



Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
Semester: (Summer, Year:2022), B.Sc. in CSE (Day)

Course Title: Wireless Network Lab
Course Code: CSE-428 Section: 191D2

Lab Project Name: Smart Office with IoT devices.

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Chapter 1

Introduction

1.1 Introduction

A smart office monitoring system is to be considered with one entity in mind that is of full probable of workforce. It's not rocketry just innovative thinking and new technology that best fits people's needs. Office monitoring among other things facilitates easy documentation and real time communication. smart office monitoring system complete on lighting, door access, room controlling, fire detection, and SMTP, FTP, Routing is construct for the security and promote the satisfactions of the employees. [4]

In this project, I try to summarize the connection of three smart offices which are in different city by using Cisco Packet Tracer. In this project, I create SMTP, FTP, Routing, and some IOT devices like lighting, door-access, room controlling, wireless connections and will try to create roaming between three smart offices.

1.2 Design Goals/Objective

- i. To enrich our knowledge in Cisco Packet Tracer.
- ii. To develop the idea of roaming of two Smart Offices.
- iii. To gather knowledge of any type of networks connections.
- iv. To enrich our knowledge how a smart office is better than a normal office.

Chapter 2

Design/Development/Implementation of the Project

2.1 Procedure

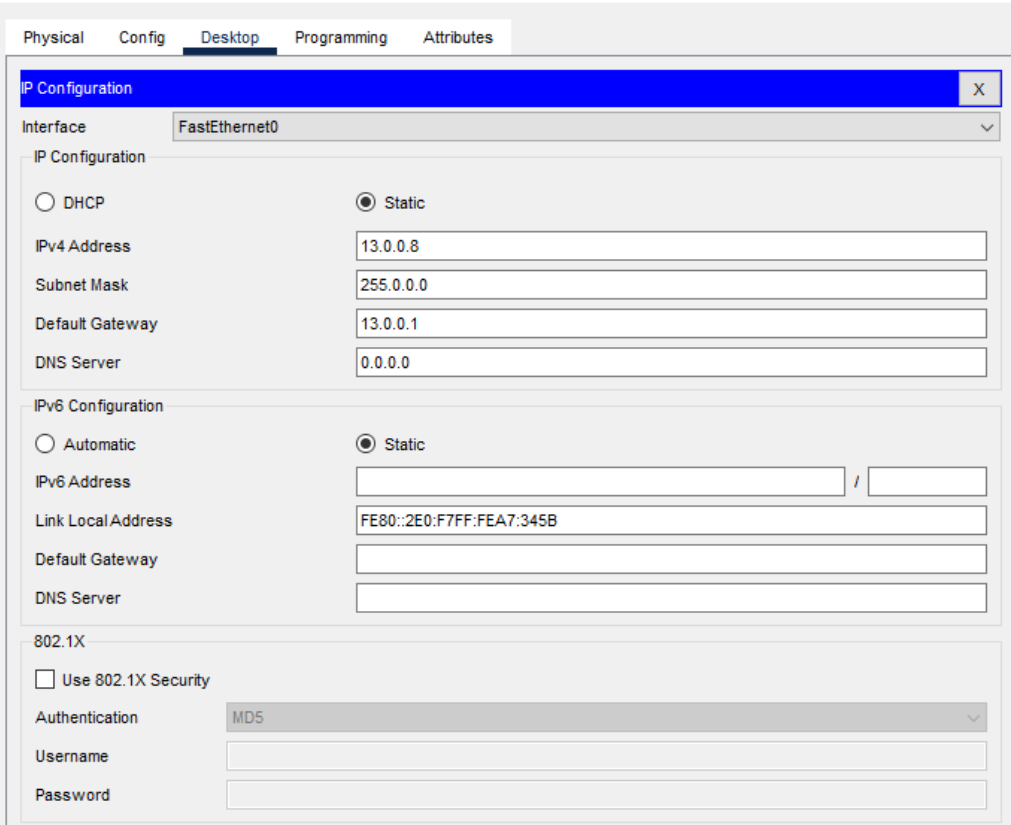
To implement SMTP, FTP and Routing protocol we followed the following steps:

1. First we open the Cisco Packet Tracer and then to do three different smart offices we need to go physical view. In the 1st page of physical view, add a background image for intercity. Then create two home city for two different countries and then click on one home city, add background picture for home city (Dhaka City, Canberra City). In Dhaka City, I create two different corporate offices for two smart offices and in Canberra City, I create one corporate office. And add background images for these corporate office. Now in these smart office I create Main Wiring Closet for device switch, router.
2. Then I added all the devices that I need to implement the project.
3. Then I configure the IP address of all devices. So figure-2.1.1.1 showed the IP address configuration of a Computer.
4. When completed all the IP address configurations, I configure the IP address of SMTP Server..
5. I set DNS IP and configuration for SMTP. And then I send message and it showed successes.
6. After completing SMTP, I set FTP configuration
7. Then I configure the routing. I used 4 routers here and use dynamic routing. To configure this at first I go WIC-2T and add a port for serial port.
8. Then I add the 4router and set their serial port number and at last we add the router with switch by their Fast Ethernet number. I use dynamic router so at first I go to RIP and set the all network IP
9. And finally I have added IOT device. We have added AC, Fan, Light, Mobile devices by a HomeGateway. Given condition among them and also create a fire detection system and security locking system.

2.1.1 IP, SMTP, FTP, Routing Configuration

2.1.1.1 User IP configuration:

By giving IP address, subnet mask, default gateway.



The screenshot shows a network configuration window titled "IP Configuration" with a close button (X). The window has tabs for "Physical", "Config", "Desktop", "Programming", and "Attributes", with "Config" selected. The "Interface" dropdown is set to "FastEthernet0".

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 13.0.0.8

Subnet Mask: 255.0.0.0

Default Gateway: 13.0.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::2E0:F7FF:FEA7:345B

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

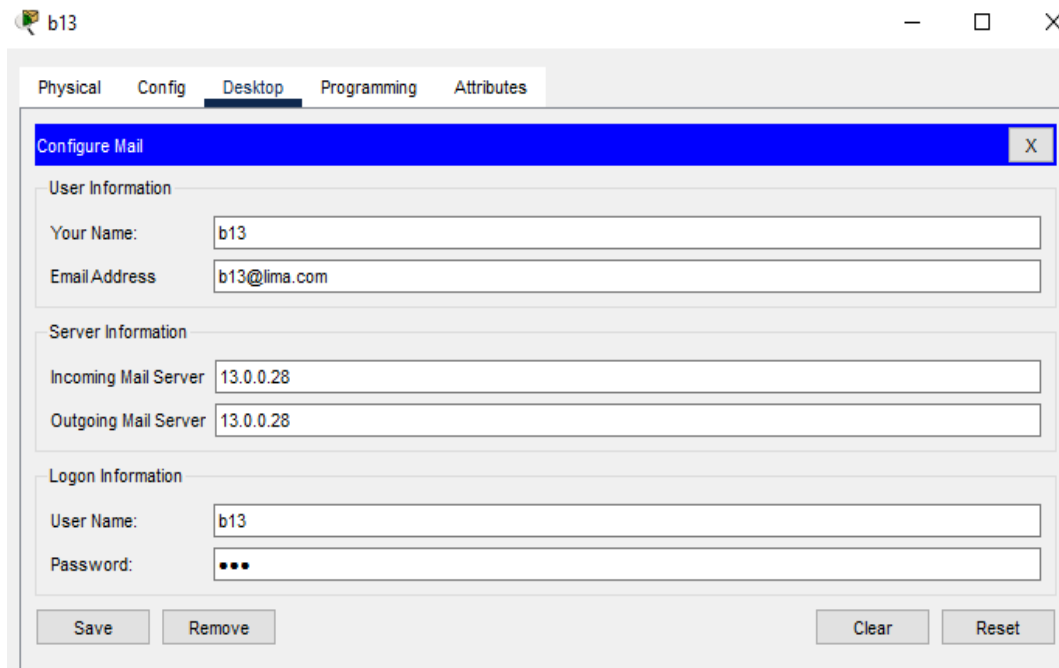
Authentication: MD5

Username:

Password:

