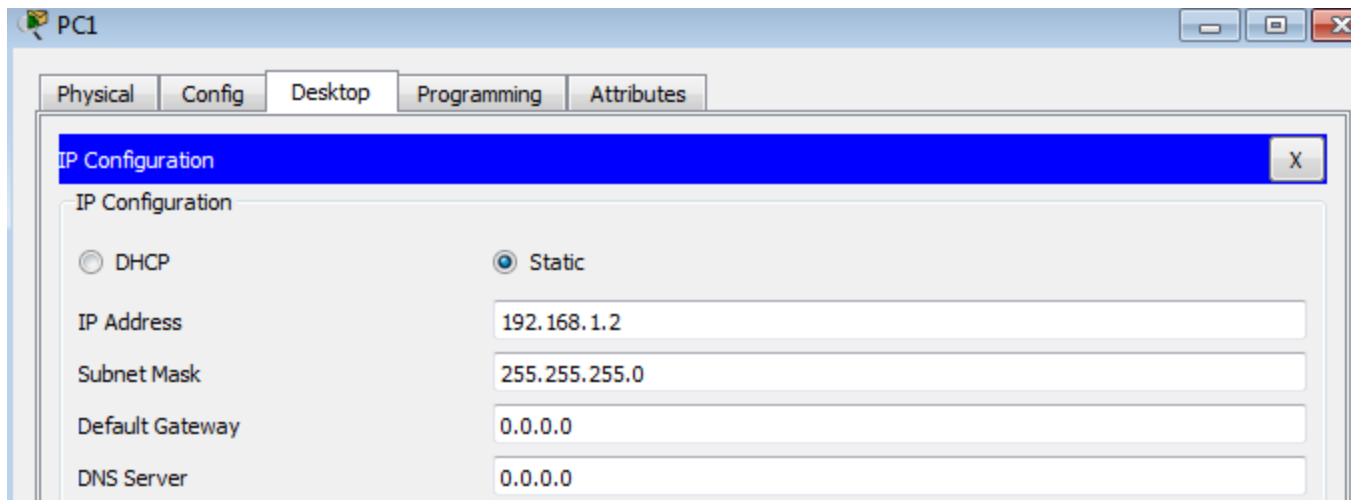
FTP Server



FTP Server



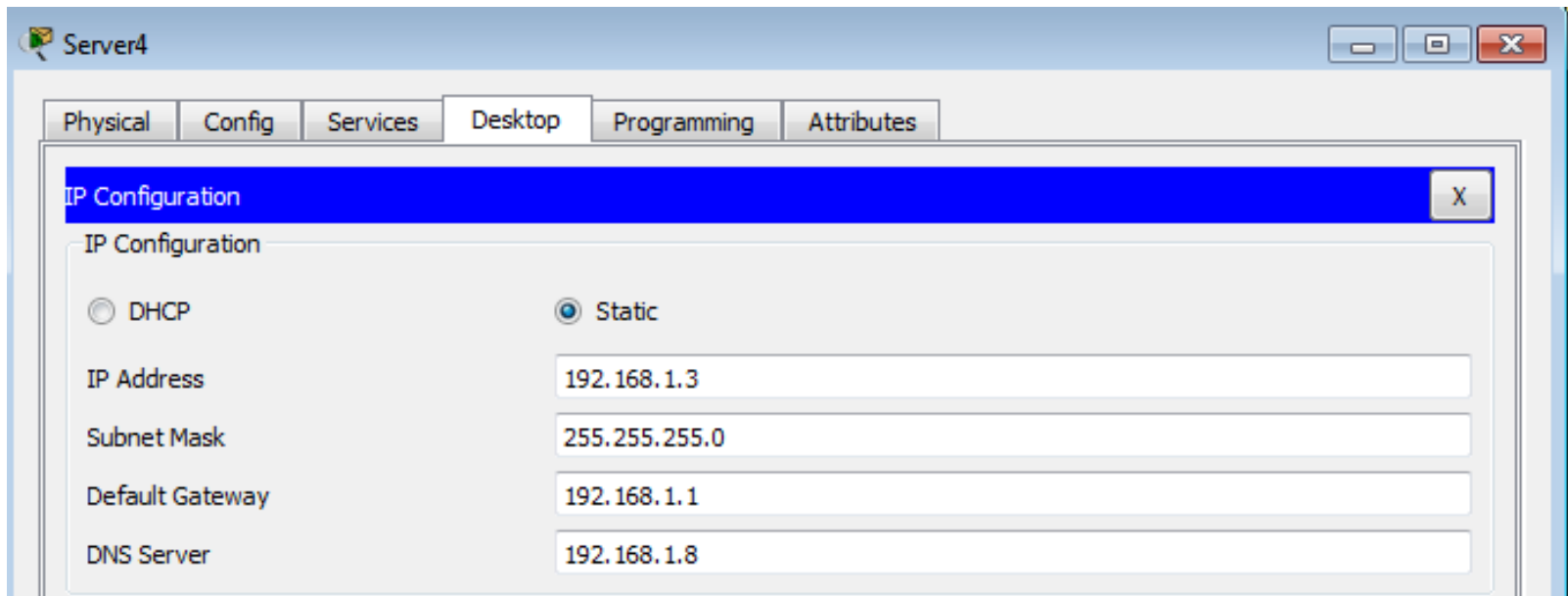
PC0



PC1

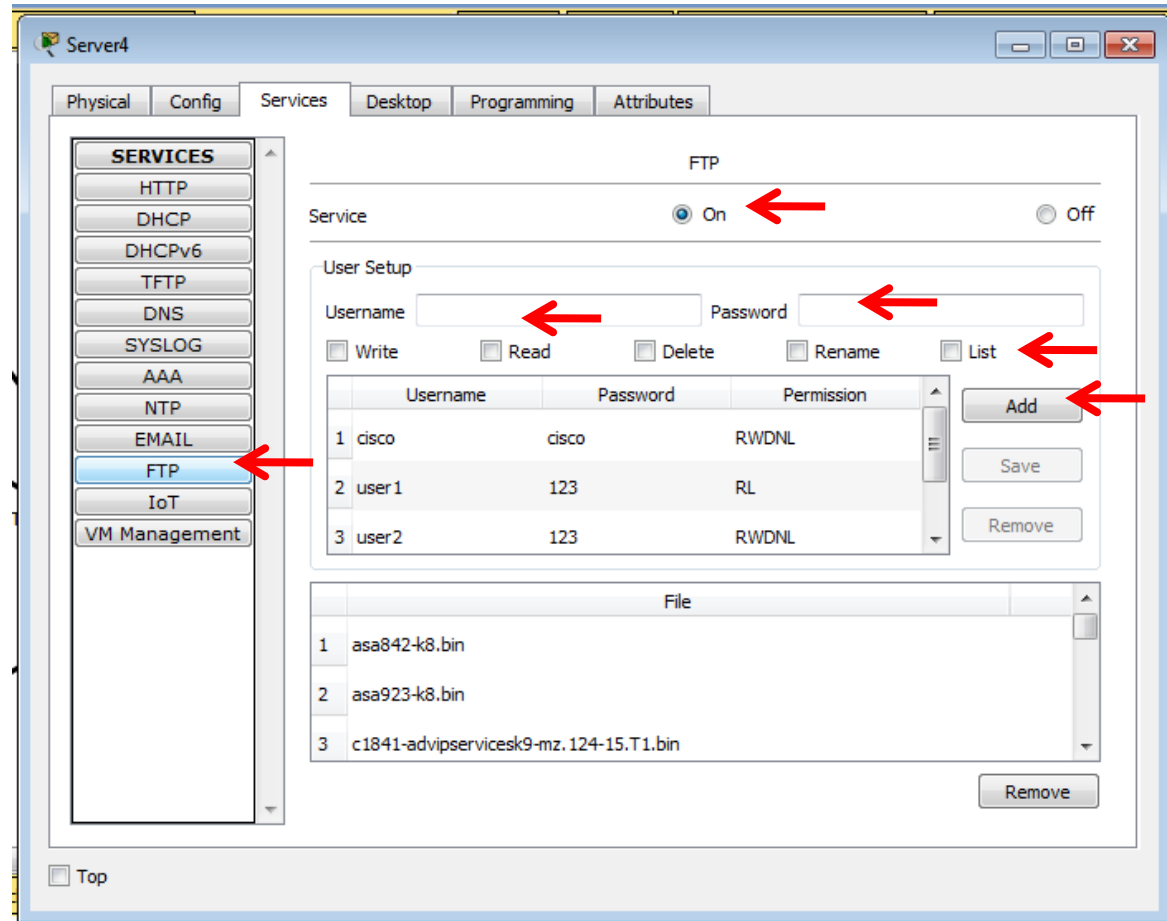
To Create a FTP Server

- Click on the Server
- Click on the Desktop tab.
 - Click on the IP Configuration icon.
 - Click on the IP Address dialog box and assign following IP



