



East West University

## Mini Project Report



COURSE TITLE

**CSE405: Computer Networks**

**Section: 01**

**Fall 2021**



SUBMITTED  
TO

**Dr. Maheen Islam**

Associate Professor

Department of Computer Science & Engineering

**East West University**



SUBMITTED  
BY

**Md. Shahadat Anik Sheikh**

**ID NO: 2019-1-60-068**

Department of Computer Science & Engineering

**East West University**



SUBMISSION  
DATE

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## Introduction

Internet is used to connect different computer systems (located in different geographic location). Networking has revolutionized the world and created a new arena for the overall development of every nation.[1] It is the practice of transporting and exchanging data between nodes over a shared medium in an information system. For this project, I have made a small networking system where both wire and wireless connection were used. In this project, there are 5 departments; where I have connected many devices, routers and switches through cables and many devices are also connected wirelessly. Here I have changed department A's configuration to DHCP using a server.

The Dynamic Host Configuration Protocol (DHCP) is a network management protocol used on Internet Protocol (IP) networks for automatically assigning IP addresses and other communication parameters to devices connected to the network using client-server architecture. By setting DNS and HTTP server, Departments can send email to each other as Domain Name System (DNS) Server used for matching website hostnames (like example.com) to their corresponding Internet Protocol or IP addresses. Here I used 2 email addresses for PC5 and PC8. On the other hand, all devices can send messages to one another using IP addresses, routers and switches. Also the server hosts a website which can be browsed from all the computers configured.

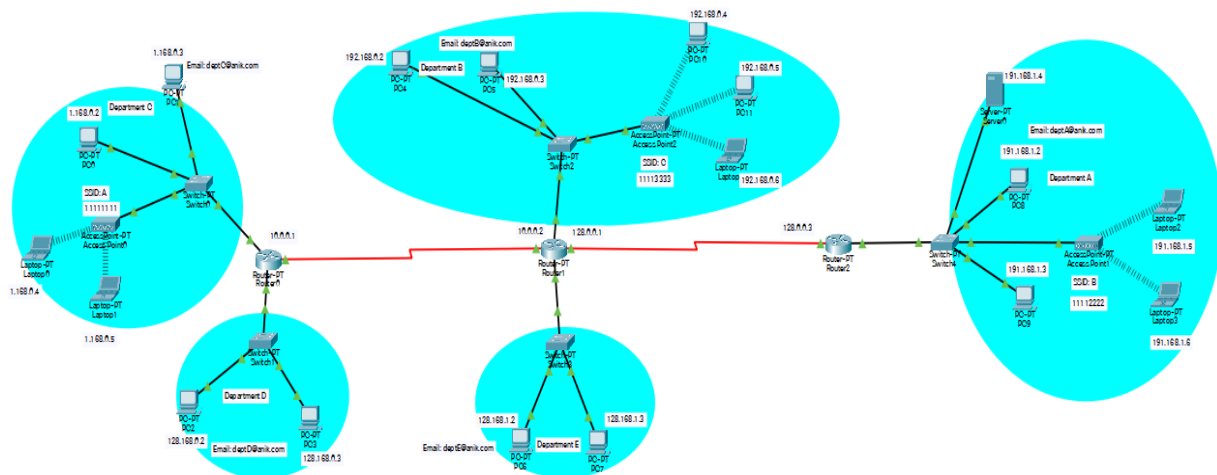


Fig: Mini Network

## Parts of the network architecture

The parts of this network are given below:

### 1. Hardware:

1. PC
2. Laptop
3. Router
4. Access Points
5. Switch
6. Custom build PC
7. Servers

### 2. Transmission Media:

1. Copper Wire
2. Wireless and Serial DTE

### 3. Protocols:

#### For Routing:

1. Static
2. RIP etc.

#### For TCP/IP:

1. HTTP
2. HTTPS
3. DNS
4. Email service etc.

## Components of the network

In this mini network, there are 5 departments started from A and ended with E. They are given below:

### Department A:

In department A, there are 1 server (Server 0) and 2 PCs (PC8, PC9) connected with 1 switch (Switch 4) with copper straight cable. Here 2 laptops (Laptop 2, Laptop 3) are connected with 1 access point (Access Point 1) wirelessly (SSID : B 11112222). The Access point is also connected with the Switch 4 with copper straight cable. The server contains DNS, emails and all the devices of the network can communicate with each other.