Figure 2.1.1.1: IP configuration

2.1.1.2 Mail Configuration:

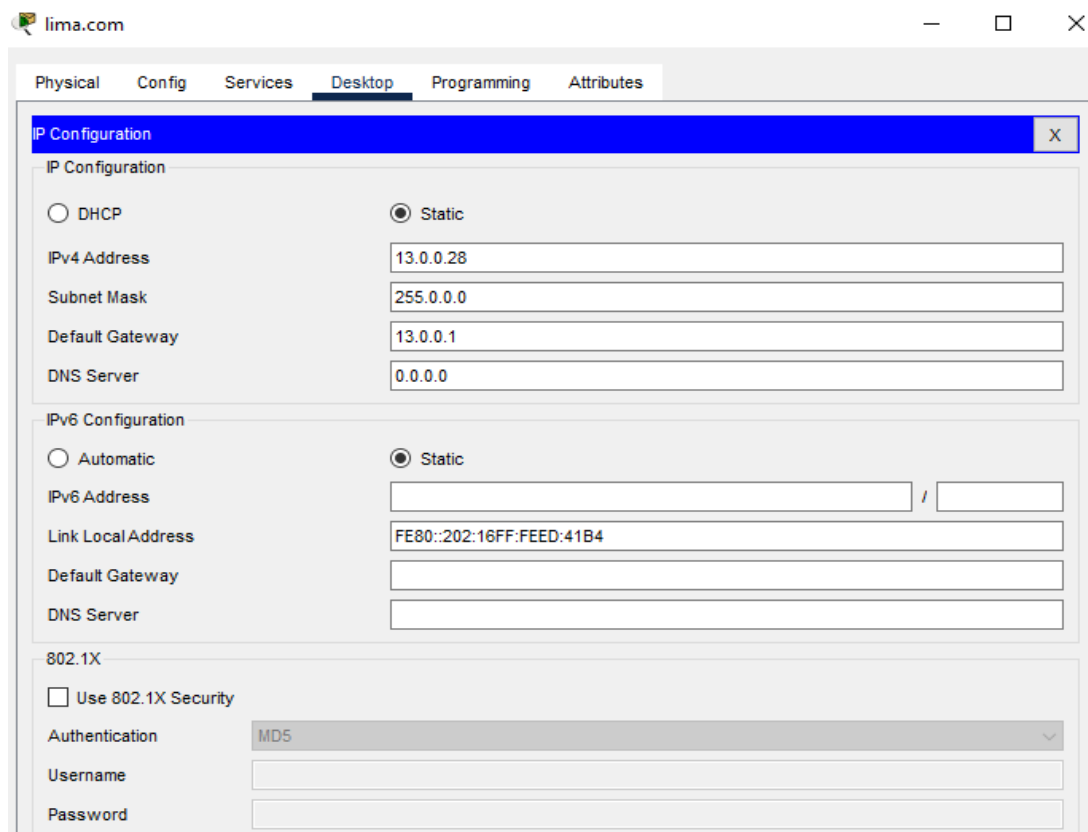


The screenshot shows a software window titled 'b13' with a standard Windows-style title bar (minimize, maximize, close buttons). Inside the window, there are five tabs: 'Physical', 'Config', 'Desktop', 'Programming', and 'Attributes'. The 'Desktop' tab is currently selected. Within the 'Desktop' tab, there is a sub-dialog titled 'Configure Mail' with a close button (X) in its top right corner. This sub-dialog is organized into three sections: 'User Information', 'Server Information', and 'Logon Information'. The 'User Information' section contains two text fields: 'Your Name:' with the value 'b13' and 'Email Address' with the value 'b13@lima.com'. The 'Server Information' section contains two text fields: 'Incoming Mail Server' and 'Outgoing Mail Server', both with the value '13.0.0.28'. The 'Logon Information' section contains two text fields: 'User Name:' with the value 'b13' and 'Password:' with three dots indicating a masked password. At the bottom of the 'Configure Mail' dialog, there are four buttons: 'Save', 'Remove', 'Clear', and 'Reset'.

Section	Field	Value
User Information	Your Name:	b13
	Email Address	b13@lima.com
Server Information	Incoming Mail Server	13.0.0.28
	Outgoing Mail Server	13.0.0.28
Logon Information	User Name:	b13
	Password:	...

Figure 2.1.1.2: User Mail Configuration

2.1.1.3 Mail Server IP Configuration:



The screenshot shows a web-based configuration interface for a device, with the browser address bar displaying "lima.com". The interface has a top navigation bar with tabs: Physical, Config, Services, Desktop (selected), Programming, and Attributes. Below the navigation bar, the "IP Configuration" section is active, indicated by a blue header bar with a close button (X). The "IP Configuration" section contains two sub-sections: "IP Configuration" and "IPv6 Configuration".

IP Configuration

- ☐ DHCP
- ☒ Static
- IPv4 Address: 13.0.0.28
- Subnet Mask: 255.0.0.0
- Default Gateway: 13.0.0.1
- DNS Server: 0.0.0.0

IPv6 Configuration

- ☐ Automatic
- ☒ Static
- IPv6 Address: [Empty field] / [Empty field]
- Link Local Address: FE80::202:16FF:FEED:41B4
- Default Gateway: [Empty field]
- DNS Server: [Empty field]

802.1X

- ☐ Use 802.1X Security
- Authentication: MD5 (dropdown menu)
- Username: [Empty field]
- Password: [Empty field]

Figure 2.1.1.3: Mail Server IP configuration

2.1.1.4 SMTP Configuration:

The screenshot displays the Lima configuration interface. At the top, there is a navigation bar with tabs: Physical, Config, Services, Desktop, Programming, and Attributes. The 'Services' tab is selected. On the left, a vertical sidebar lists various services: SERVICES, HTTP, DHCP, DHCPv6, TFTP, DNS, SYSLOG, AAA, NTP, EMAIL (highlighted in blue), FTP, IoT, VM Management, and Radius EAP. The main area is titled 'EMAIL' and contains two sections: 'SMTP Service' and 'POP3 Service'. Both sections have radio buttons for 'ON' (selected) and 'OFF'. Below these, there is a 'Domain Name' field with the value 'lima.com' and a 'Set' button. The 'User Setup' section features a 'User' field with 'b1' and a 'Password' field with 'b1'. Below these fields is a list of users from b1 to b16, with b1 selected. To the right of the list are three buttons: '+', '-', and 'Change Password'.

lima.com

Physical Config **Services** Desktop Programming Attributes

SERVICES

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

EMAIL

SMTP Service ☒ ON ☐ OFF

POP3 Service ☒ ON ☐ OFF

Domain Name:

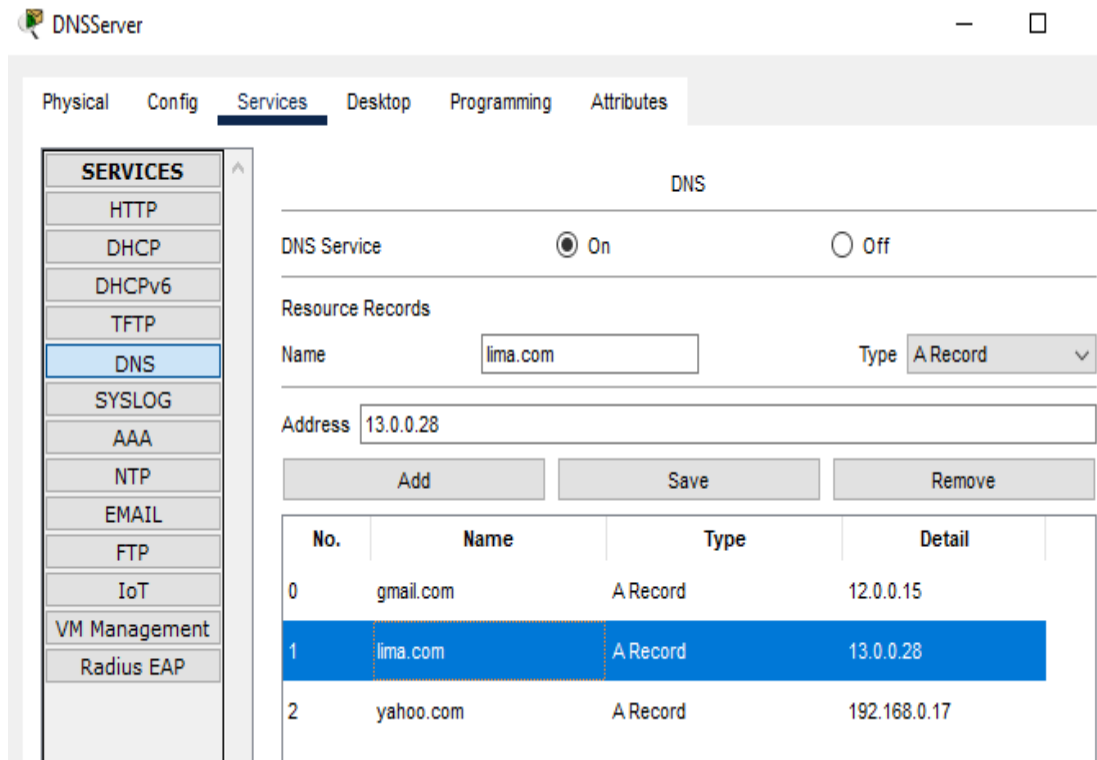
User Setup

User Password

- b1
- b2
- b3
- b4
- b5
- b6
- b7
- b8
- b9
- b10
- b11
- b12
- b13
- b14
- b15
- b16

Figure 2.1.1.4: SMTP Configuration

2.1.1.5 DNS Configuration:



The screenshot shows the DNSServer application window. The 'Services' tab is selected in the top navigation bar. On the left, a 'SERVICES' sidebar lists various services, with 'DNS' highlighted. The main area is titled 'DNS' and contains the following configuration options:

- DNS Service:** A radio button interface with 'On' selected and 'Off' unselected.
- Resource Records:** A section for adding and managing DNS records.