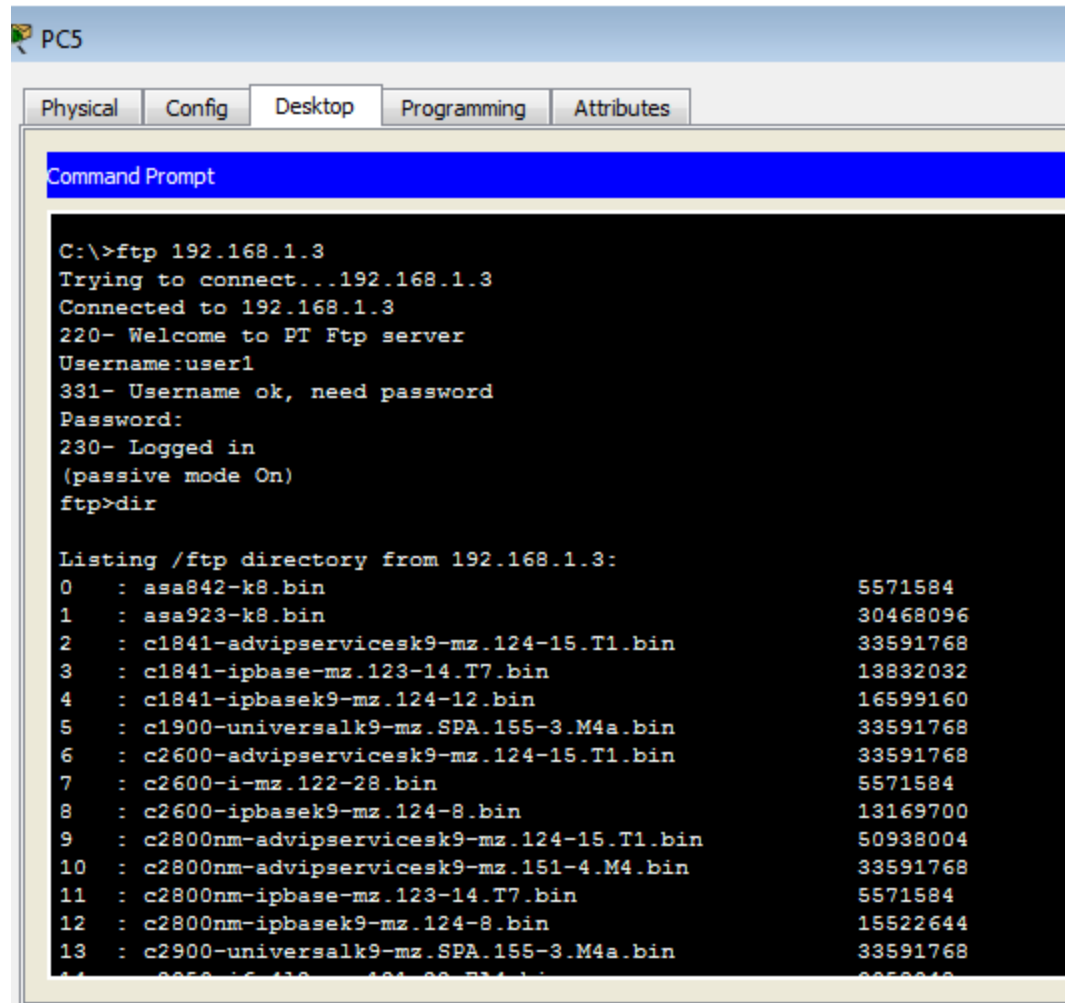
To Create a FTP Server

- Click on the Service Tab
- Select FTP service
- Check whether the FTP Services are enabled
- To add user in username and password.
- Give permission
- Click on Add.



To Create a FTP Server

- Click on any PC
- Click on Desktop Tab and then Command Prompt.
- Type ftp and press enter
- Type username and password.
- Type dir
- Try to delete a file
- We are done with FTP server

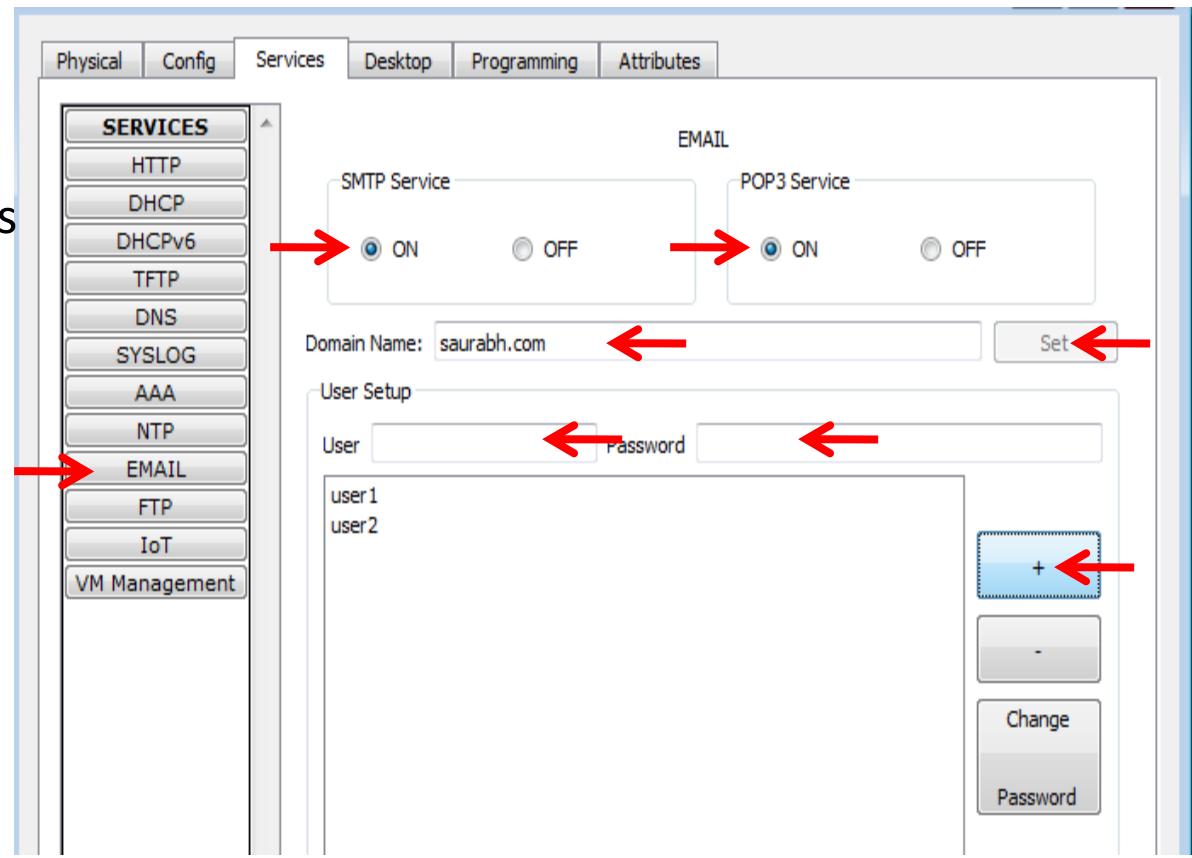


```
PC5
Physical Config Desktop Programming Attributes
Command Prompt
C:\>ftp 192.168.1.3
Trying to connect...192.168.1.3
Connected to 192.168.1.3
220- Welcome to PT Ftp server
Username:user1
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>dir

Listing /ftp directory from 192.168.1.3:
0 : asa842-k8.bin 5571584
1 : asa923-k8.bin 30468096
2 : c1841-advipservicesk9-mz.124-15.T1.bin 33591768
3 : c1841-ipbase-mz.123-14.T7.bin 13832032
4 : c1841-ipbasek9-mz.124-12.bin 16599160
5 : c1900-universalk9-mz.SPA.155-3.M4a.bin 33591768
6 : c2600-advipservicesk9-mz.124-15.T1.bin 33591768
7 : c2600-i-mz.122-28.bin 5571584
8 : c2600-ipbasek9-mz.124-8.bin 13169700
9 : c2800nm-advipservicesk9-mz.124-15.T1.bin 50938004
10 : c2800nm-advipservicesk9-mz.151-4.M4.bin 33591768
11 : c2800nm-ipbase-mz.123-14.T7.bin 5571584
12 : c2800nm-ipbasek9-mz.124-8.bin 15522644
13 : c2900-universalk9-mz.SPA.155-3.M4a.bin 33591768
14 : c2900-universalk9-mz.SPA.155-3.M4a.bin 33591768
```

To Create a Email Server

- Click on the Server (FTP Server)
- Click on the Service Tab
- Select Email service
- Check whether the SMTP and POP3 Services are enabled
- To add a domain name
- To add at least two user
- Click on Add.