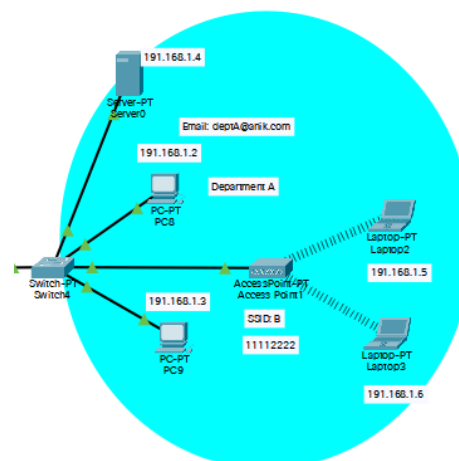


Fig: Department A

### Department B:

In department B, there are 2 PCs (PC4, PC5) connected with 1 switch (Switch 2) with copper straight cable. Here 2 PCs (PC10, PC11) and 1 laptop (Laptop-PT Laptop 4) are connected with 1 access point (Access Point 2) wirelessly (SSID: C 11113333). The Access point is also connected with the Switch 2 with copper straight cable.

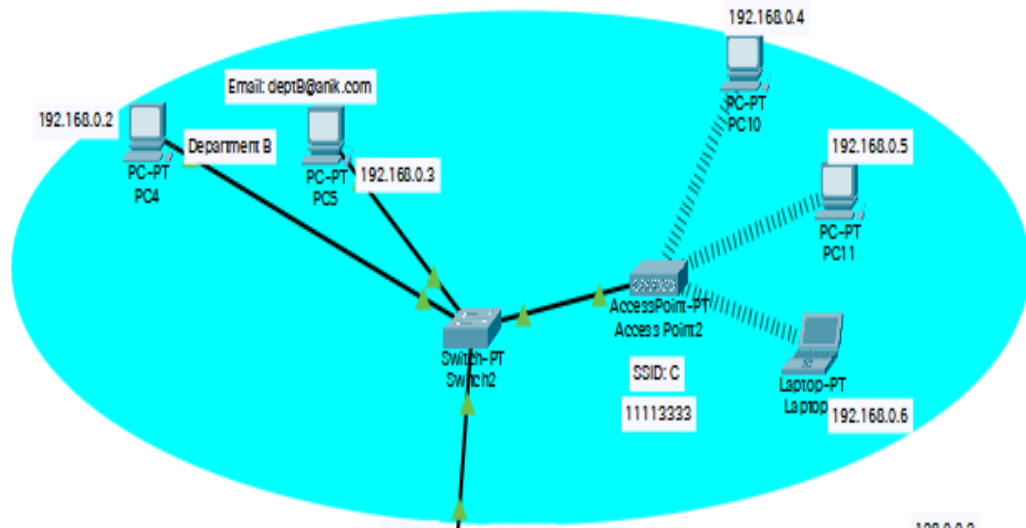


Fig: Department B

### Department C:

In department C, there are 2 PCs (PC0, PC1) connected with 1 switch (Switch 0) with copper straight cable. Here 2 laptops (Laptop 0, Laptop 1) are connected with 1 access point (Access Point 0) wirelessly (SSID: A 11111111). The Access point is also connected with the Switch 0 with copper straight cable.

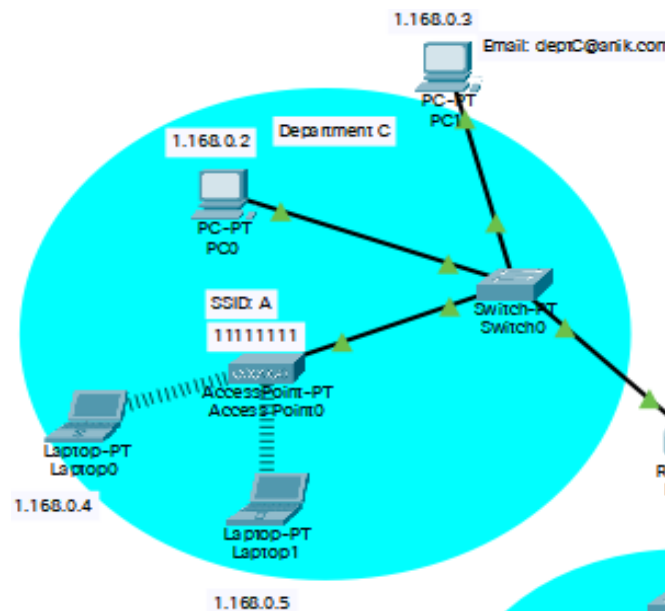


Fig: Department C

### Department D:

In department D, there are 2 PCs (PC2, PC3) connected with 1 switch (Switch 1) with copper straight cable.

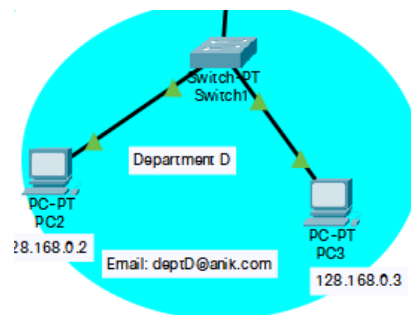


Fig: Department D

### Department E:

In department E, there are 2 PCs (PC6, PC7) connected with 1 switch (Switch 3) with copper straight cable.