Below the 'Resource Records' section, there is a table listing existing records:

No.	Name	Type	Detail
0	gmail.com	A Record	12.0.0.15
1	lima.com	A Record	13.0.0.28
2	yahoo.com	A Record	192.168.0.17

At the top of the 'Resource Records' section, there are input fields for 'Name' (containing 'lima.com') and 'Type' (a dropdown menu set to 'A Record'). Below these is an 'Address' field containing '13.0.0.28'. At the bottom of this section are three buttons: 'Add', 'Save', and 'Remove'.

Figure 2.1.1.5: DNS Configuration

2.1.1.6 FTP Configuration:

Physical Config **Services** Desktop Programming Attributes

SERVICES

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

FTP

Service ☒ On ☐ Off

User Setup

Username Password

☒ Write ☒ Read ☒ Delete ☒ Rename ☒ List

	Username	Password	Permission
1	a	a	RWDNL
2	b	b	RN
3	c	c	RNL
4	cisco	cisco	RWDNL
5	d	d	RDNL

Add

Save

Remove

Figure 2.1.1.6: DNS Configuration

2.1.1.7 Fast Ethernet Configuration:

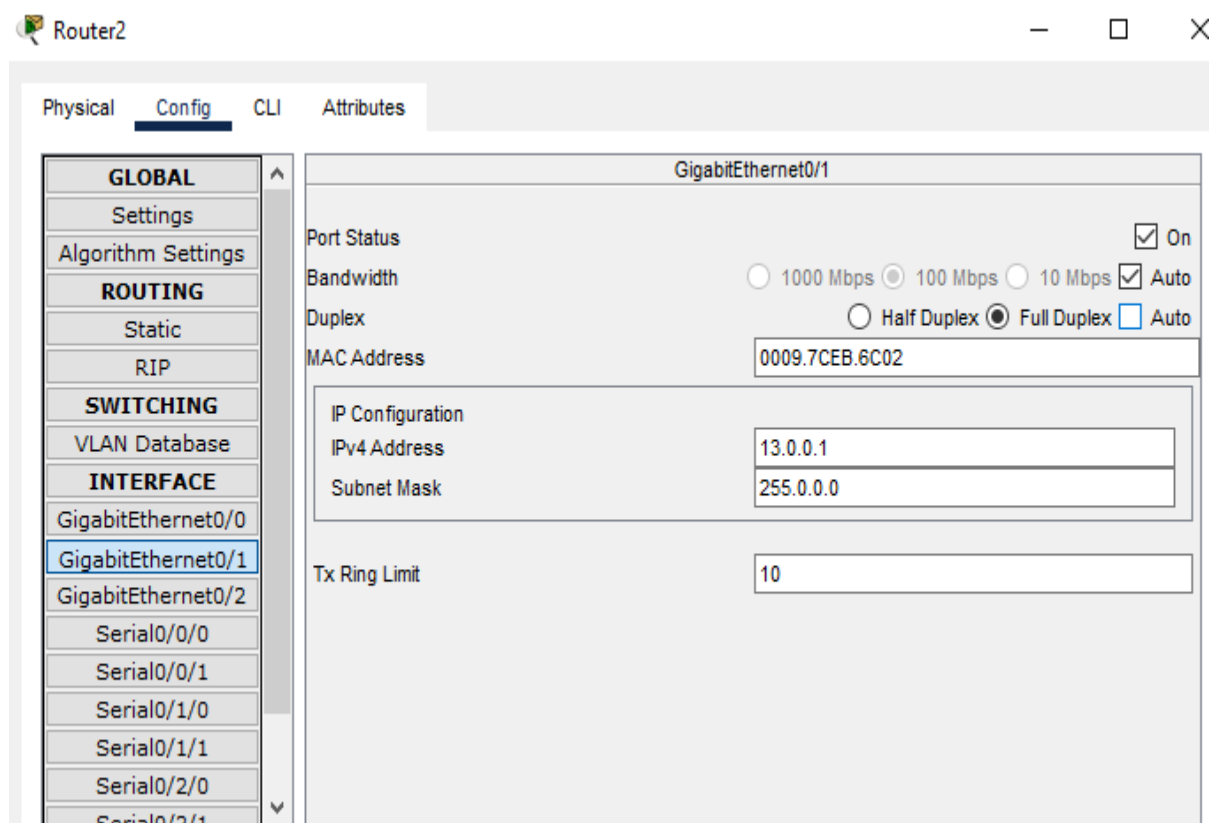


Figure 2.1.1.7: Fast Ethernet Configuration

2.1.1.8 Serial Port Configuration:

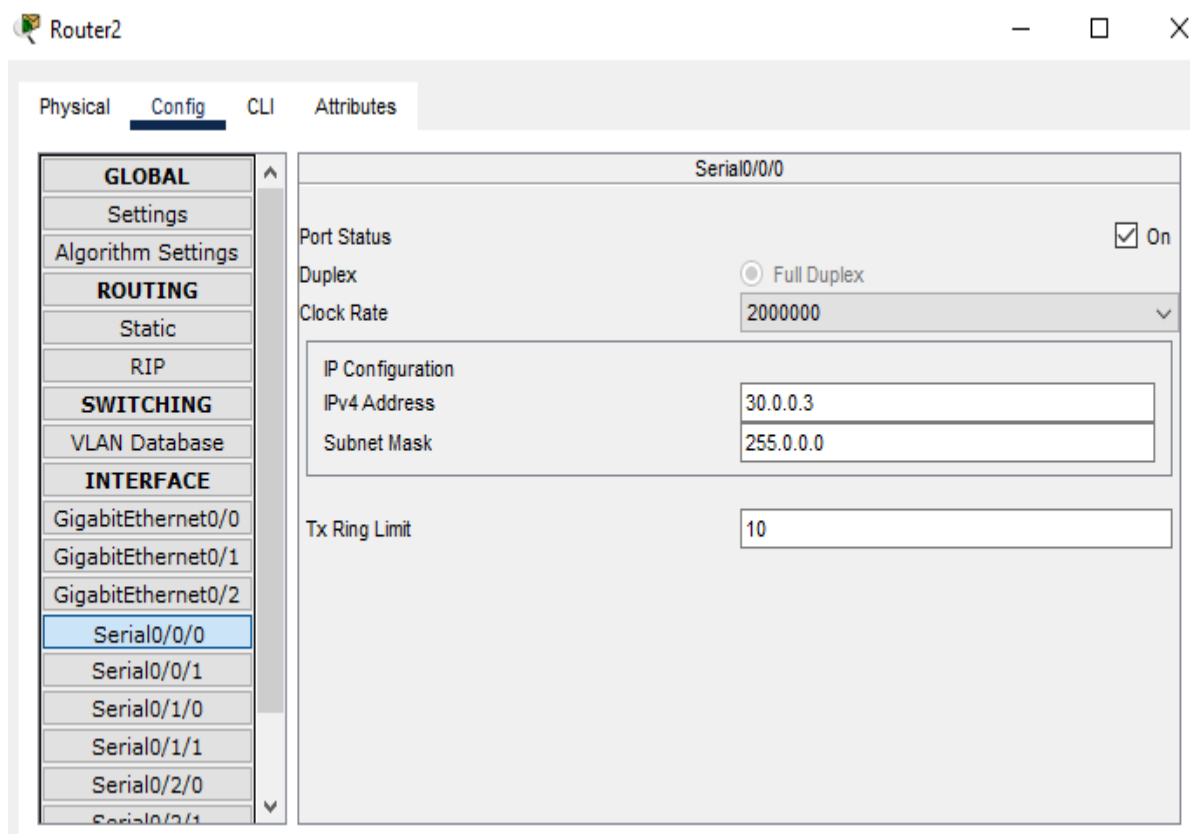


Figure 2.1.1.8: Serial Port Configuration

2.1.1.9 RIP Routing:

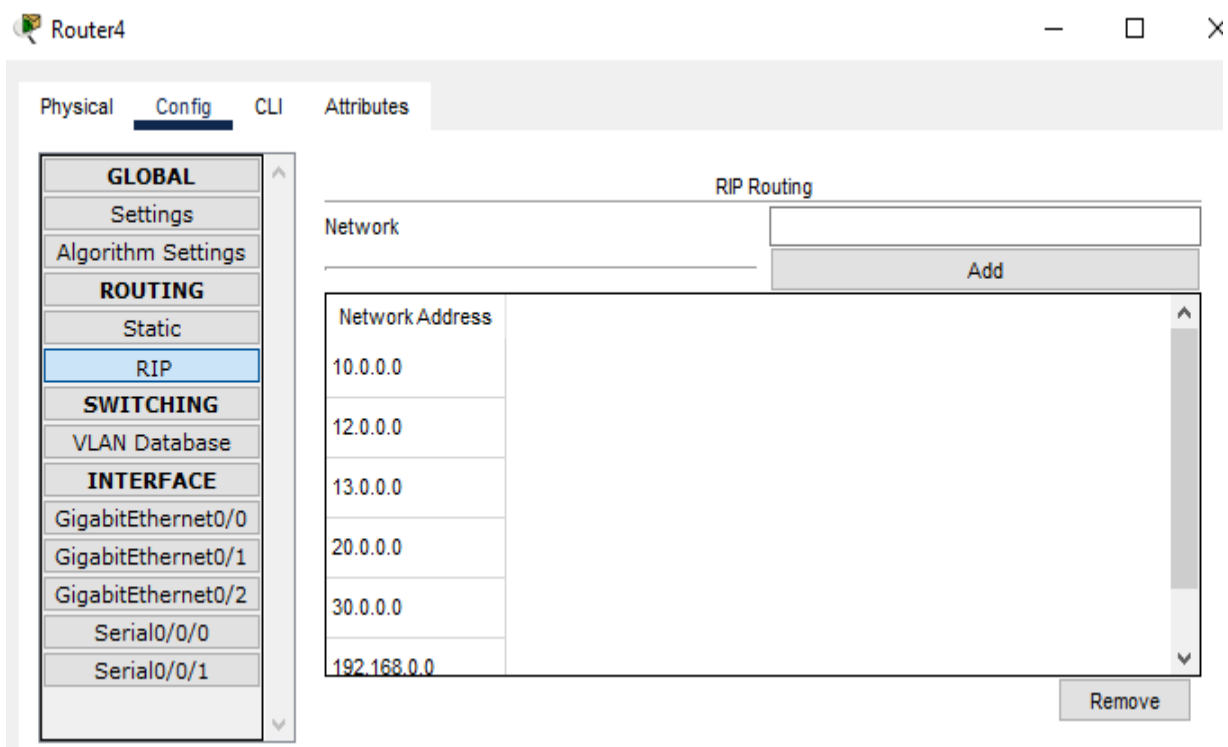


Figure 2.1.1.9: RIP Routing Configuration

2.1.2 IOT Device Connections:

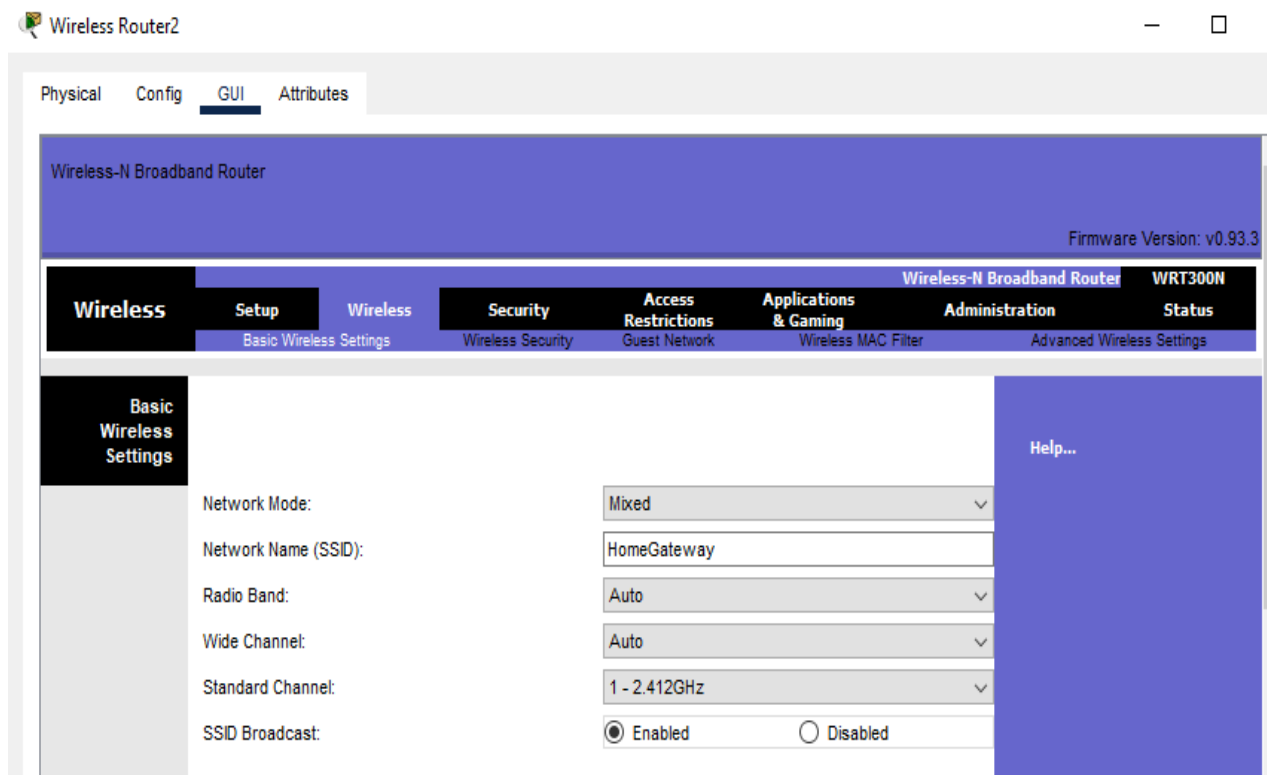


Figure 2.1.2.1: Wireless Router Configuration

Wireless Router2

Physical

Config

GUI

Attributes

Wireless-N Broadband Router

Firmware Version: v0.93.3

Wireless

Setup

Wireless

Security

Access Restrictions

Applications & Gaming

Administration

Status

Basic Wireless Settings

Wireless Security

Guest Network

Wireless MAC Filter

Advanced Wireless Settings

Wireless Security

Security Mode:

WPA2 Enterprise

Encryption:

AES

RADIUS Server:

12

.

0

.

0

.

17

RADIUS Port:

1645

Shared Secret:

123

Key Renewal:

3600

seconds

Help...