Physical Config **Services** Desktop Programming Attributes

SERVICES

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

EMAIL

SMTP Service: ☒ ON ☐ OFF

POP3 Service: ☒ ON ☐ OFF

Domain Name: saurabh.com

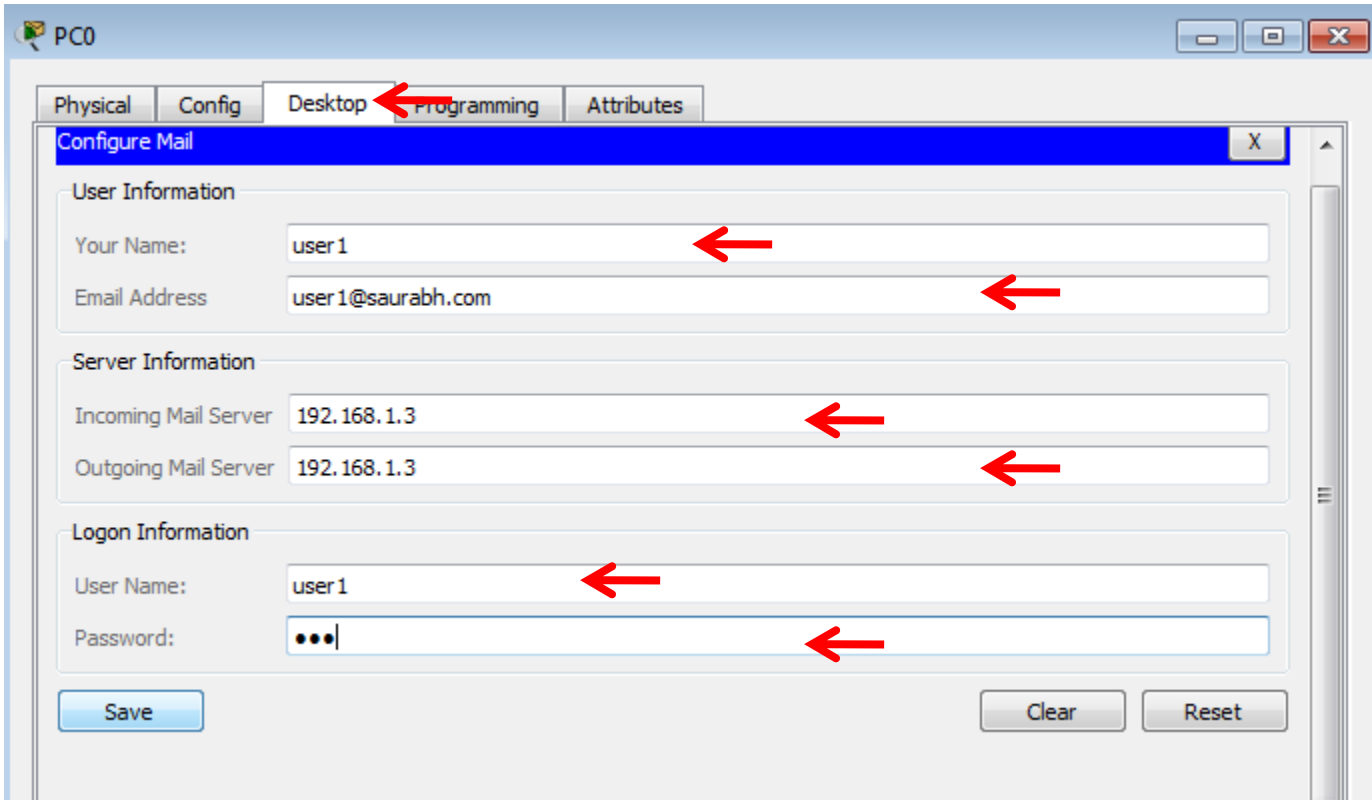
User Setup

User Password

user1
user2

To Create a Email Server

- Click on PC0, select desktop tab and chose email
- Configure mail and click on save



PC0

Physical Config Desktop Programming Attributes

Configure Mail

User Information

Your Name: user1

Email Address: user1@saurabh.com

Server Information

Incoming Mail Server: 192.168.1.3

Outgoing Mail Server: 192.168.1.3

Logon Information

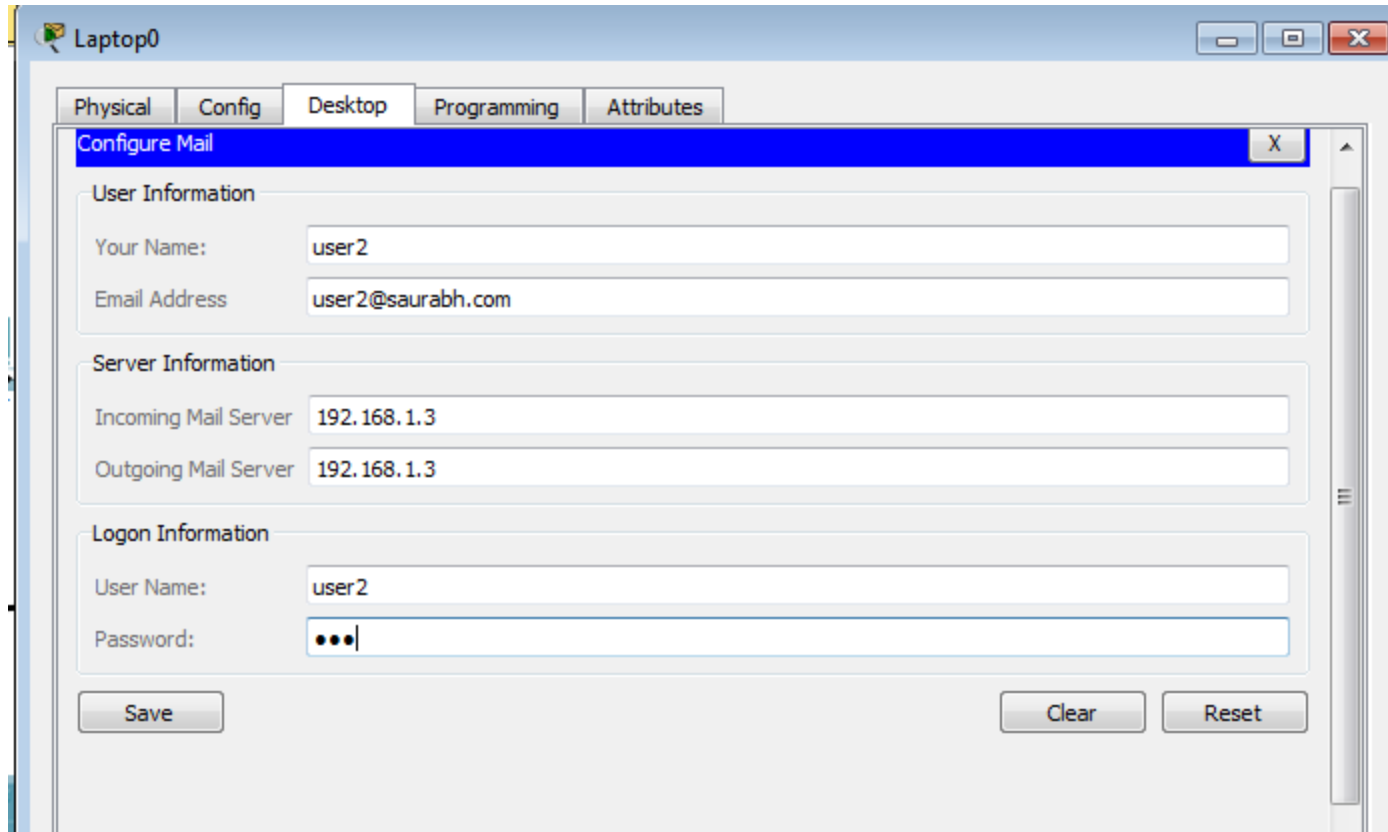
User Name: user1

Password: ...

Save Clear Reset

To Create a Email Server

- Click on PC1, select desktop tab and chose email
- Configure mail and click on save

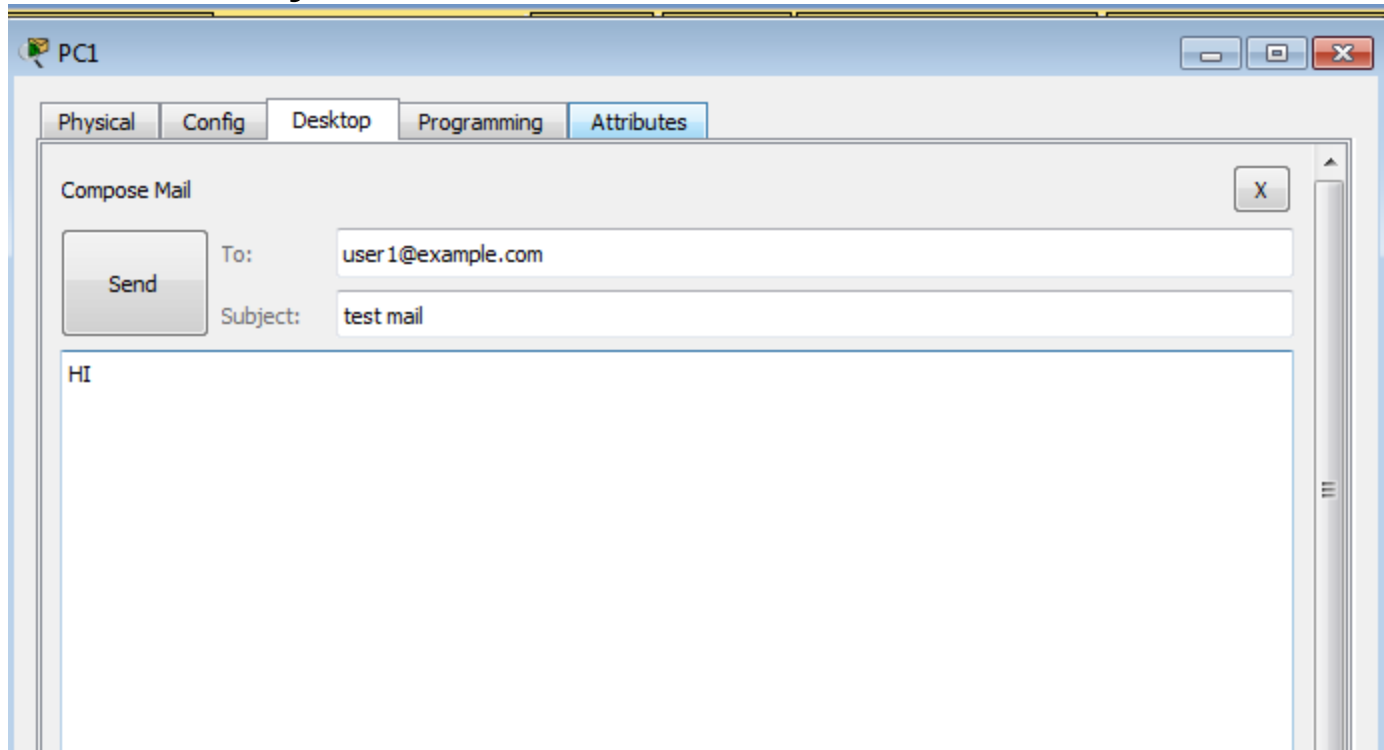


The screenshot shows a window titled 'Laptop0' with a tabbed interface. The 'Desktop' tab is selected, and within it, the 'Configure Mail' dialog box is open. The dialog box has three sections: 'User Information', 'Server Information', and 'Logon Information'. In the 'User Information' section, 'Your Name' is 'user2' and 'Email Address' is 'user2@saurabh.com'. In the 'Server Information' section, both 'Incoming Mail Server' and 'Outgoing Mail Server' are '192.168.1.3'. In the 'Logon Information' section, 'User Name' is 'user2' and 'Password' is masked with dots. At the bottom are 'Save', 'Clear', and 'Reset' buttons.