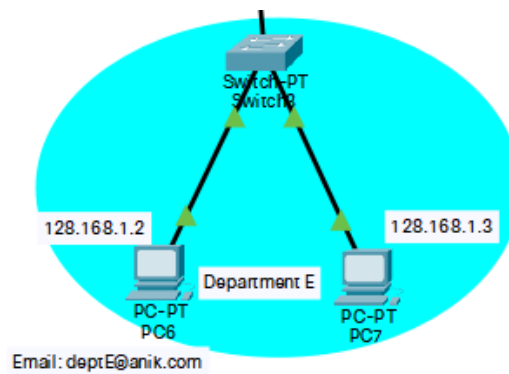
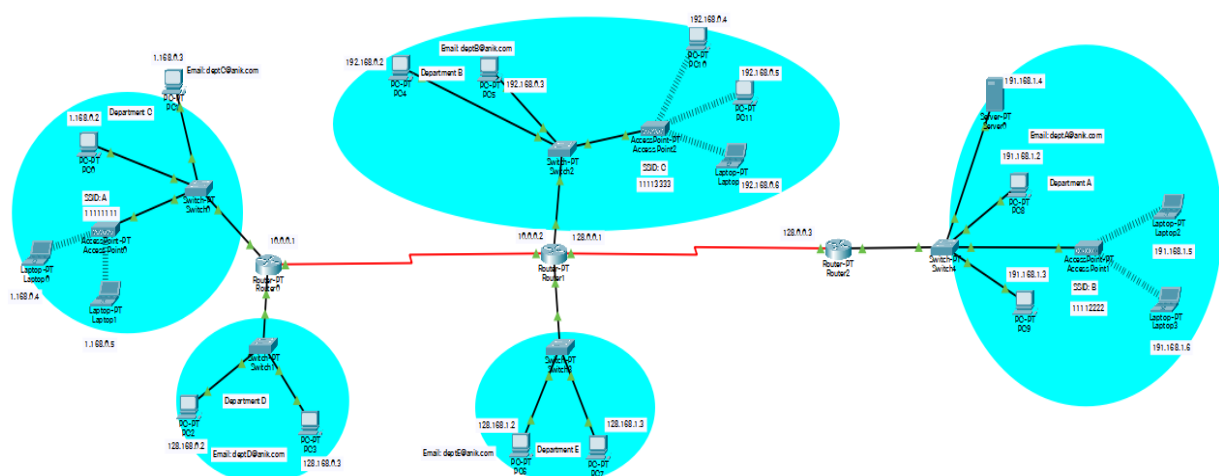


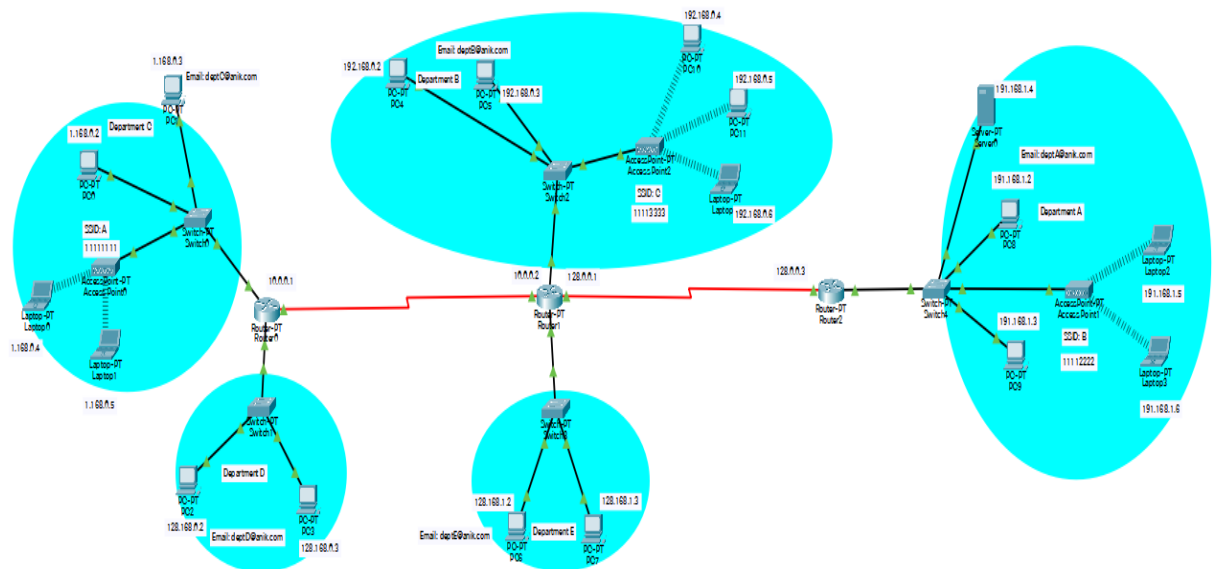
Fig: Department E

Here Department C and Department D are connected with Router 0, Department B and Department E are connected with Router 1 and Department A is connected with Router 2 with cables. Also Router 1 is connected with Router 0 and Router 2 through Serial DTE.



