

**DESIGNING A NETWORK INFRASTRUCTURE FOR COLLEGE  
CAMPUS**

**A**

**Project Report Submitted**

**In Partial fulfilment of the requirements for award of the  
Degree of  
Bachelor of Science in Computer Science**

**SUBMITTED BY**

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(20SUCS014)**

**Under the guidance of**

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MANNAR THIRUMALAI NAICKER COLLEGE  
(Autonomous)**

**Pasumalai, Madurai – 625 004.**

**April - 2023**

**MANNAR THIRUMALAI NAICKER COLLEGE  
(AUTONOMOUS)**

**PASUMALAI, MADURAI-625 004.**



**BONAFIDE CERTIFICATE**

This is to certificate that this project work entitled "**Designing A Network Infrastructure For College Campus**" is a Bonafide record work done by **A. Deepak Mayil (Register No: 20SUCS014)** in partial fulfilment for the award of the degree of B.Sc(Computer Science) of **MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)**.

Submitted for the project evaluation and viva voce held on

.....

Mr M. Selvakumar, M.Sc., M.Phil.,  
**Internal Guide**

Dr.G.Devika,M.C.A.,M.Phil.,P.hD.,  
**HOD**

**EXTERNAL EXAMINER**

## **DECLARATION**

I hereby declare that this software project done under the title “**Designing a Network Infrastructure For College Campus**” is submitted for the award of **B.Sc. (Computer Science)** is the original work and that no part of this project has been submitted fully or partially for any other organization earlier.

Date :

SIGNATURE

Place : MADURAI

(A. Deepak Mayil)

## **ACKNOWLEDGEMENT**

I thank our almighty for having showered his blessings upon us carry out this project work successfully.

I would not have been possible this project without the support from our parents and friends. Words are inadequate to thank them. Our parents are having been great and they are offering good guidance and support to us.

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I express my sincere thanks to my class in charge and guide Mr. M.Selvakumar,M.Sc.,M.Phil., Department of Computer Science, Mannar Thirumalai Naicker College.

I would like to acknowledge kind help and whole hearted co-operation extended to me by the staff members of our department.

My hearty thanks one and all who helped us in the successful completion of the project.

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# **INTRODUCTION**

## **INTRODUCTION**

### **1.1.ABSTRACT**

In today's world, Networking have become extremely necessary for providing communication, security, chat and others services. In these services, computer networks play very important role to communicate, administrate, automate and process the information from point to another points. In this project Cisco pocket tracer is used as a network simulator tools to simulate and Design a network project for a College. The project discusses interconnection between routers, switches and other components in data communication network and how are programmed and configured. Smart office and Server Room uses IoT technology to automate different activities of office and Labs. IoT devices connected to the internet, to allow the distant monitoring and controlling of different appliances such as light, fan, air conditioner, etc. In this project, I implemented smart office using new released "Cisco packet tracer" simulation software, since different IOT device used for automation is included in this new version simulator. The previous software has only networking device, but in new released simulator IOT device is included those are sensor, board, IOE device and Programming Languages with classically networking device. To design smart office I used different device used for security, safety and environment prosperity. The protocols used for designing a Network Infrastructure are RIP, DHCP, VLAN, OSPF, MAIL, FTP, HTTP, A College campus consists of multiple labs, Net cafe, departments and server rooms.

# **SYSTEM ANALYSIS**

## **SYSTEM ANALYSIS**

### **INTRODUCTION**

System Analysis and Design, is the process of gathering and interpreting facts, diagnosing problem and using the information to recommend improvement to the system. Before development of any project can be pursued, a system study is conducted to learn the details of the current business solution. Information gathered through the study forms the basis for creating alternative design strategies. Virtually all organizations are systems that interact with their environment through receiving input and producing output.

It is a management technique used in designing a new system, improving an existing system or solving problem. System analysis does not guarantee that the user will derive an ideal solution to a problem. This depends solely on the way one designs a system to exploit the potential in the method. To put it in another way, creativity is as much as must pre-design the study and problem solving process and evaluate every successive step in the system analysis.

Taking all these factors into account and with the knowledge of the inter-relationship between the various fields and sections and their potential interactions, they are considered for developing the whole system in an integrated manner, this project is developed to meet all the criteria in the management technique which also helps us in the development and design of the new system or to improve the existing system.