Section	Field	Value
User Information	Your Name:	user2
	Email Address	user2@saurabh.com
Server Information	Incoming Mail Server	192.168.1.3
	Outgoing Mail Server	192.168.1.3
Logon Information	User Name:	user2
	Password:	•••

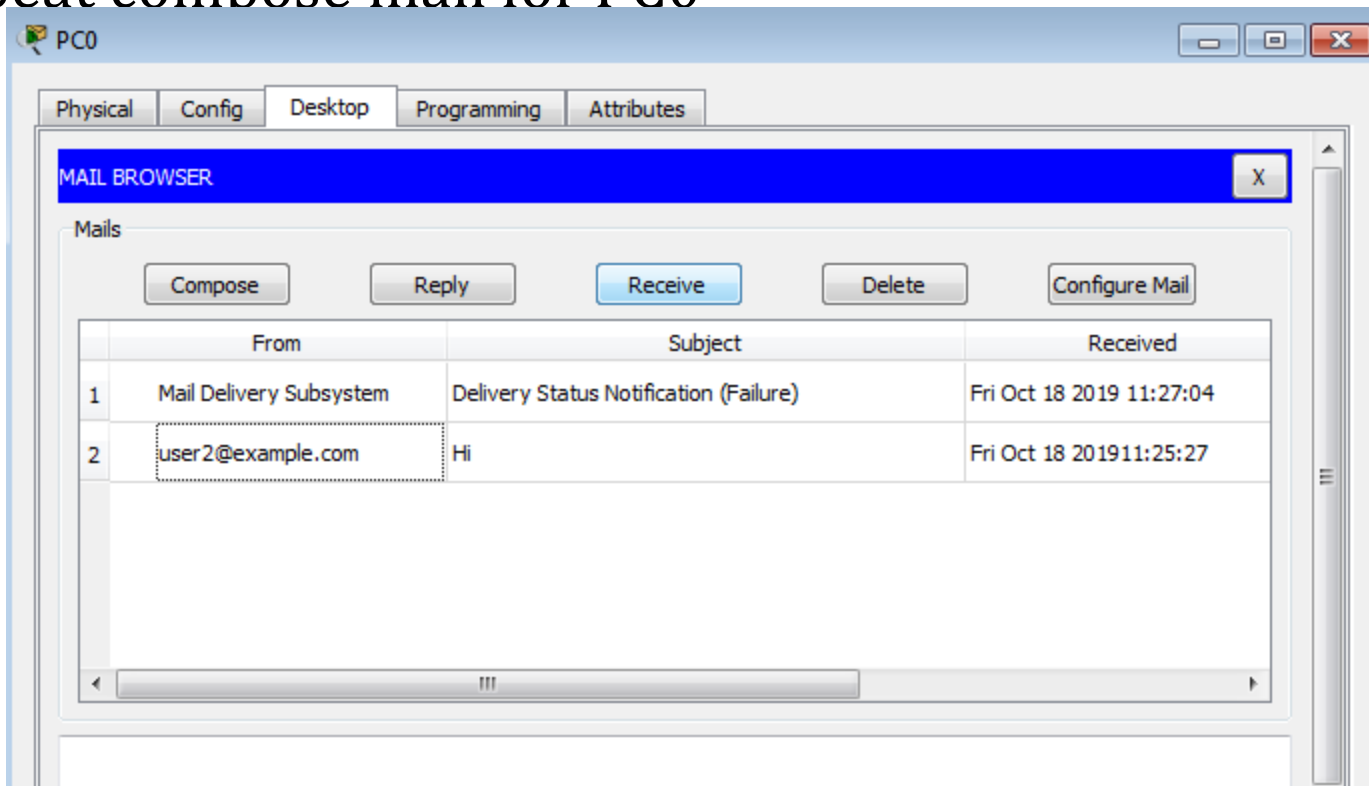
To Create a Email Server

- Click on PC1, select desktop tab and chose email
- Click on compose
- Fill the entry and click on send



To Create a Email Server

- Click on PC1, select desktop tab and chose email
- Click on receive. You will find your mail here
- Repeat compose mail for PC0



DHCP

- Dynamic Host Configuration Protocol (**DHCP**) is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway.
- A DHCP server enables computers to request IP addresses and networking parameters automatically from the Internet service provider (ISP), reducing the need for a network administrator or a user to manually assign IP addresses to all network devices

DHCP Server

- A **DHCP Server** is a network **server** that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices.
- It relies on the standard protocol known as Dynamic Host Configuration Protocol or **DHCP** to respond to broadcast queries by clients.

To Create a DHCP Server

- Click on the Server0
 - Click on the Desktop tab.
 - Click on the IP Configuration icon.
 - Click on the IP Address dialog box.
 - Type in 192.168.1.1 as the address and press enter.
 - A default value of 255.255.255.0 should appear in the Subnet Mask field.
 - Type 192.168.1.1 as the default gateway and press enter.
 - Type 0.0.0.0 as the default DNS server and press enter.

To Create a DHCP Server

- **Configure the server0**
- Select the Services tab.
- Select DHCP from the SERVICES list in the left pane.
- In the DHCP configuration window, configure a DHCP as shown in the figure with the following settings.
- Click On to turn the DCHP service on
- Pool name: serverpool
- Default Gateway: 192.168.1.1
- DNS Server: 0.0 .0.0
- Starting IP Address: 192.168.1.21
- Subnet Mask 255.255.255.0
- Click save to add the pool

Server0

Physical
Config
Services
Desktop
Programming
Attributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

DHCP

Interface

FastEthernet0

Service
☒ On
☐ Off

Pool Name

serverPool

Default Gateway

192.168.1.1

DNS Server

0.0.0.0

Start IP Address :

192

168

1

0

Subnet Mask:

255

255

255

0

Maximum Number of Users :

235

TFTP Server:

0.0.0.0

WLC Address:

0.0.0.0

Add

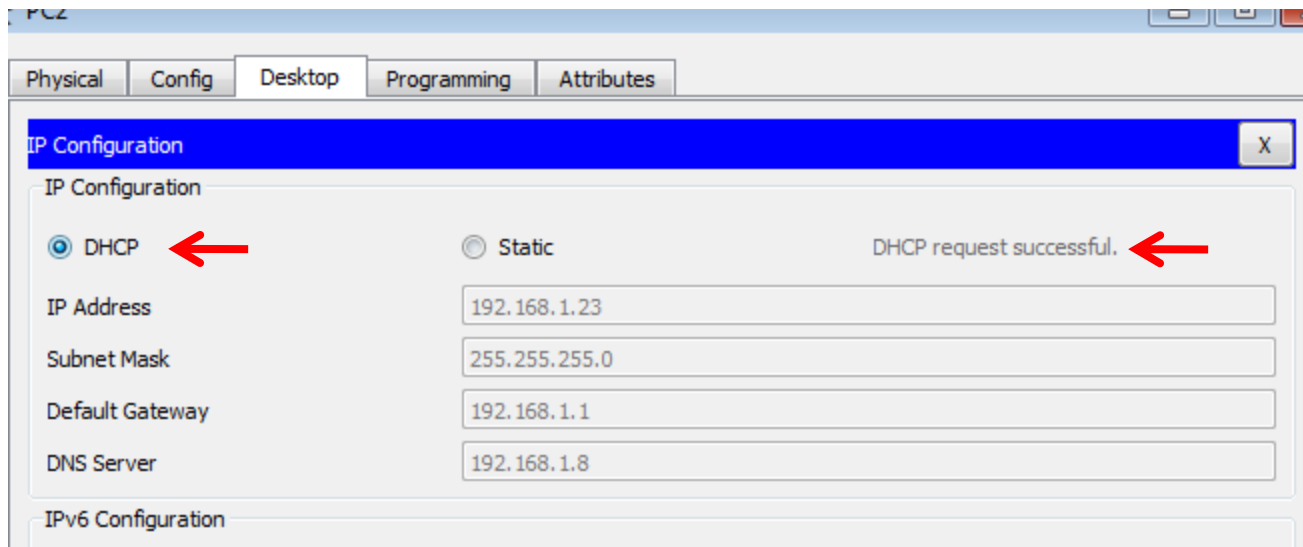
Save

Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max Jse	TFTP Server	WLC Address
serverPool	192.168...	0.0.0.0	192.168...	255.255...	235	0.0.0.0	0.0.0.0

Create a DHCP Server

- Click on the PC connected to fa0/0
- Click on the PC icon on the Logical workspace
- Select the Desktop tab and then the IP Configuration icon
- Switch to DHCP instead of Static
- Check whether DHCP is Successful.



DNS

- The Domain Name System (DNS) is a hierarchical and decentralized naming system for computers, services, or other resources connected to the Internet or a private network.
- It associates various information with domain names assigned to each of the participating entities.
- The Domain Name System delegates the responsibility of assigning domain names and mapping those names to Internet resources by designating authoritative name servers for each domain