## Working principles of different parts of the network

### 1) Connections of all devices using cables and also wirelessly



### 2) Configured the PC's static and RIP routing

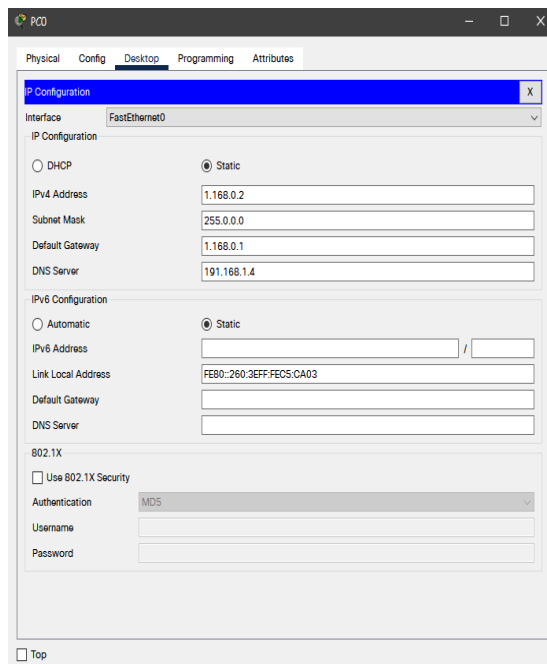


Fig: Static

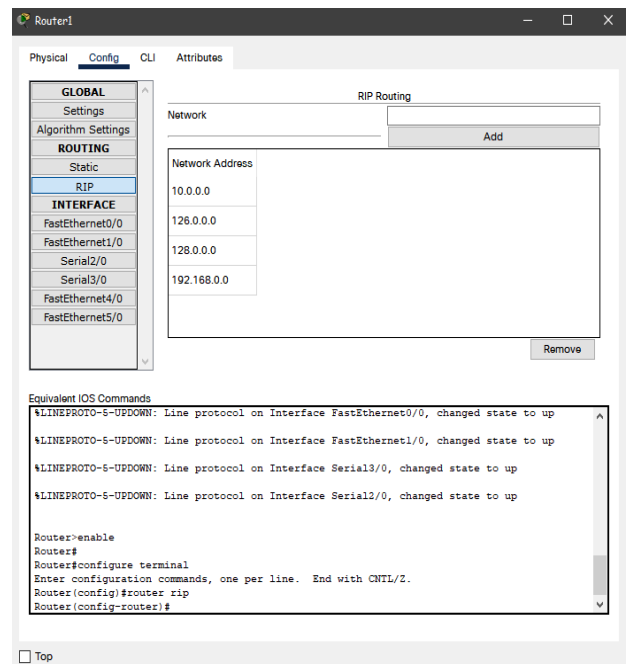
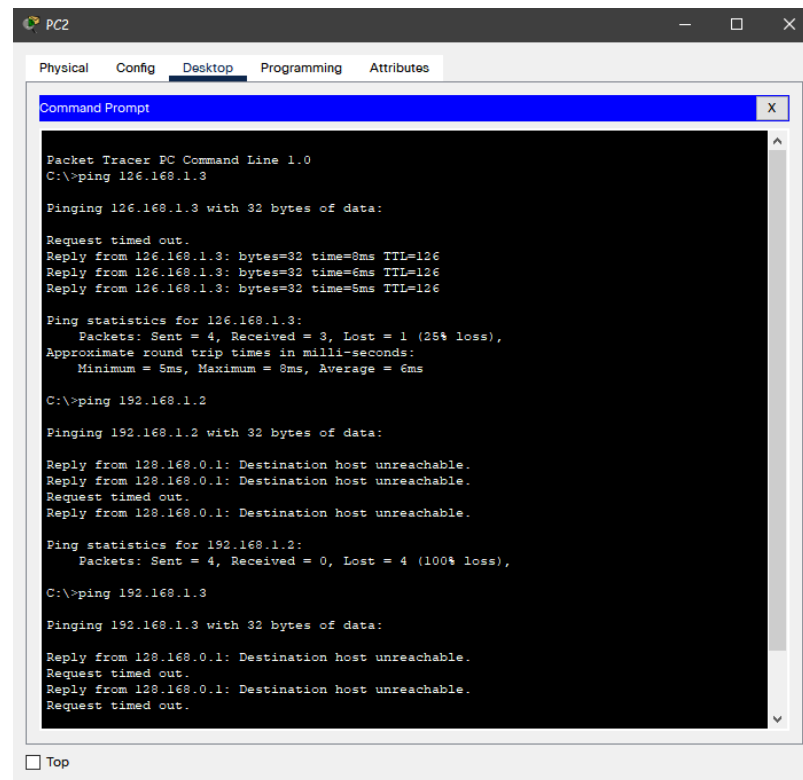


Fig: RIP

3) Pinged to check the connections.