Figure 2.1.2.2: Wireless Router Configuration

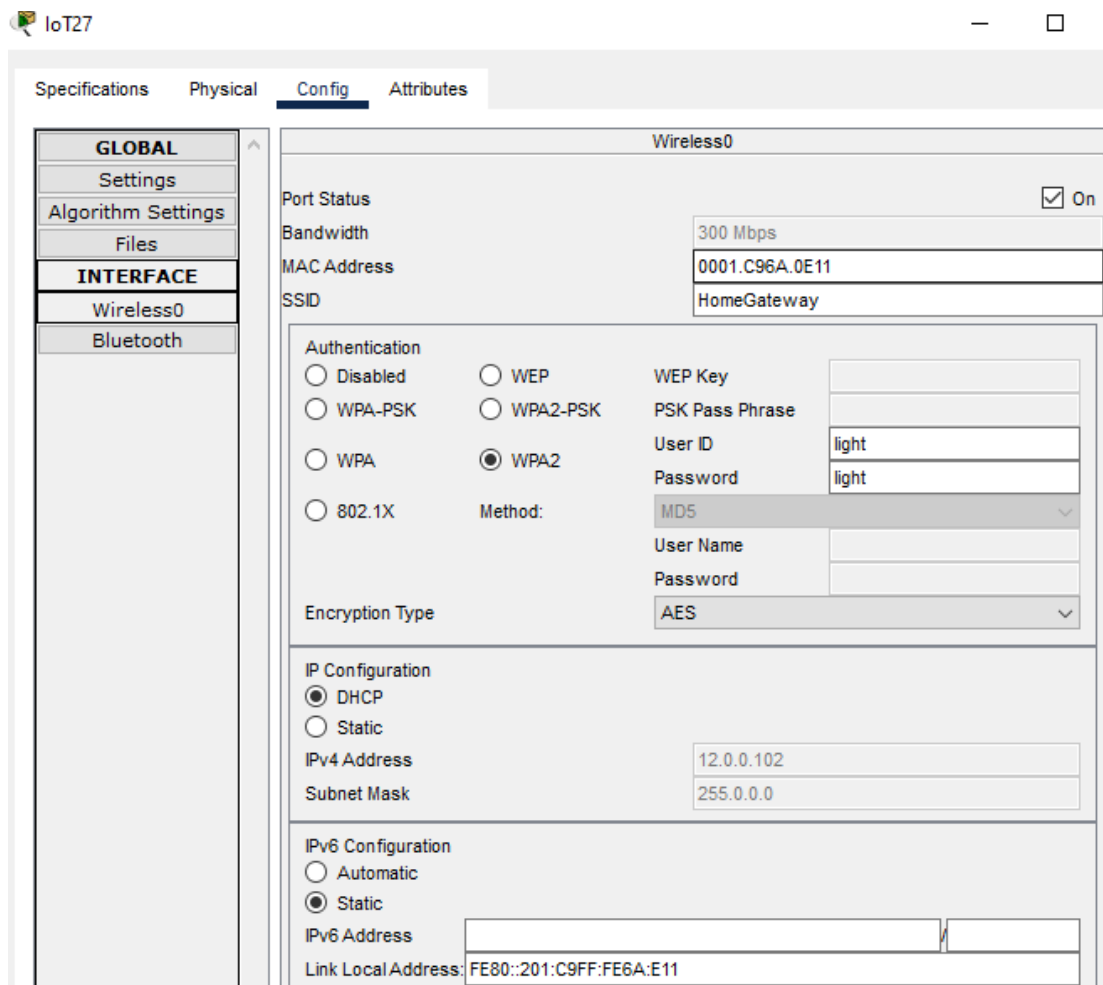


Figure 2.1.2.3: IoT device connection in wireless router

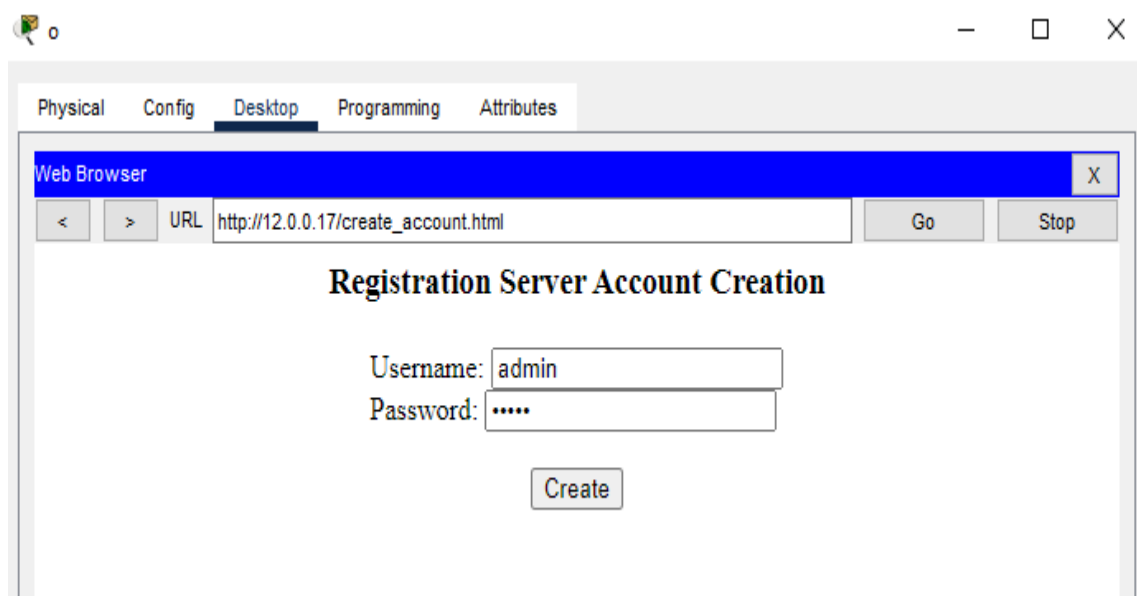


Figure 2.1.2.4: Registration Server Account Creation

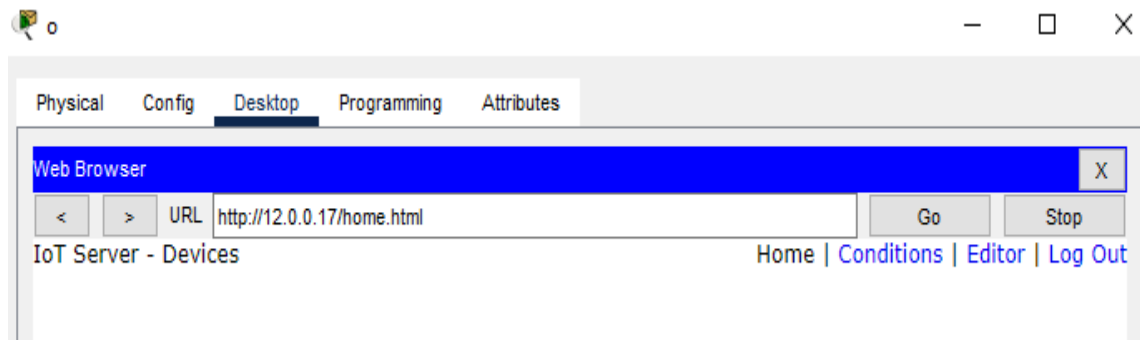


Figure 2.1.2.5: Registration Server Account Create success

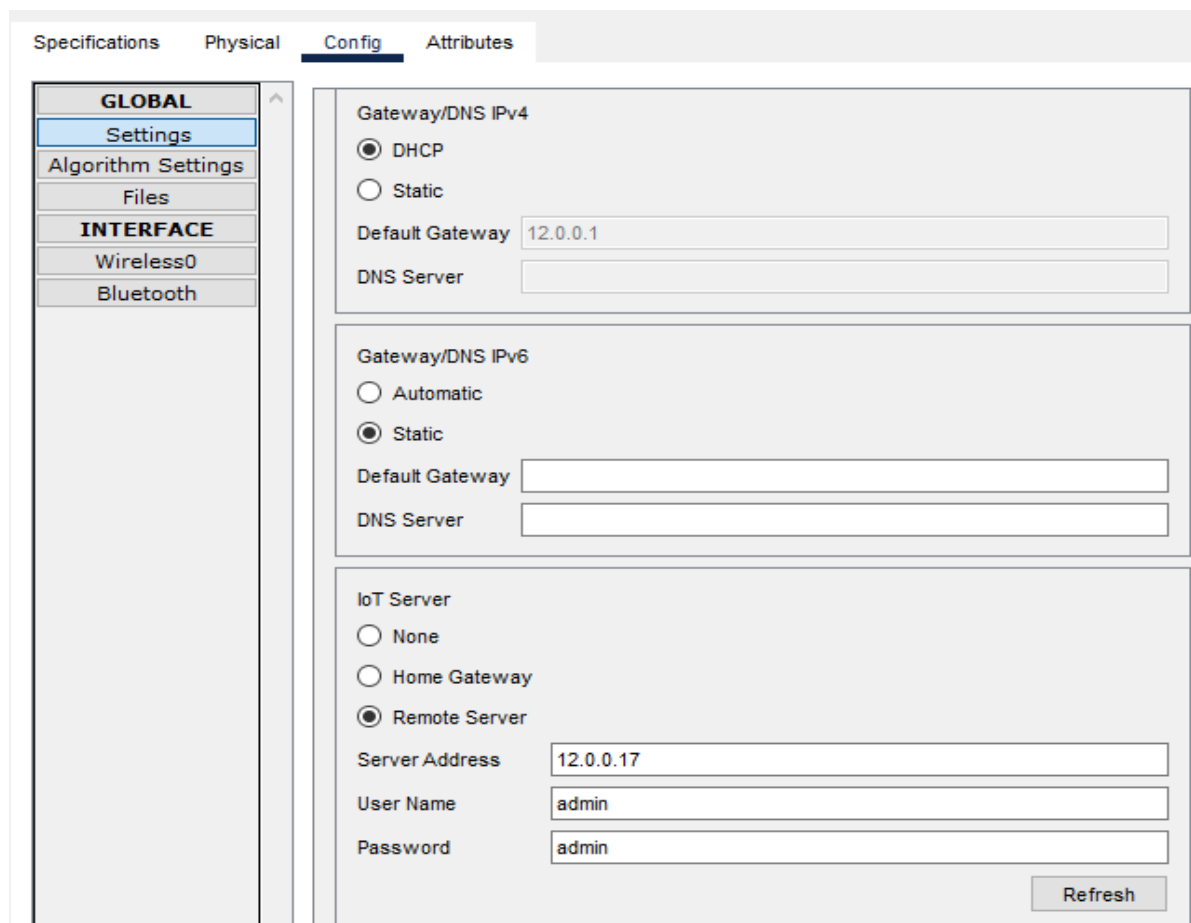


Figure 2.1.2.6: Remote Control.

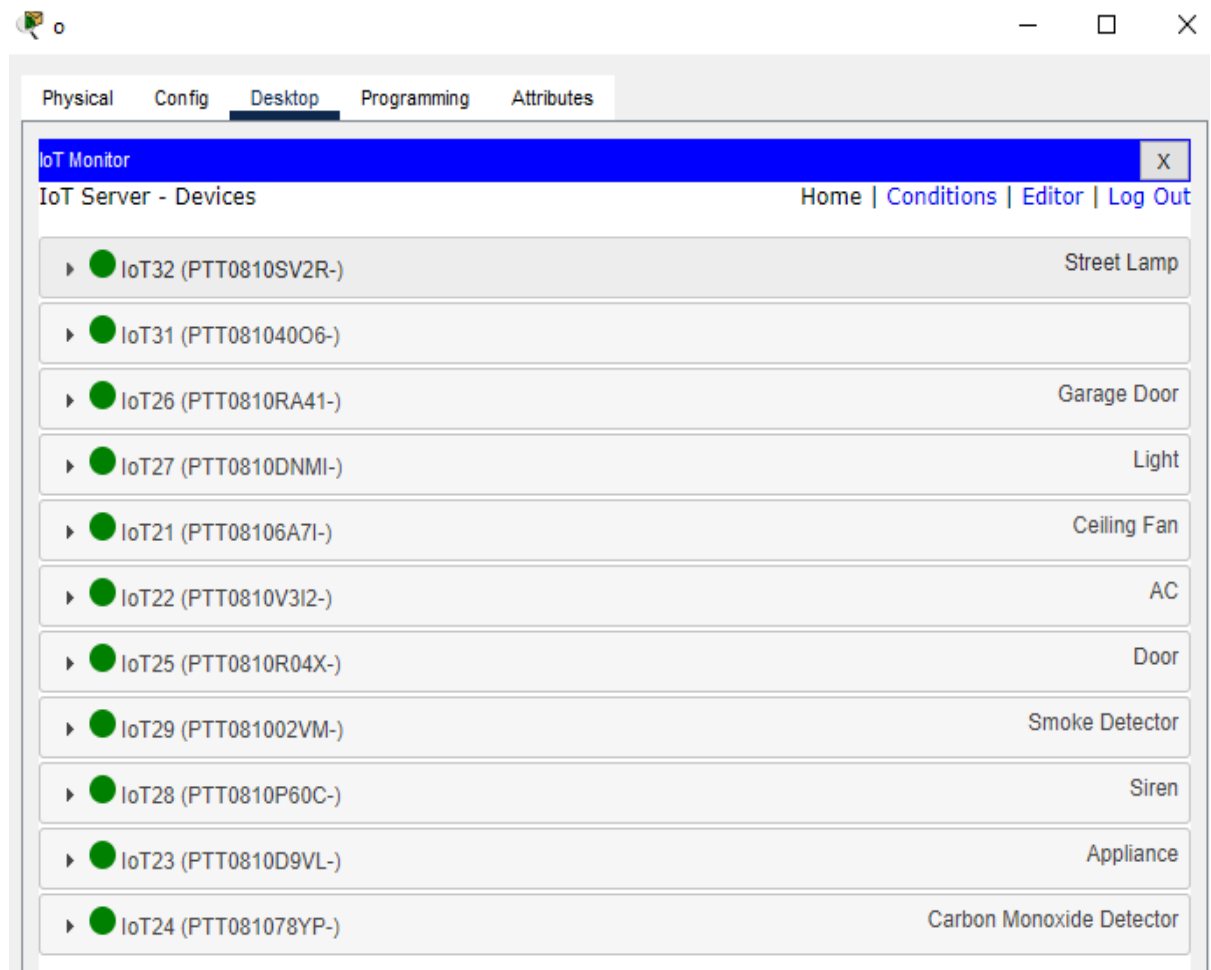


























Figure 2.1.2.7: IoT Monitor

Chapter 3

Performance Evaluation

3.1 Simulation Environment/ Simulation Procedure

Simulation Panel				
Event List				
Vis.	Time(sec)	Last Device	At Device	Type
	0.000	--	l	 ICMP
	0.000	--	l	 ARP
	0.001	l	Switch2	 ARP
	0.002	Switch2	h	 ARP
	0.002	Switch2	i	 ARP
	0.002	Switch2	j	 ARP
	0.002	Switch2	k	 ARP
	0.002	Switch2	m	 ARP
	0.002	Switch2	Multilayer Switch0	 ARP
	0.003	Multilayer Switch0	Switch0	 ARP
	0.003	Multilayer Switch0	Switch1	 ARP
	0.003	Multilayer Switch0	Switch3	 ARP
	0.003	Multilayer Switch0	Switch5	 ARP
	0.003	Multilayer Switch0	Switch4	 ARP
	0.003	Multilayer Switch0	Router1	 ARP
	0.004	Switch0	a	 ARP
	0.004	Switch1	b	 ARP
	0.004	Switch1	c	 ARP
	0.004	Switch1	d	 ARP
	0.004	Switch1	e	 ARP
	0.004	Switch1	f	 ARP
	0.004	Switch1	g	 ARP
	0.004	Switch1	DNS_server	 ARP
	0.004	Switch1	@gmail.com	 ARP

3.2 Results and Discussions

During the implementation of these protocols, the main problems we have encountered are, each and every small step should be thoroughly examined. Otherwise, errors may be found requires a lot of time and patience. So, we didn't take too many numbers keep connections and projects simple. However, it may be possible to implement it. It turns into a large network and gains benefits