DNS Server

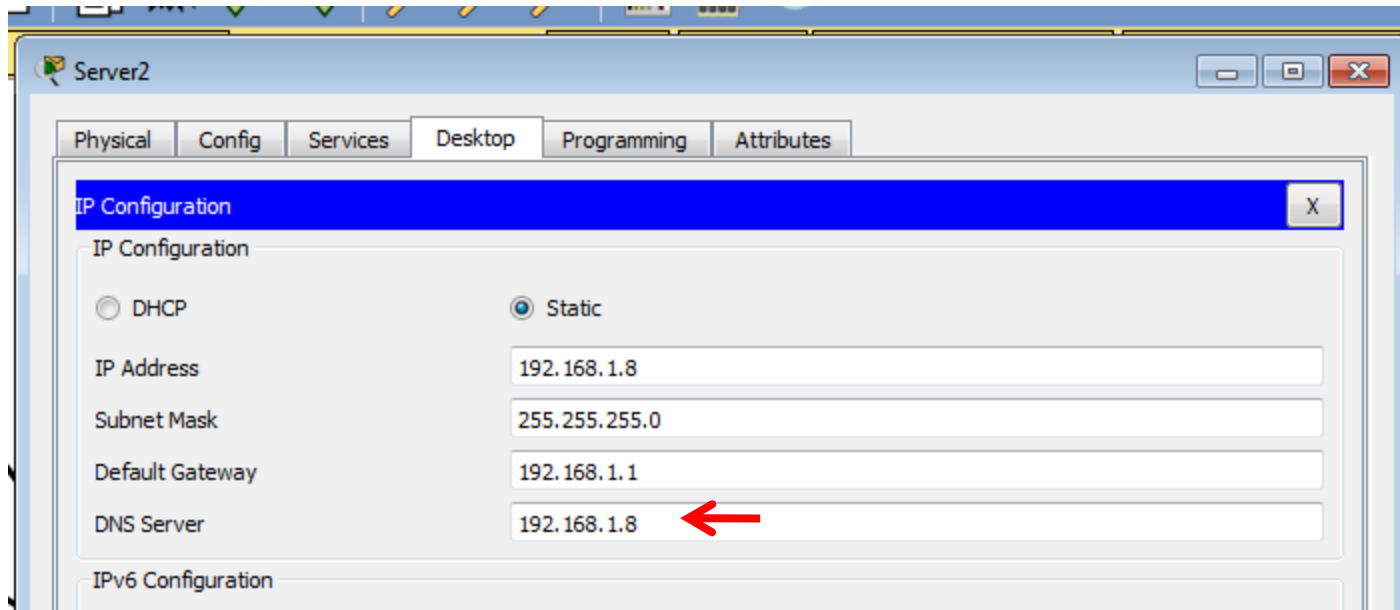
- A **DNS server** is a computer **server** that contains a database of public IP addresses and their associated hostnames, and in most cases serves to resolve, or translate, those names to IP addresses as requested.
- **DNS servers** run special software and communicate with each other using special protocols

Create a DNS Server

- Click on the Server1
 - Click on the Desktop tab.
 - Click on the IP Configuration icon.
 - Click on the IP Address dialog box.
 - Type in 192.168.1.8 as the address and press enter.
 - A default value of 255.255.255.0 should appear in the Subnet Mask field.
 - Type 192.168.1.1 as the default gateway and press enter.
 - Type 192.168.1.8 as the DNS and press enter.

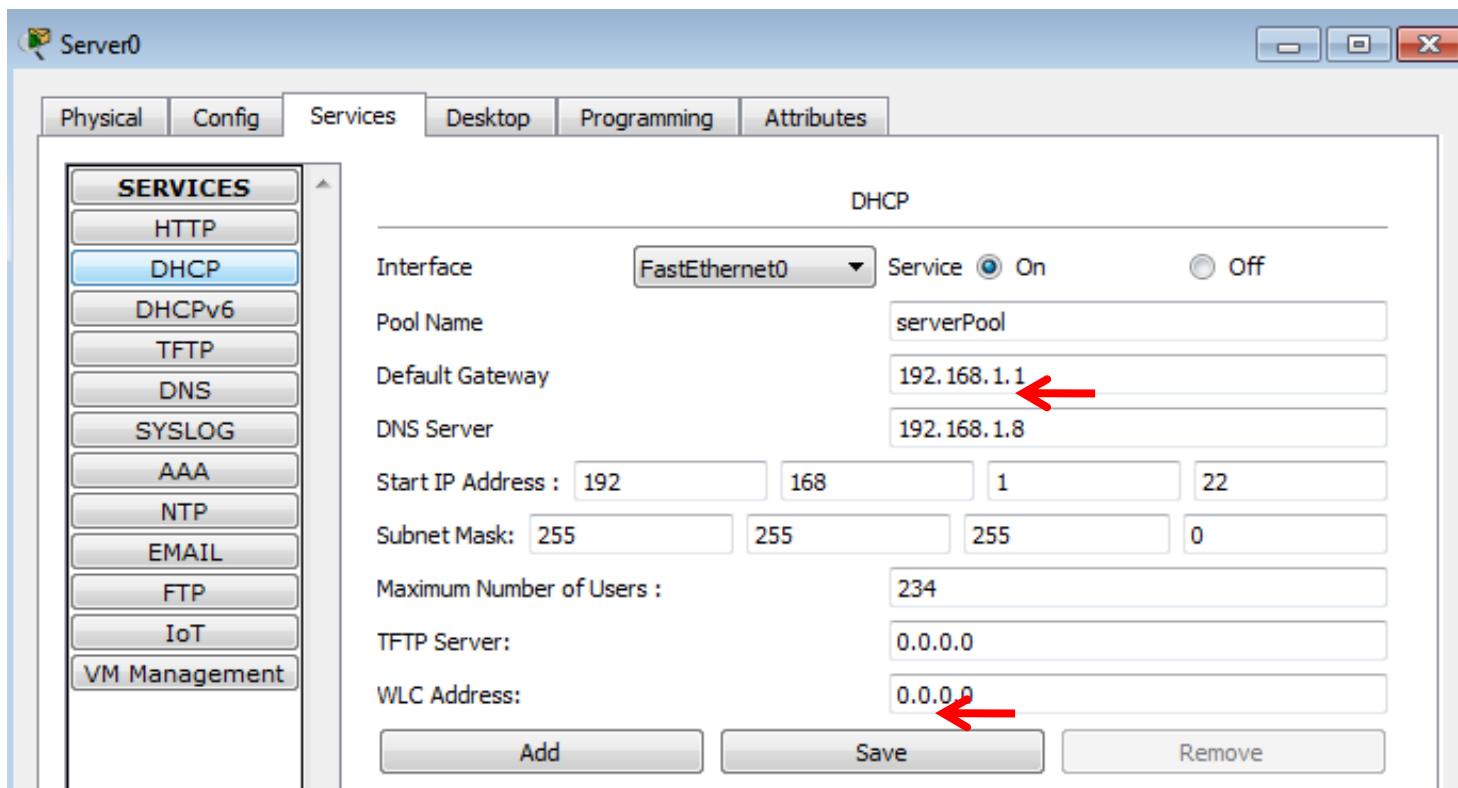
Create a DHCP Server

- Update DHCP server adding DNS server(192.168.1.8) IP in IP configuration in Desktop tab



Create a DNS Server

- Update DHCP server by adding DNS server(192.168.1.8) IP in DHCP services in service tab and then save



The screenshot shows the 'Server0' configuration window with the 'Services' tab selected. The 'DHCP' service is highlighted in the left sidebar. The main configuration area for DHCP is displayed, showing the following settings:

- Interface: FastEthernet0
- Service: ☒ On ☐ Off
- Pool Name: serverPool
- Default Gateway: 192.168.1.1 (indicated by a red arrow)
- DNS Server: 192.168.1.8
- Start IP Address: 192.168.1.22
- Subnet Mask: 255.255.255.0
- Maximum Number of Users: 234
- TFTP Server: 0.0.0.0
- WLC Address: 0.0.0.0 (indicated by a red arrow)

At the bottom, there are three buttons: 'Add', 'Save', and 'Remove'.

HTTP

- **HTTP** means HyperText Transfer Protocol. **HTTP** is the underlying protocol used by the World Wide Web and this protocol defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands
- Communication between client computers and web servers is done by sending **HTTP** Requests and receiving **HTTP** Responses

HTTP Server

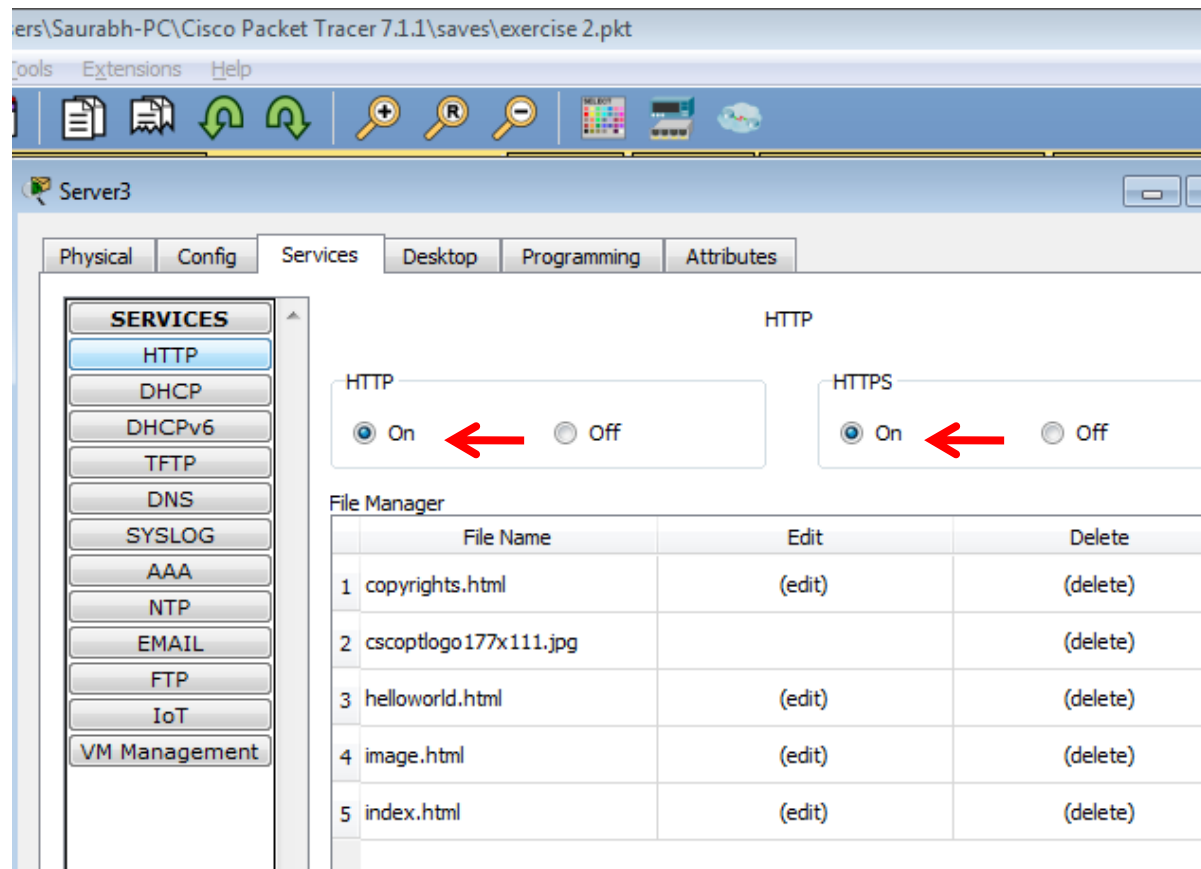
- A **HTTP server** is a computer that runs websites.
- It's a computer program that distributes web pages as they are requisitioned.