The screenshot shows a Packet Tracer PC Command Prompt window with the following text:

```
Packet Tracer PC Command Line 1.0
C:\>ping 126.168.1.3

Pinging 126.168.1.3 with 32 bytes of data:

Request timed out.
Reply from 126.168.1.3: bytes=32 time=8ms TTL=126
Reply from 126.168.1.3: bytes=32 time=6ms TTL=126
Reply from 126.168.1.3: bytes=32 time=5ms TTL=126

Ping statistics for 126.168.1.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 8ms, Average = 6ms

C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 128.168.0.1: Destination host unreachable.
Reply from 128.168.0.1: Destination host unreachable.
Request timed out.
Reply from 128.168.0.1: Destination host unreachable.

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 128.168.0.1: Destination host unreachable.
Request timed out.
Reply from 128.168.0.1: Destination host unreachable.
Request timed out.
```

4) Configured Access point with SSID and Access point connection with devices

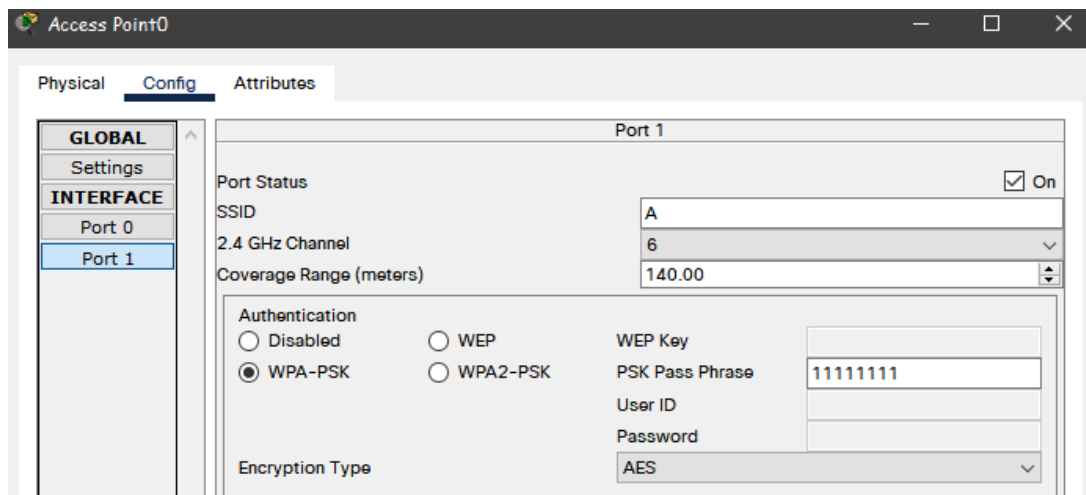


Fig: Access Point 0

Laptop0

Physical **Config** Desktop Programming Attributes

**GLOBAL**

Settings

Algorithm Settings

**INTERFACE**

Wireless0

Bluetooth

**Wireless0**

Port Status ☒ On

Bandwidth 54 Mbps

MAC Address 0001.43B5.91CA

SSID A

Authentication

☐ Disabled ☐ WEP ☒ WPA-PSK ☐ WPA2-PSK ☐ WPA ☐ WPA2 ☐ 802.1X

WEP Key

PSK Pass Phrase 11111111

User ID

Password

Method: MD5

User Name

Password

Encryption Type AES

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 1.168.0.4

Subnet Mask 255.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address

Link Local Address: FE80::201:43FF:FE85:91CA

Fig: Laptop 0

## 5) Configured Server to DHCP

Server0

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 191.168.1.1

DNS Server 191.168.1.4

Start IP Address : 191 168 1 2

Subnet Mask: 255 255 0 0

Maximum Number of Users : 512

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	191.168.1.1	191.168.1.4	191.168.1.2	255.255.0.0	512	0.0.0.0	0.0.0.0



## 6) Configured Department A's all devices to DHCP

The screenshot shows the configuration window for PC8, specifically the 'Desktop' tab. The 'IP Configuration' section is active, showing settings for the 'FastEthernet0' interface. The 'DHCP' option is selected under 'IP Configuration'. The 'IPv6 Configuration' section shows 'Static' selected. The '802.1X' section has 'Use 802.1X Security' unchecked and 'Authentication' set to 'MD5'.

PC8

Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☒ DHCP ☐ Static

IPv4 Address: 191.168.1.3

Subnet Mask: 255.255.0.0

Default Gateway: 191.168.1.1

DNS Server: 191.168.1.4

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::2D0:D3FF:FE38:17E0

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

☐ Top

## 7) Configured the DNS

The screenshot shows the configuration window for Server0, specifically the 'Services' tab. The 'DNS' service is selected in the left sidebar. The 'DNS Service' is set to 'On'. The 'Resource Records' section shows a table with one record: 'anik.com' of type 'A Record' with address '191.168.1.4'.