## **2.1. EXISTING SYSTEM**

All the hosts are assigned with static IPs and are assigned in the order in which it where set up. No support for dynamic IP allocations. Even though the working is divided into three major sectors all the host, multimedia devices are connected in a single network. Thus, network security and maintenance are difficult. One more problem observed was the existing switches were outdated and hence could not prove to be beneficial for the network administrator to observe monitor and handle the network traffic the system has no remote access to the network. Absence of basic small-scale businesses firewall was also observed. Thus, security is also compromised. Three server rooms were used for the purpose of independent networking which further caused wastage of power and money

## **2.2. PROPOSED SYSTEM**

In order to implement Smart Campus used new released Cisco packet tracer, which included different smart object used for home automation such as smart fan, smart window, smart door, smart light, smart Window, smart door, fire sprinkler, lawn sprinkler and different sensor is included. To control this smart object and sensor, microcontroller (MCU-PT) and Home Gateway used, since it provide programming environment for controlling smart object connected to it and provide controlling mechanisms by registering smart device to Home Gateway respectively . In the proposed System Protocol Switch Routing Information Protocol (RIP) to Open Shortest Path First. It is a widely used and supported routing protocol. It is a more intelligent routing protocol than RIP, IGRP and EIGRP. It supports unlimited router in the network, It is basically use for larger size organization in the network.

# **SYSTEM REQUIREMENT SPECIFICATION**

## **SYSTEM REQUIREMENT SPECIFICATION**

### **3.1. HARDWARE SPECIFICATION**

The above Hardware specifications were used in both Server and Client machines when developing

- System : Ryzen 7 4800H.
- Hard Disk : 512 GB
- Monitor : FHD 144Hz
- Mouse : Logitech.
- Ram : 16 GB.

### **3.2. SOFTWARE SPECIFICATION**

#### **SOFTWARE NAME: Cisco Packet Tracer**

- In this project Cisco pocket tracer is used as a network simulator tools to simulate and Design a network project for a College.
- Cisco Packet Tracer as the name suggests, is a tool built by Cisco. This tool provides a network simulation to practice simple and complex networks.
- The main purpose of Cisco Packet Tracer is to help students learn the principles of networking with hands-on experience as well as develop Cisco technology specific skills. Since the protocols are implemented in software only method, this tool cannot replace the hardware Routers or Switches. Interestingly, this tool does not only include Cisco products but also many more networking devices.

### **3.3. NETWORK REQUIREMENTS**

- 1: The new system should be able to reduce internet downtime. Download and upload links should be maintained above 5 Mbps speed requirement.
- 2: Network will be scalable.
- 3: The system should support remote access.
- 4: Should comprise of data centres with necessary security features and support.

# **NETWORK DEVICES**

## **NETWORK DEVICES**

### **Cisco Router 4331**

- Wire-speed performance for concurrent services such as security and voice, and advanced services to multiple T1/E1/DSL WAN rates
- Enhanced investment protection through increased performance and modularity
- Enhanced investment protection through increased modularity
- Increased density through High-Speed WAN Interface Card Slots (four)
- Enhanced Network Module Slot
- Support for over 90 existing and new modules ✓ Support for majority of existing AIMs, NMS, WICS, VWICS, and VICS
- Two Integrated 10/100 Fast Ethernet ports ✓ Optional Layer 2 switching support with Power over Ethernet (PoE) (as an option) Security
- On-board encryption
- Support of up to 1500 VPN tunnels with the AIM-EPII-PLUS Module
- Antivirus defence support through Network Admission Control (NAC)
- Intrusion Prevention as well as stateful Cisco IOS Firewall support and many more essential security features



## Cisco switch 2960-24TT

- Cisco Catalyst 2960 Series switches support voice, video, data, and highly secure access. They also deliver scalable management as your business needs change.
- The Common Features are included: Enhanced security including Cisco Trust Sec for providing authentication, access control, and security policy administration, Multiple Fast or Gigabit Ethernet performance options.
- Cisco Energy Wise for power management, Scalable network management.
- Cisco Catalyst 2960 Series Switches have using Auto Smart Ports, installation with Auto Install and enhanced troubleshooting to facilitate ease of use.
- Comprehensive management tools such as Cisco Network Assistant provide ongoing management and monitoring of switches
- Price: 1,58,869/-



## **Server**

- A server is a computer that provides data to other computers. May serve data to systems on a local area network (LAN) or a wide area network (WAN) over the Internet.
- While any computer can be configured as a server, most large businesses use rack-mountable hardware designed specifically for server functionality. In a business or corporate environment, a server and other network equipment are often stored in a closet or glass house.
- When a client requires data or functionality from a server, it sends a request over the network. The server receives this request and responds with the appropriate information.
- There are many types of servers that all perform different functions. File server. Print server, Web server, Database server, proxy server, Ftp server, Blade server, Virtual server, Telnet server etc...



## **Personal Computer**

- A computer is a device that accepts information and manipulates it for some result based on a program, software, or sequence of instructions on how the data is to be processed.
- The second type of computer you may be familiar with is a laptop computer, commonly called a laptop. Laptops are battery-powered computers that are more portable than desktops, allowing you to use them almost anywhere
- The best business computers still have an important role to play in any modern office.