To Create a HTTP Server

- Click on the Server3 linked to fa0/1
 - Click on the Desktop tab.
 - Click on the IP Configuration icon.
 - Click on the IP Address dialog box.
 - Type in 10.0.0.10 as the address and press enter.
 - A default value of 255.0.0.0 should appear in the Subnet Mask field.
 - Type 10.0.0.1 as the default gateway and press enter.
 - Type 192.168.1.8 as the DNS and press enter.

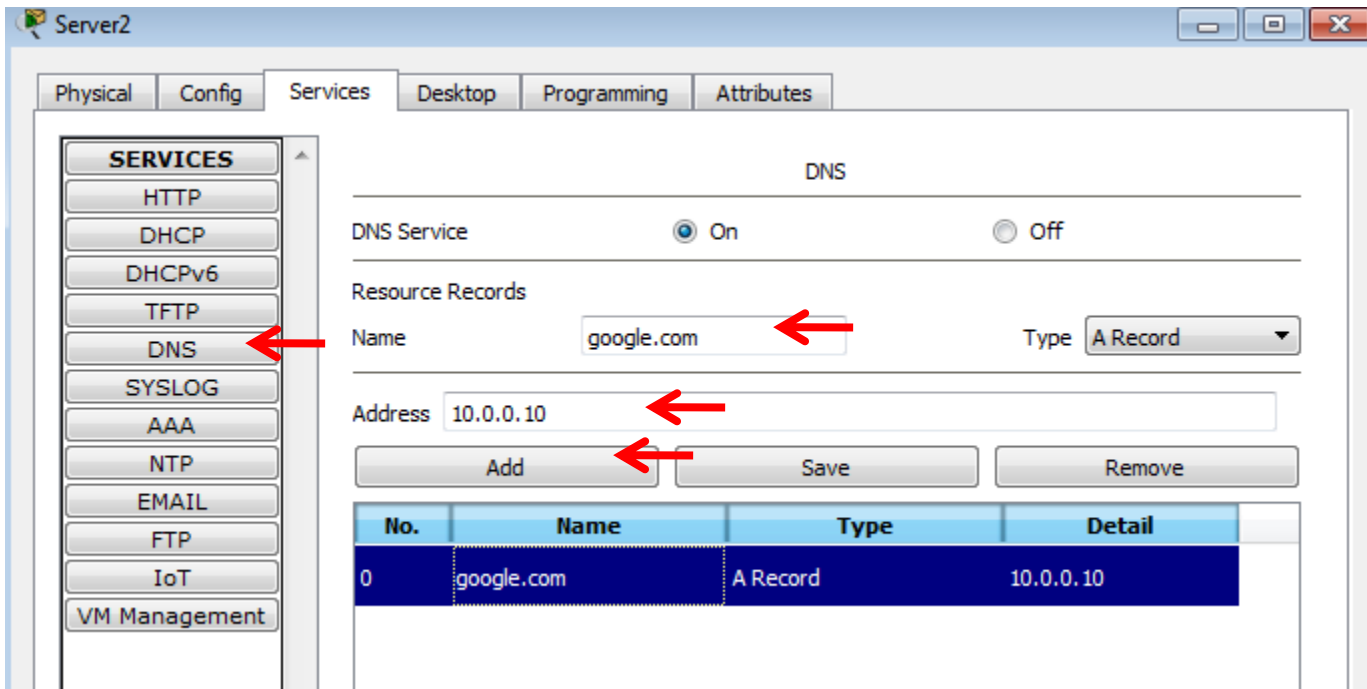
To Create a HTTP Server

- Click on the Service Tab
- Select HTTP service
- Check whether both HTTP and HTTPS are enabled.
- To Create record on DNS Server



To Create a HTTP Server

- Click on the Server0 (DNS Server)
- Select the service tab and Select DNS service
 - Add a name (google.com) in name and Add a 10.0.0.10 in address
 - And then click on Add



Server2

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

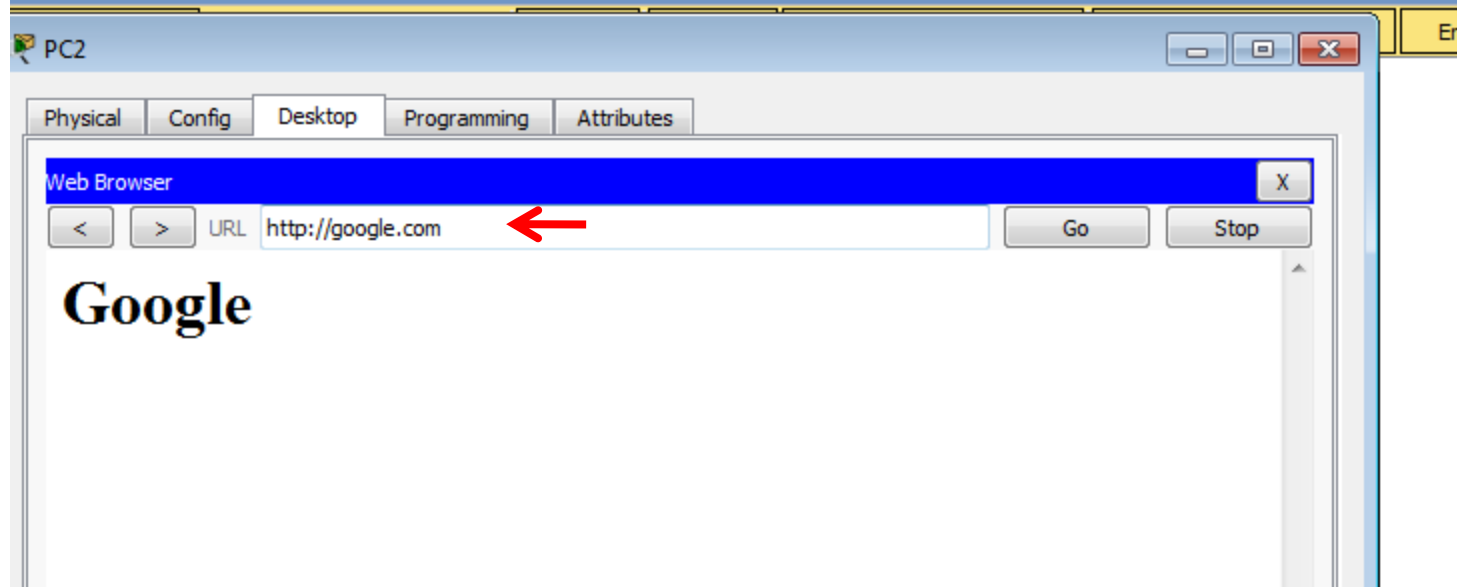
Name Type **A Record**

Address

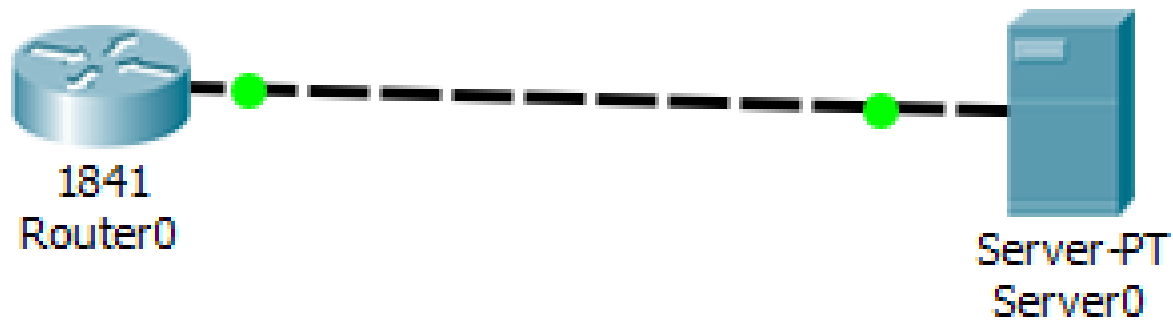
No.	Name	Type	Detail
0	google.com	A Record	10.0.0.10

To Create a HTTP Server

- Click on the PC
 - Click on the Desktop tab and Click on the Web Browser icon.
 - In URL type: google.com
 - We are done with HTTP/HTTPS server