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

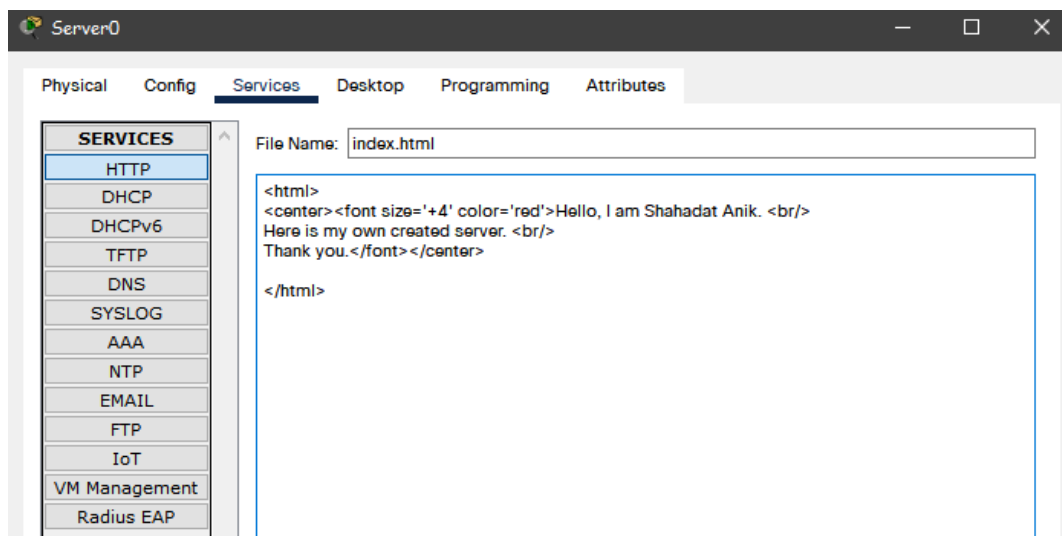
Name: Type: A Record

Address:

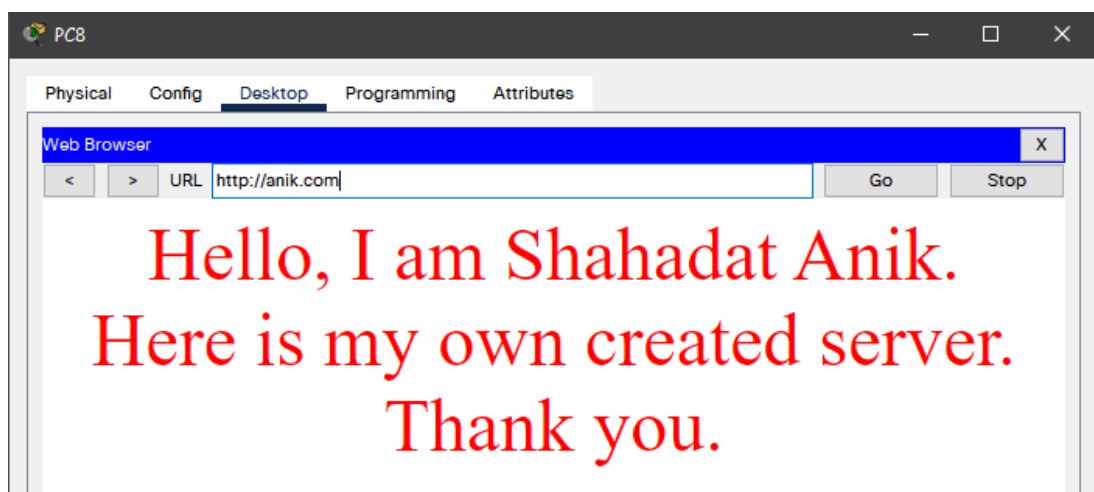
Add Save Remove

No.	Name	Type	Detail
0	anik.com	A Record	191.168.1.4

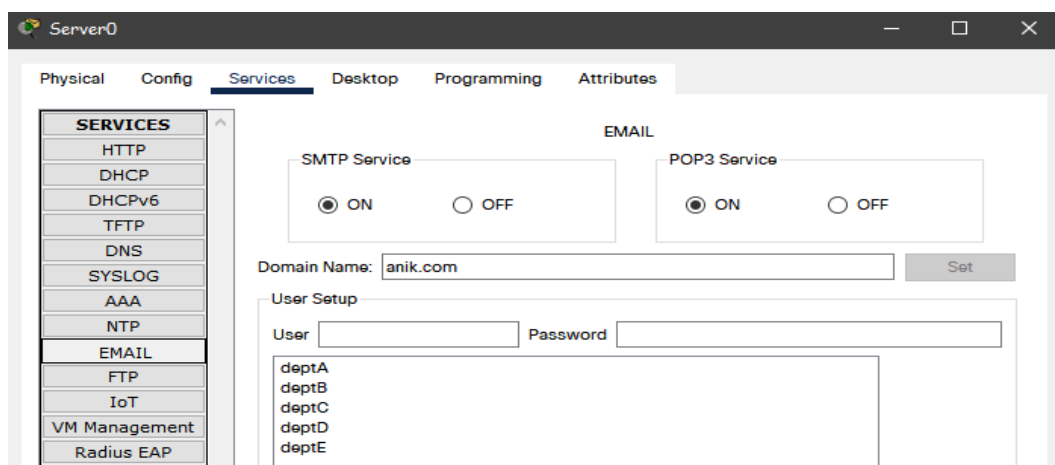
## 8) Configured index.html in HTTP setup