### **Computer Maintenance Plans**

- Anti-virus software checkups
- Disk space utilization
- Defragmentation of hard drives
- Troubleshoot hardware and software issues
- Temporary internet files purging
- Installed software checkups

## Laptop

- A laptop computer is a small personal computer. They are designed to be more portable than traditional desktop computers, with many of the same abilities. Laptops are able to be folded flat for transportation and have a built-in keyboard and touchpad.



- Most laptops are powerful enough for everyday business administrative, home, or school use. However, if a user does graphical work such as 3D rendering or movie encoding.
- Similar to personal computers, laptops require a power source—they can be plugged into an outlet or operate on their internal battery. Laptop computers can be used at a desk by themselves, or as a desktop-style computer by connecting a separate monitor, keyboard, and mouse.
- These small computers can also be hooked into docking stations—devices that allow some laptops to easily connect to peripherals like monitors and keyboards at a desk—and then "undock" for easy mobile use and transport.
- Components such as processors, motherboards, memory sticks, hard drives, graphics cards, and interface devices are all items that form a laptop computer. The smaller these components are, the smaller and lighter a laptop can be.

## **Firewall**

- A firewall is a network security device that monitors incoming and outgoing network traffic and decides whether to allow or block specific traffic based on a defined set of security rules.
- Firewalls have been a first line of defense in network security for over 25 years. They establish a barrier between secured and controlled internal networks that can be trusted and untrusted outside networks, such as the Internet.
- A firewall can be hardware, software, software-as-a service (SaaS), public cloud, or private cloud (virtual).



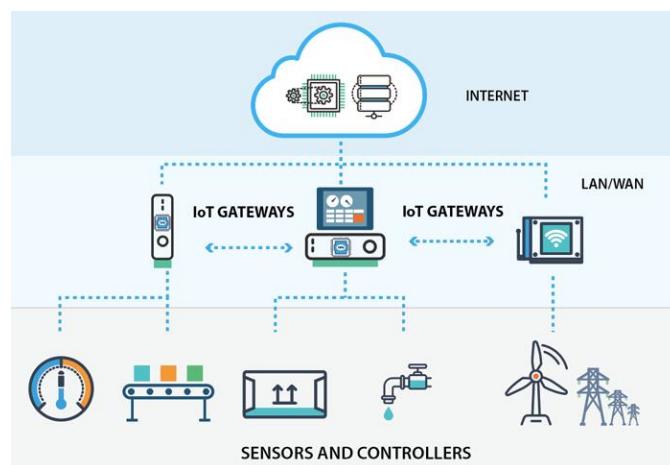
- Firewalls carefully analyze incoming traffic based on pre-established rules and filter traffic coming from unsecured or suspicious sources to prevent attacks.
- Firewalls guard traffic at a computer's entry point, called ports, which is where information is exchanged with external devices.

## IoT GATEWAY

- An IoT Gateway is a solution for enabling IoT communication, usually device-to-device communications or device-to-cloud communications. The gateway is typically a hardware device housing application software that performs essential tasks. At its most basic level, the gateway facilitates the connections between different data sources and destinations.
- A simple way to conceive of an IoT Gateway is to compare it to your home or office network router or gateway. Such a gateway facilitates communication between your devices, maintains security and provides an admin interface where you can perform basic functions

IoT Gateway feature set:

- Facilitating communication with legacy or non-internet connected devices
- Data caching, buffering and streaming
- Device to Device communications/M2M
- Networking features and hosting live data
- Data visualization and basic data analytics via IoT Gateway applications
- Security – manage user access and network security features
- Device configuration management
- System diagnostics