Network Time Protocol(NTP) Server

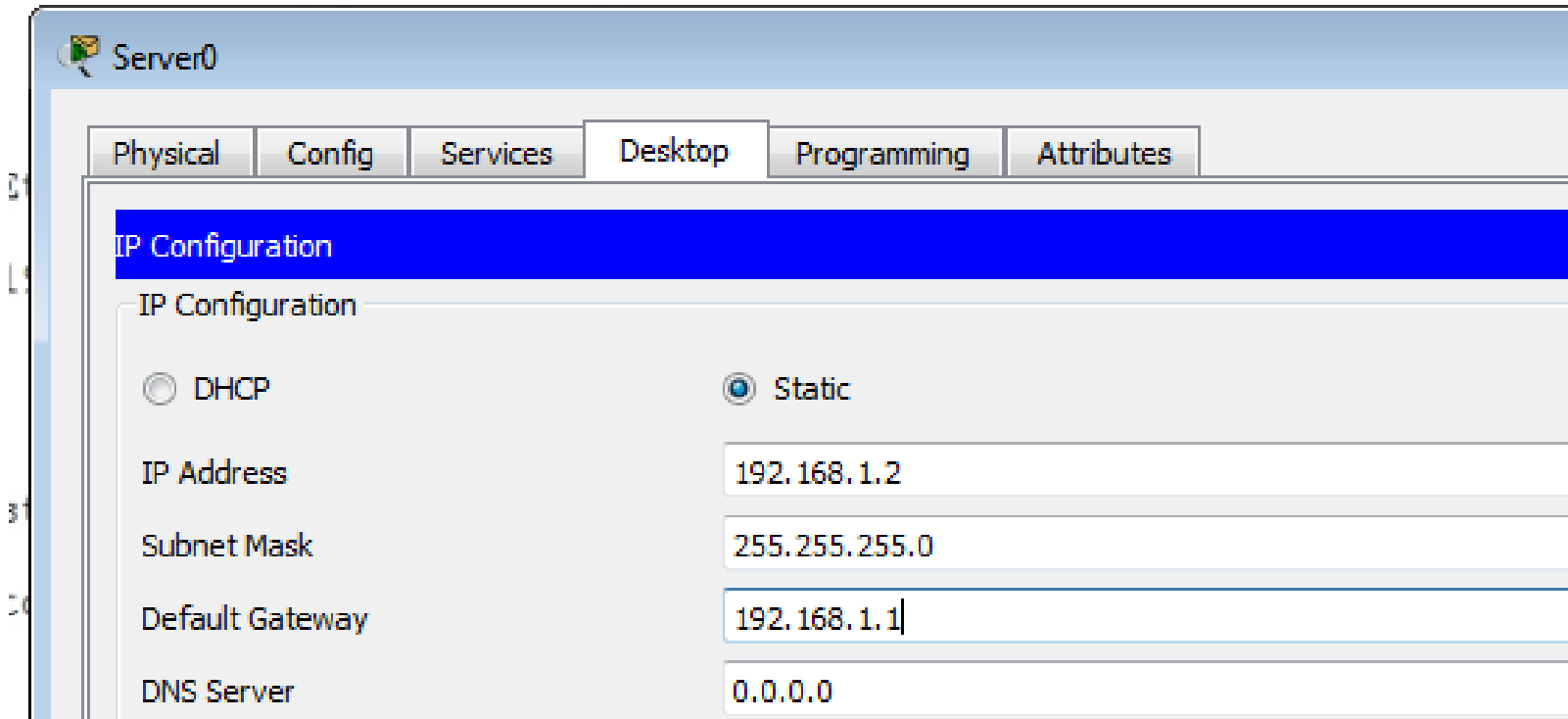


Network Time Protocol(NTP) Server

- Click on the Router and type
- **no]: no**
- **Router>en**
- **Router#conf t**
- **Router(config)#int fa0/0**
- **Router(config-if)#ip address 192.168.1.1
255.255.255.0**
- **Router(config-if)#no sh**
- **Router(config-if)#end**
- **Router#**

Network Time Protocol(NTP) Server

- Assign the IP to the server



The screenshot shows a configuration window for 'Server0'. The 'Desktop' tab is selected, and the 'IP Configuration' section is highlighted in blue. Below this, the 'Static' radio button is selected for IP configuration. The fields are filled with the following values:

Field	Value
IP Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0

Network Time Protocol(NTP) Server

Click on the router and type

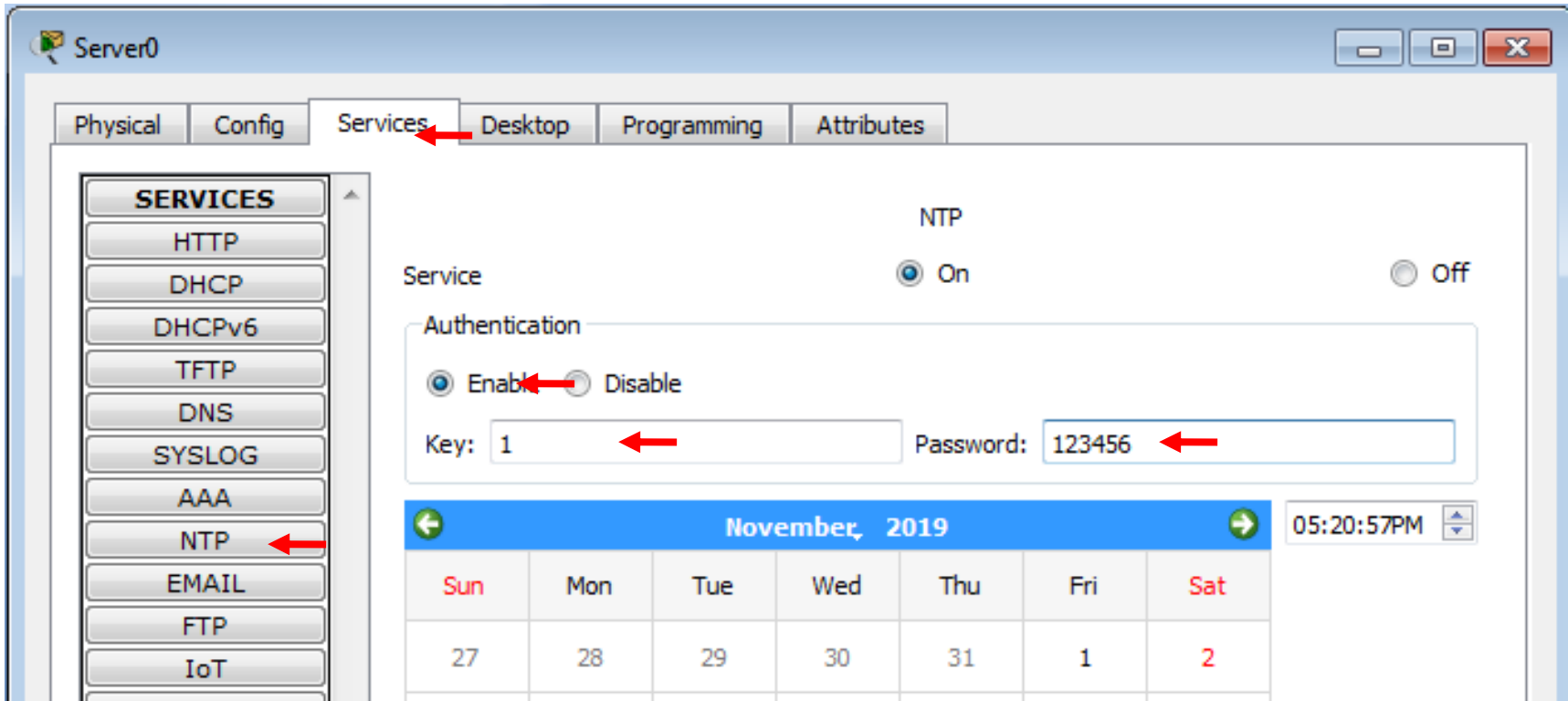
- **Router#show clock**

*0:4:50.440 UTC Mon Mar 1 1993 (please note)

- **Router#**

Network Time Protocol(NTP) Server

- Click on server and NTP service



The screenshot shows the 'Server0' configuration window with the 'Services' tab selected. The 'SERVICES' list on the left includes HTTP, DHCP, DHCPv6, TFTP, DNS, SYSLOG, AAA, NTP, EMAIL, FTP, and IoT. The 'NTP' service is highlighted with a red arrow. The 'NTP' service configuration on the right shows the 'Service' status as 'On' (radio button selected). The 'Authentication' section has 'Enable' selected (radio button selected) and 'Disable' unselected. The 'Key' field contains '1' and the 'Password' field contains '123456', both highlighted with red arrows. At the bottom, there is a calendar for November 2019 and a digital clock showing 05:20:57PM.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2

Network Time Protocol(NTP) Server

- **Router(config)#ntp ?**
- **Router(config)#ntp server 192.168.1.2**
- **Router(config)#ntp authentication-key 1 ?**
- md5 MD5 authentication
- **Router(config)#ntp authentication-key 1 md5 123456**
- **Router(config)#ntp update-calendar**
- **Router(config)#end**
- **Router#show clock**
- *0:10:37.310 UTC Mon Mar 1 1993 {compare with previous time}
- **Router#**