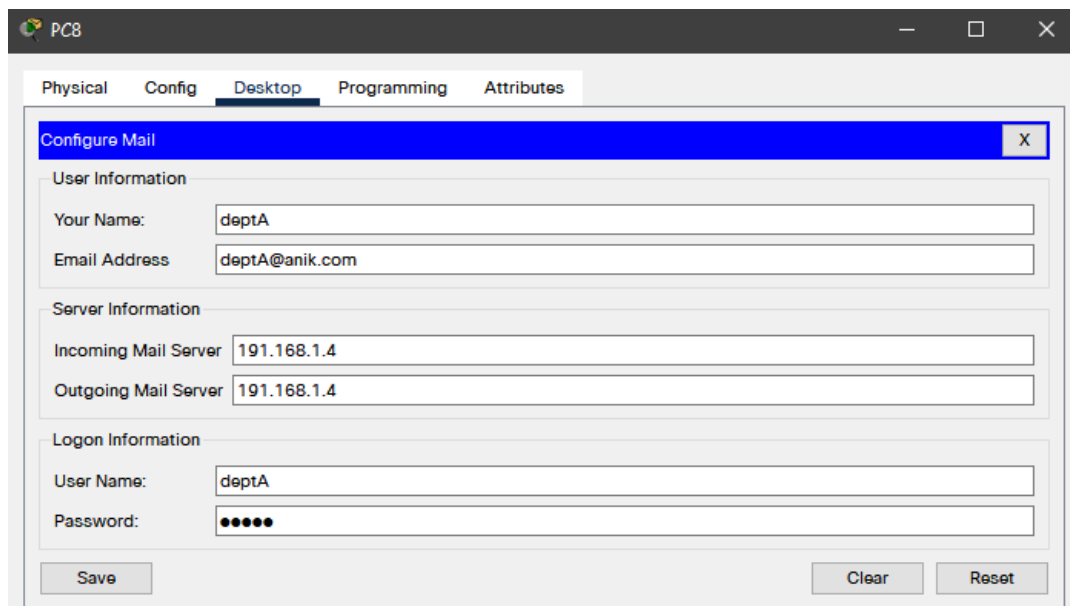
## 9) Browsed from PCs connected or configured with the server



## 10) Created an email domain in server



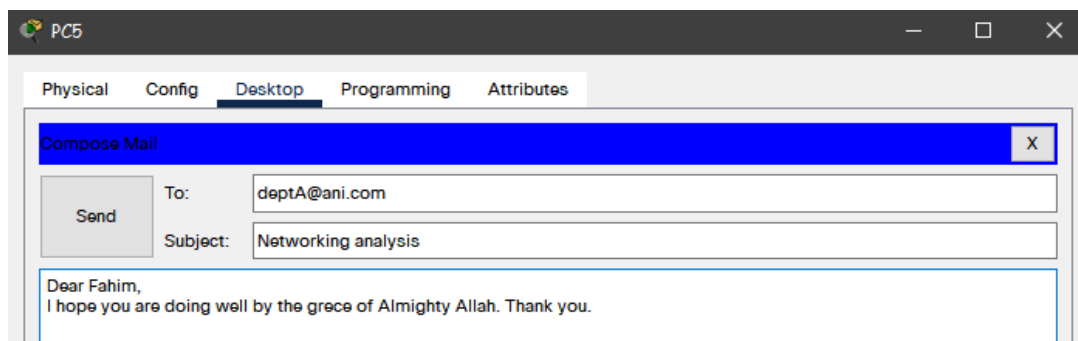
## 11) Configured the PC which will use email



The screenshot shows the 'Configure Mail' dialog box in the 'Desktop' tab of PC8. The dialog has three sections: User Information, Server Information, and Logon Information. The 'Your Name' field is filled with 'deptA' and the 'Email Address' field is filled with 'deptA@anik.com'. In the 'Server Information' section, both 'Incoming Mail Server' and 'Outgoing Mail Server' are set to '191.168.1.4'. In the 'Logon Information' section, the 'User Name' is 'deptA' and the 'Password' is masked with six dots. At the bottom, there are 'Save', 'Clear', and 'Reset' buttons.