3.2.1 Results

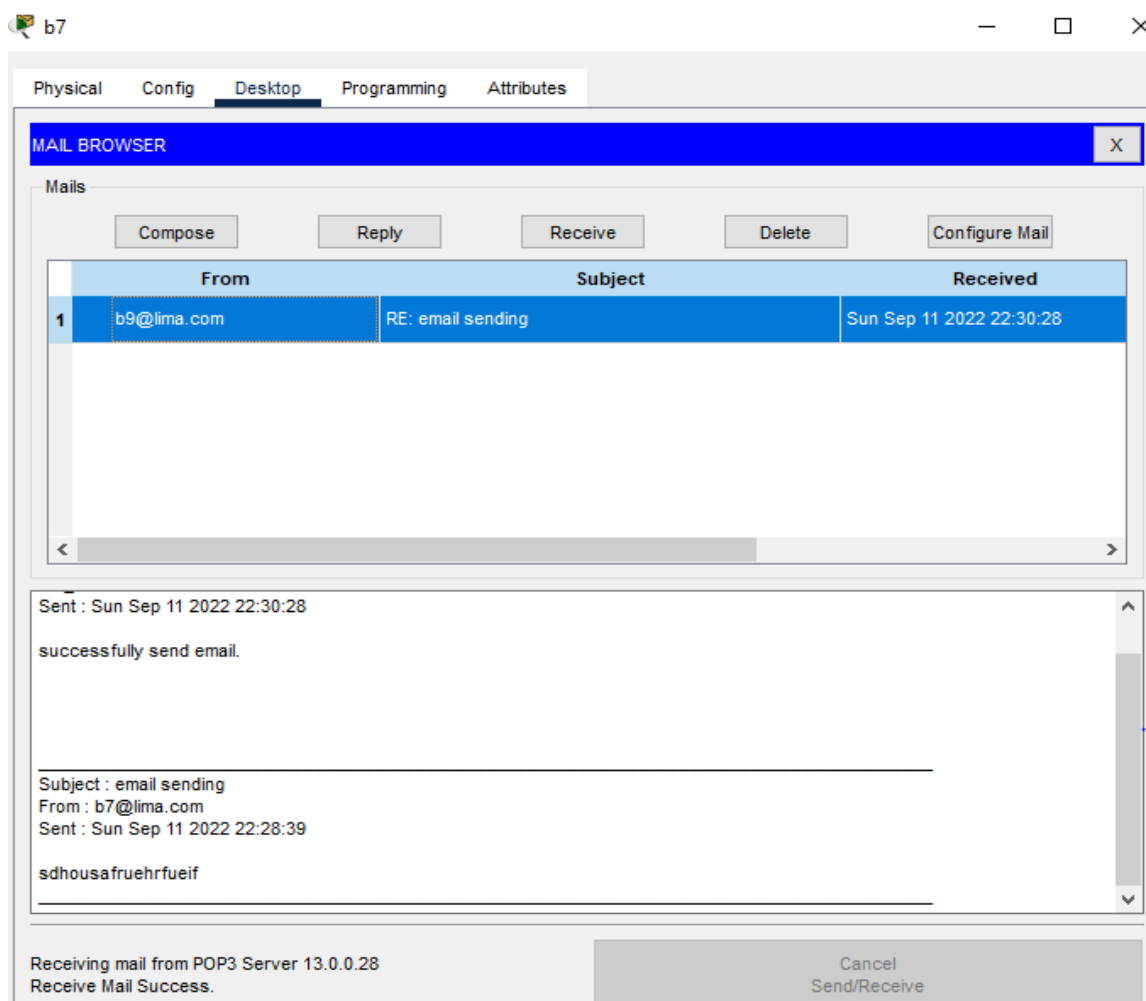



Figure 3.2.1.1: Email Success

 a

Physical

Config

Desktop

Programming

Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 12.0.0.15

Pinging 12.0.0.15 with 32 bytes of data:

Reply from 12.0.0.15: bytes=32 time=1ms TTL=128
Reply from 12.0.0.15: bytes=32 time<1ms TTL=128
Reply from 12.0.0.15: bytes=32 time<1ms TTL=128
Reply from 12.0.0.15: bytes=32 time<1ms TTL=128

Ping statistics for 12.0.0.15:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ftp
Cisco Packet Tracer PC Ftp

Usage: ftp target

C:\>ftp 12.0.0.15
Trying to connect...12.0.0.15
Connected to 12.0.0.15
220- Welcome to PT Ftp server
Username:a
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>put lima.txt

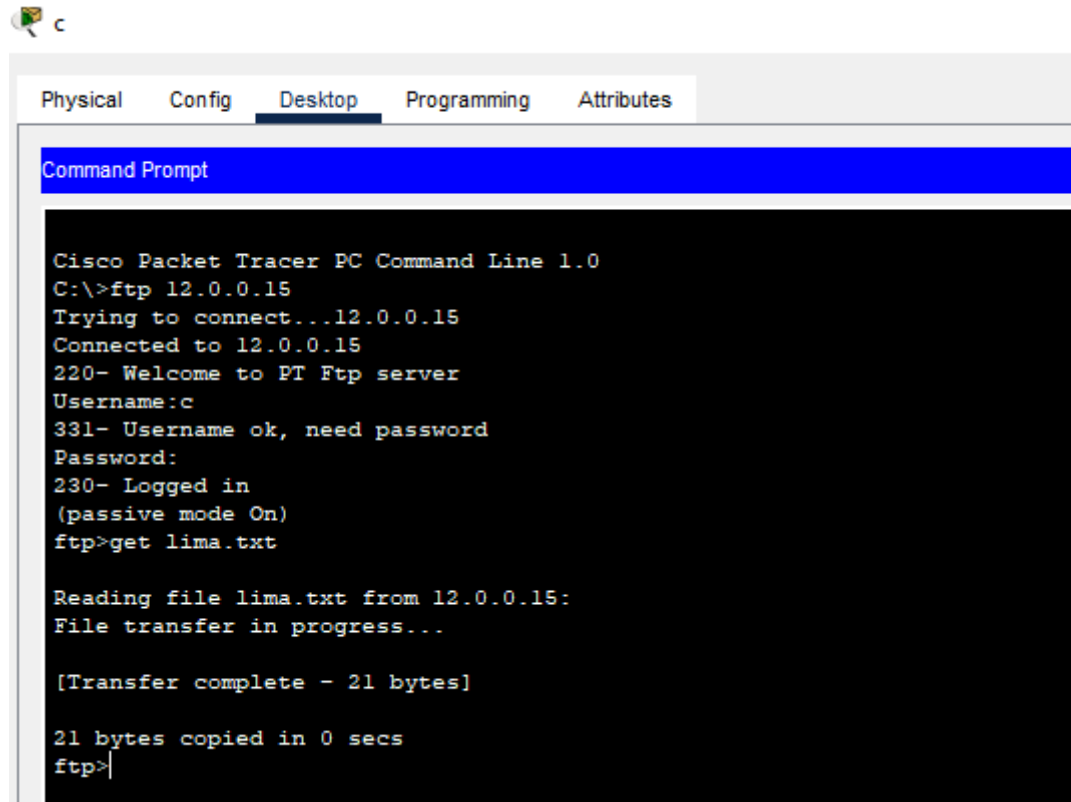
Writing file lima.txt to 12.0.0.15:
File transfer in progress...

[Transfer complete - 21 bytes]

21 bytes copied in 0.084 secs (250 bytes/sec)
ftp>dir

Listing /ftp directory from 12.0.0.15:
```

Figure 3.2.1.2: FTP checking



The image shows a Cisco Packet Tracer PC Command Line window. The window has tabs for Physical, Config, Desktop, Programming, and Attributes, with Desktop selected. The Command Prompt area shows the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ftp 12.0.0.15
Trying to connect...12.0.0.15
Connected to 12.0.0.15
220- Welcome to PT Ftp server
Username:c
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>get lima.txt

Reading file lima.txt from 12.0.0.15:
File transfer in progress...

[Transfer complete - 21 bytes]

21 bytes copied in 0 secs
ftp>
```