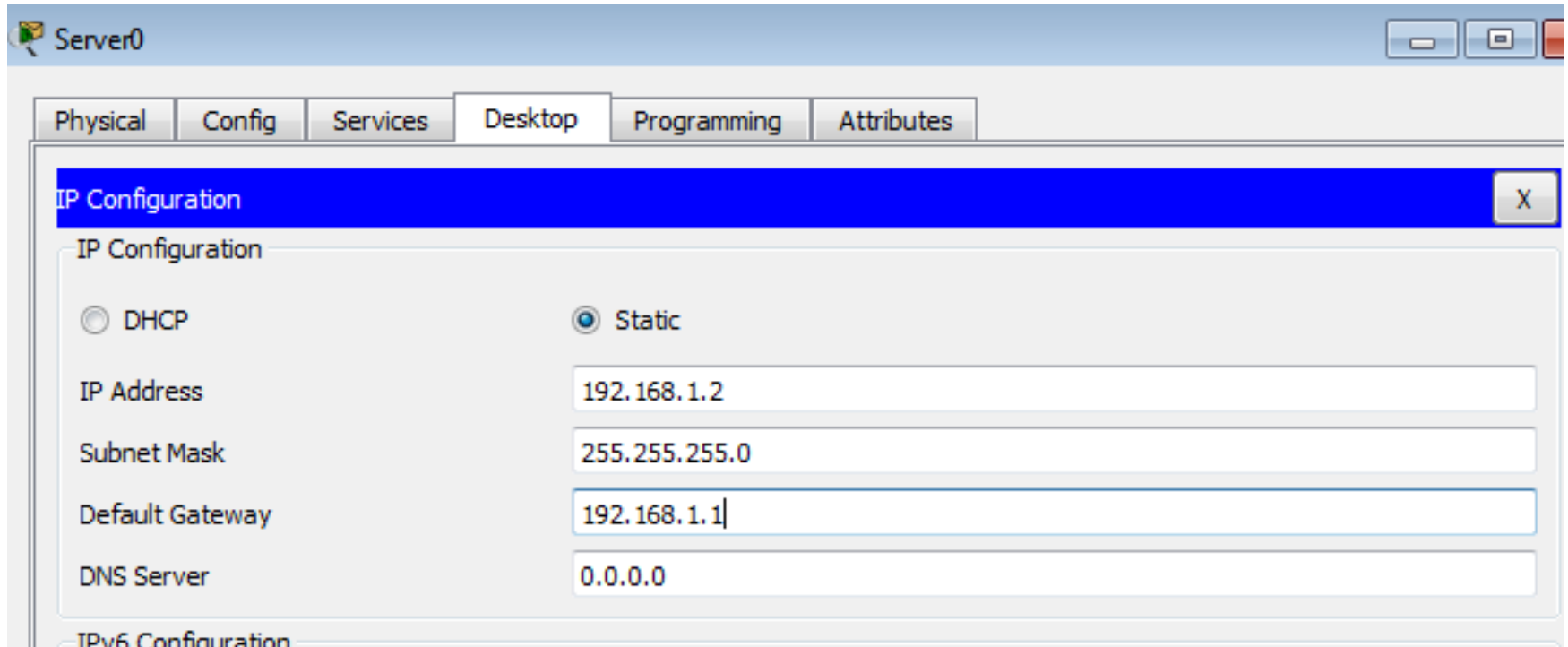
Syslog Server

- 1 router 1841
- 1 Server



Syslog Server

- Assign the following IP to server



The screenshot shows a window titled "Server0" with several tabs: Physical, Config, Services, Desktop, Programming, and Attributes. The "Config" tab is active, and within it, the "IP Configuration" sub-tab is selected. The "IP Configuration" section has a blue header bar with a close button (X). Below the header, there are two radio buttons: "DHCP" (unselected) and "Static" (selected). The "Static" configuration is shown with the following fields:

Field	Value
IP Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0

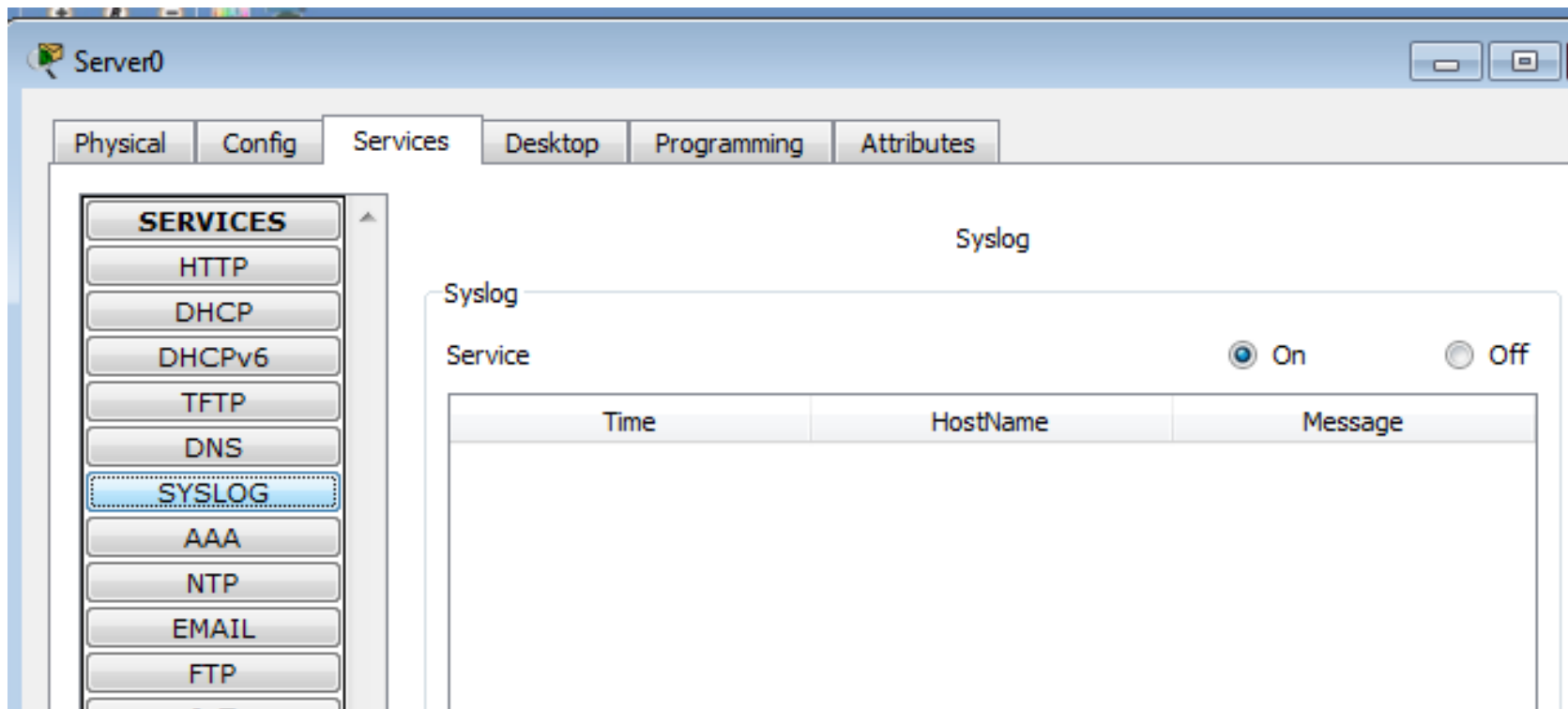
Below the IP Configuration section, there is a partially visible "IPv6 Configuration" section.

Syslog Server

- Click on the Router and type
- **no]: no**
- **Router>en**
- **Router#conf t**
- **Router(config)#int fa0/0**
- **Router(config-if)#ip address 192.168.1.1 255.255.255.0**
- **Router(config-if)#no sh**
- **Router(config-if)#end**
- **Router#**

Syslog Server

- Check the syslog service is on at server

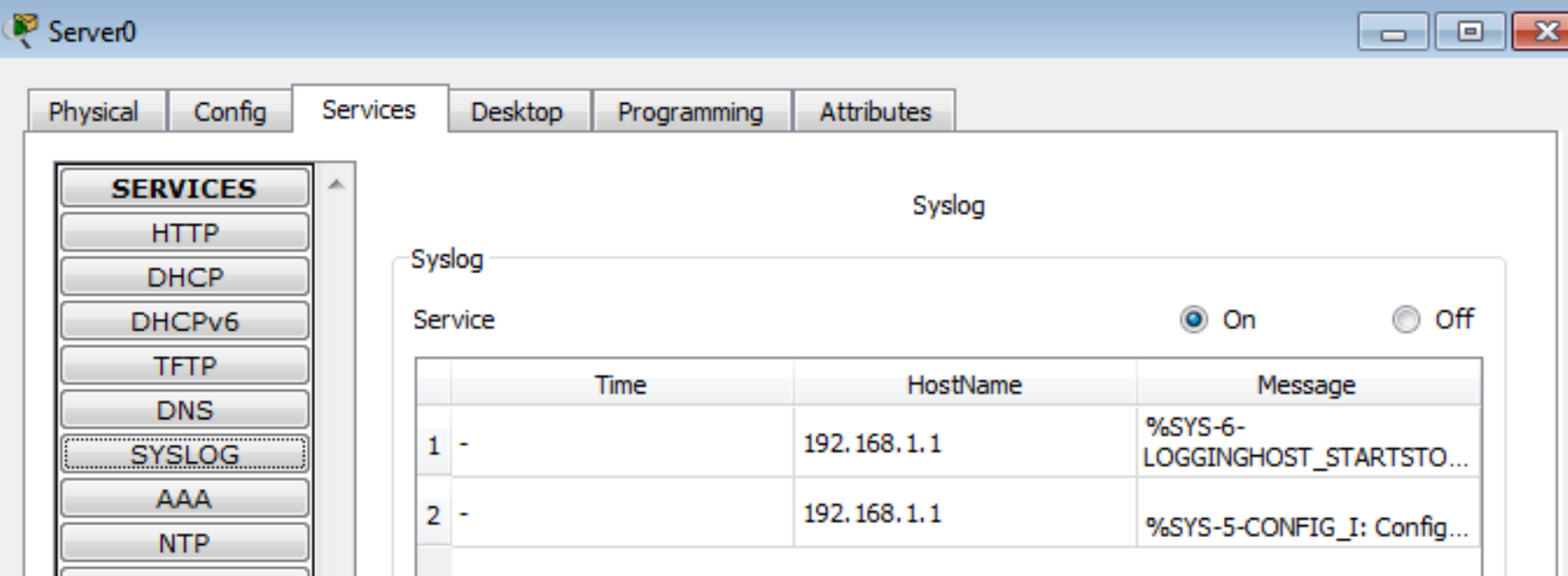


Syslog Server

- Click on router and type
 - Router(config-if)#logging 192.168.1.2
 - Router(config)#logging trap debugging
 - Router(config)#logging on
 - Router(config)#int fa0/0
 - Router(config-if)#sh
 - Router(config-if)#no sh
 - Router(config-if)#exit
 - Router(config)#end
 - Router#ping 192.168.1.2
 - Router#

Syslog Server

- Check your server syslog for entries.



The screenshot shows the 'Server0' configuration window with the 'Services' tab selected. The 'Syslog' service is highlighted in the left-hand menu. The main area displays the 'Syslog' configuration, where the 'Service' is set to 'On'. Below this, a table lists the syslog entries.

	Time	HostName	Message
1 -		192.168.1.1	%SYS-6-LOGGINGHOST_STARTSTO...
2 -		192.168.1.1	%SYS-5-CONFIG_I: Config...