Section	Field	Value
User Information	Your Name:	deptA
	Email Address	deptA@anik.com
Server Information	Incoming Mail Server	191.168.1.4
	Outgoing Mail Server	191.168.1.4
Logon Information	User Name:	deptA
	Password:	••••••

## 12) Sending emails

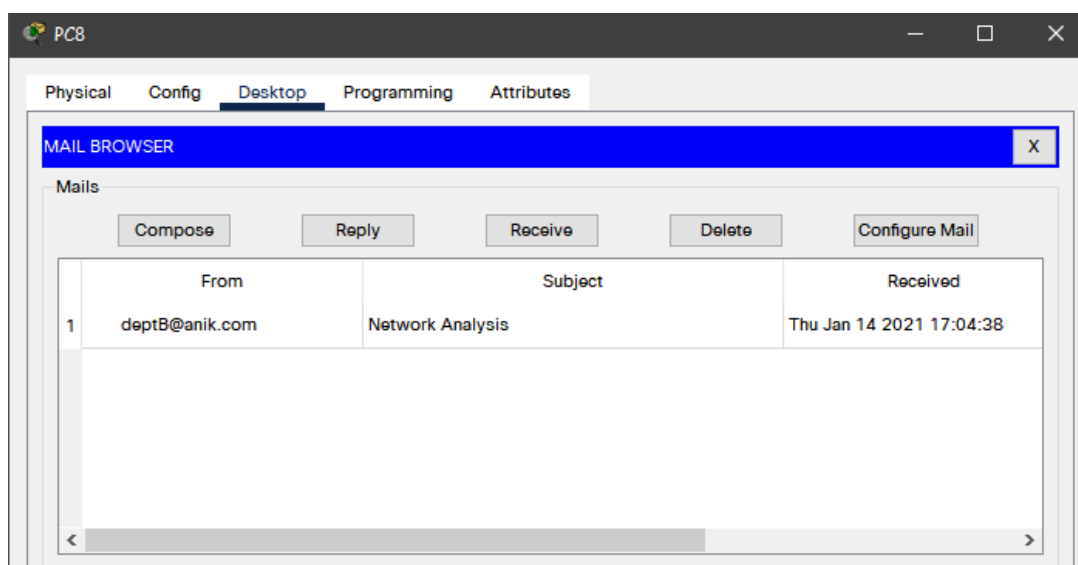


The screenshot shows the 'Compose Mail' dialog box in the 'Desktop' tab of PC5. The 'To:' field is filled with 'deptA@ani.com' and the 'Subject:' field is filled with 'Networking analysis'. Below these fields is a text area containing the message: 'Dear Fahim, I hope you are doing well by the grece of Almighty Allah. Thank you.' There is a 'Send' button on the left side of the dialog.

Field	Value
To:	deptA@ani.com
Subject:	Networking analysis

Dear Fahim,  
I hope you are doing well by the grece of Almighty Allah. Thank you.







## 13) Receiving emails



The screenshot shows the 'MAIL BROWSER' window in the 'Desktop' tab of PC8. It features a toolbar with 'Compose', 'Reply', 'Receive', 'Delete', and 'Configure Mail' buttons. Below the toolbar is a table listing received emails. The first email is from 'deptB@anik.com' with the subject 'Network Analysis' and received on 'Thu Jan 14 2021 17:04:38'. A scrollbar is visible at the bottom of the table.

	From	Subject	Received
1	deptB@anik.com	Network Analysis	Thu Jan 14 2021 17:04:38

#### 14) Sending packets successfully from one Department to another Department

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Ed
	Successful	PC4	Laptop3	ICMP		0.000	N	0	(e
	Successful	PC2	Laptop3	ICMP		0.000	N	1	(e
	Successful	PC2	PC4	ICMP		0.000	N	2	(e

## Discussion and Conclusion

This mini project is little bit complex networking in between 5 departments, where all the devices are either connected with cable or wireless. Also there are RIP and static settings that I have configured successfully. Here the only server is configured with a DNS and emails which is also configured to DHCP in Department A and all the devices requested for IP addresses from server. So devices in Department A configured to DHCP from static. Therefore, every network in that server can communicate with each other.

The DHCP setting, DNS, emails and wireless connections settings are the newly introduced components in this mini project. I have learned a lot through this project. In future, it will help me work with computer networking.

## Reference

[1]

[https://www.tutorialspoint.com/basics\\_of\\_computer\\_science/basics\\_of\\_computer\\_science\\_networking.htm#:~:text=A%20computer%20networking%20is%20a,especially%20for%20the%20business%20purpose.](https://www.tutorialspoint.com/basics_of_computer_science/basics_of_computer_science_networking.htm#:~:text=A%20computer%20networking%20is%20a,especially%20for%20the%20business%20purpose.)