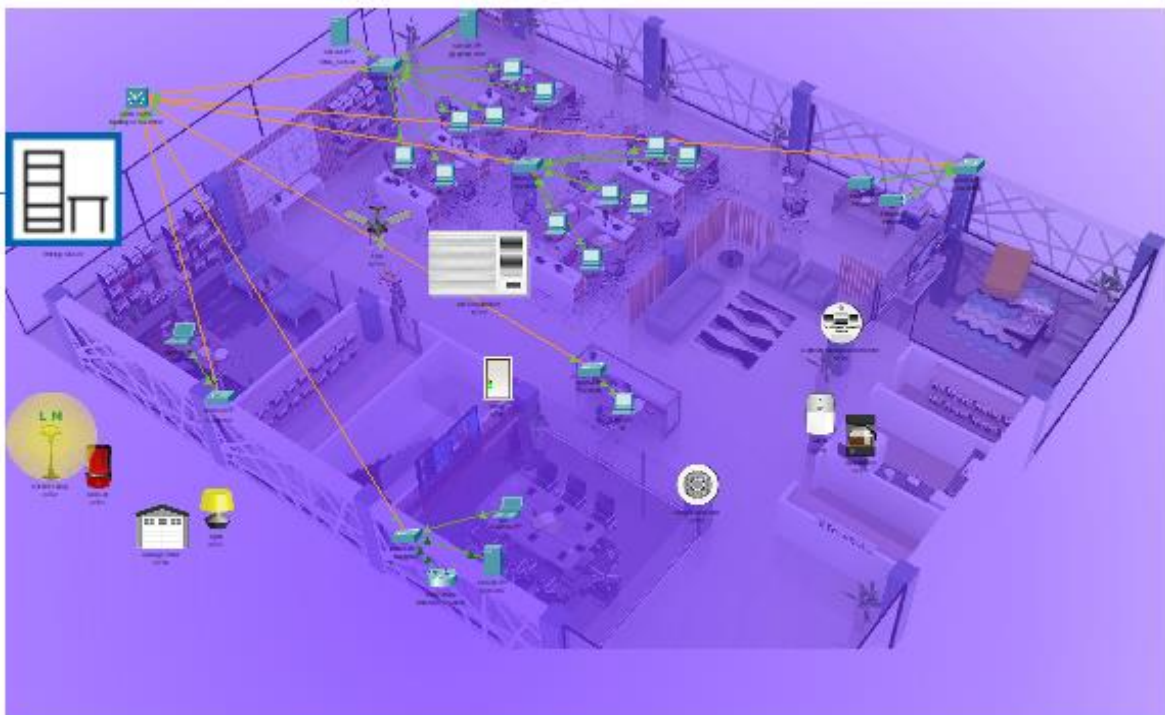
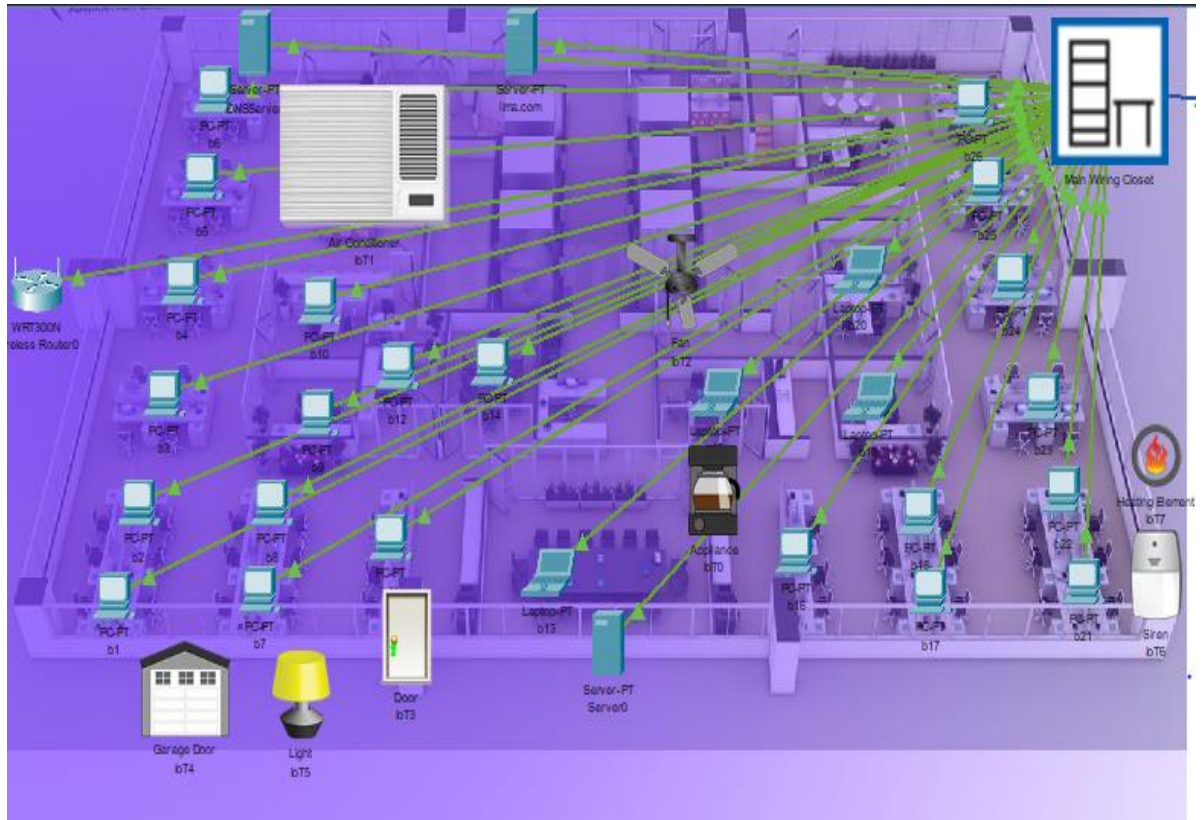
Figure 3.2.1.3: FTP checking

3.2.2 Analysis and Outcome

I didn't finish the project as I thought. Since I don't know much so that simple problem become very difficult to understand.

The outcome is:



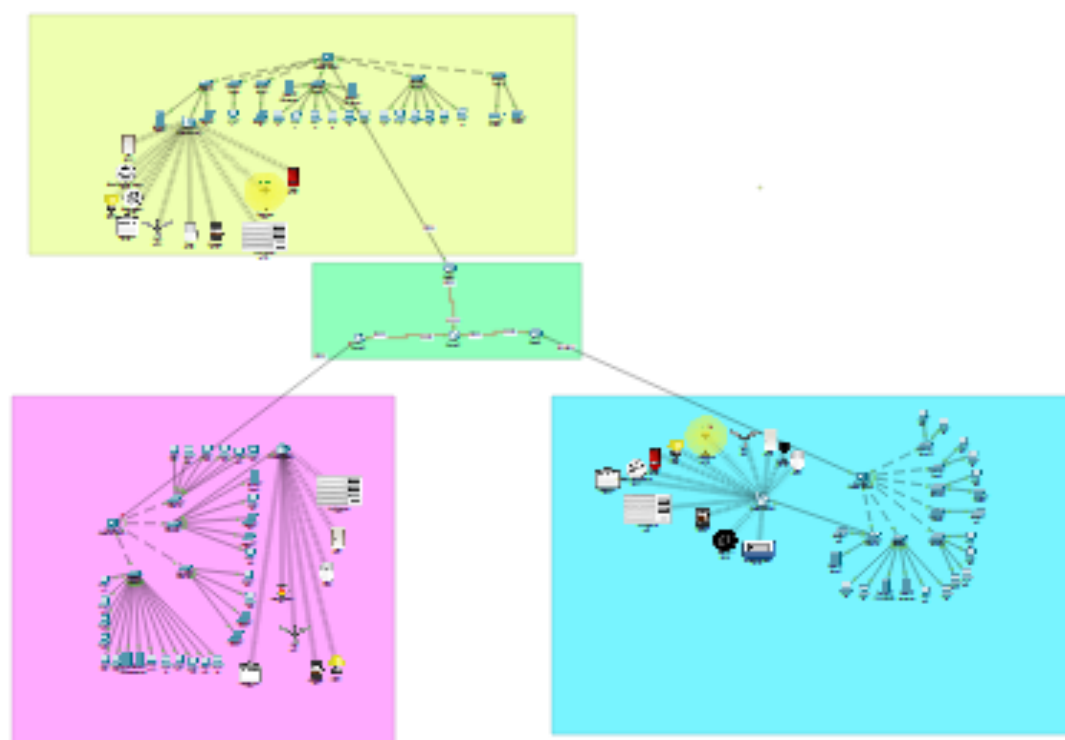


These two office are in Dhaka city.



And this office in Canberra City.

So, overall project in logical view:



Chapter 4

Conclusion

4.1 Introduction

This is a simple project constructing network system smart office by implementing the SMTP Server, FTP server and Routing protocol and IOT devices.

4.1 Practical Implications

- Can help a beginner to learn the basic of Cisco Packet Tracer.
- Can help a beginner to know how to use physical view in Cisco Packet Tracer.
- Able to do another types of networks like college, University, Two cities connections etc.
- Also after completing the project in real, the communications would be better.

4.2 Scope of Future Work

This is a simple project constructing network system of Smart Office by implementing the SMTP Server, FTP server, Routing protocol and here dynamic routing & IoT has been used. By the help of this concept, Smart Home IoT, educational institute's, banking networking systems and any kind of networking for internal communication with server can be implemented as well as it can be implemented in networking system of any company or organizations who want to have a network system and internal servers of their own

References

- [1] Kurose, J. F., & Ross, K. W. (2009). "Computer Networking: A Top-Down Approach (Vol. 4)". Boston, USA: Addison Wesley. 7th Edition.
- [2] <https://www.youtube.com/watch?v=KwhrRyWPv64&t=591s>
- [3] <https://www.youtube.com/watch?v=puwn2Kxj4HE>
- [4] [https://www.academia.edu/39707451/IRJET- SMART OFFICE MONITORING SYSTEM USING IOT](https://www.academia.edu/39707451/IRJET- SMART_OFFICE_MONITORING_SYSTEM_USING_IOT)