# CABLE

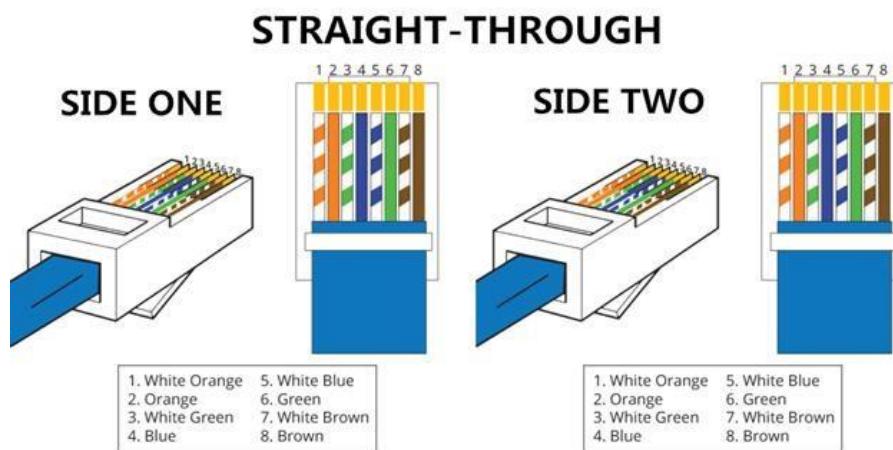
## Serial cable DCE

- Serial cable (DCE) stands for Data Communications Equipment DCE is typically a modem, DSU/CSU, or other piece of data communications equipment.
- A Cisco serial interface is operating as a DTE by default.
- When you take a cable and connect two routers directly by their serial interfaces (with a DTE/DCE), they are both waiting for the other to send them a clock rate. One of the interfaces must act as the DCE and that interface must send the clock rate.
- In a data station, the equipment that performs functions, such as signal conversion and coding, at the network end of the line between the data terminal equipment (DTE) and the line, and that may be a separate or an integral part of the DTE or of intermediate equipment.



## Straight through (RJ-45)

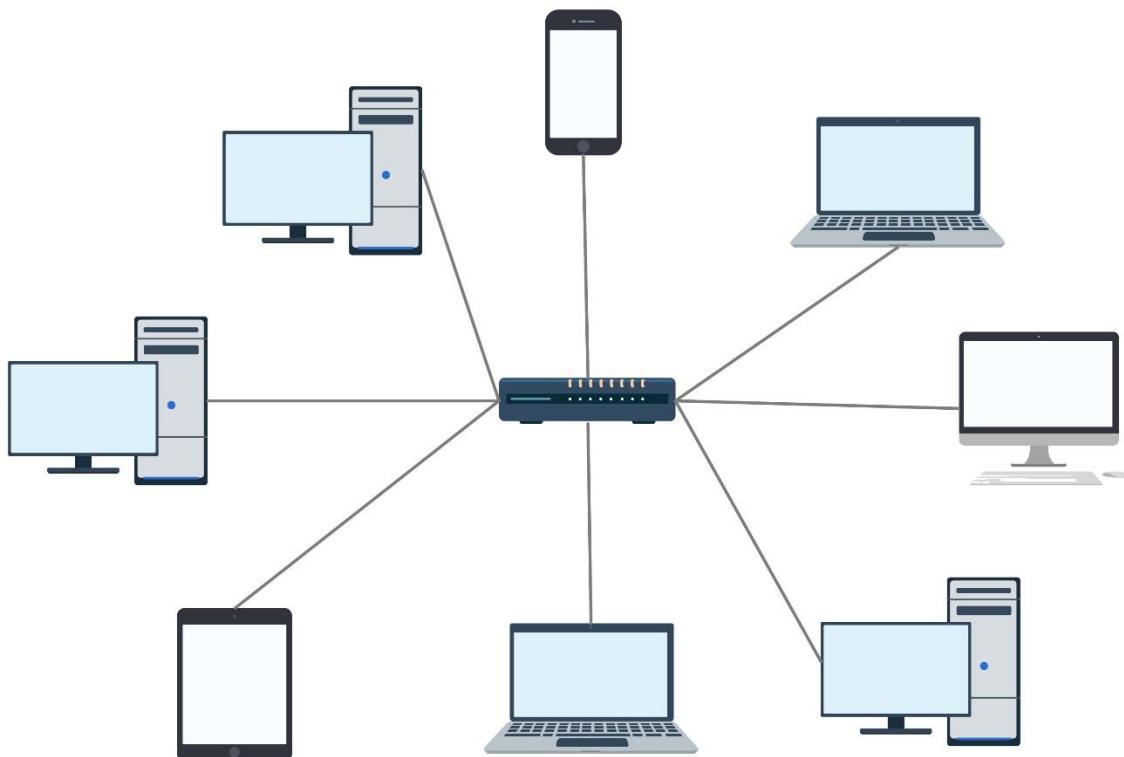
- Straight-through cable is used to connect computers and networking devices such as hubs and switches
- Straight-through cable is also commonly referred to as patch cable.
- Straight cable looks like Both sides (side A and side B) of cable have wire arrangement with same color
- Straight-through cable is a type of CAT5 with RJ-45 connectors at each end, and each has the same pin out in accordance with either the T568A or T568B standards.
- It uses the same color code throughout the LAN for consistency and is used in LAN to connect a computer or a network hub such as a router



# **TOPOLOGY**

## **Topology**

- A star topology, sometimes known as a star network, is a network topology in which each device is connected to a central hub.
- It is one of the most prevalent computer network configurations, and it's by far the most popular Network Topology.
- In this network arrangement, all devices linked to a central network device are displayed as a star.



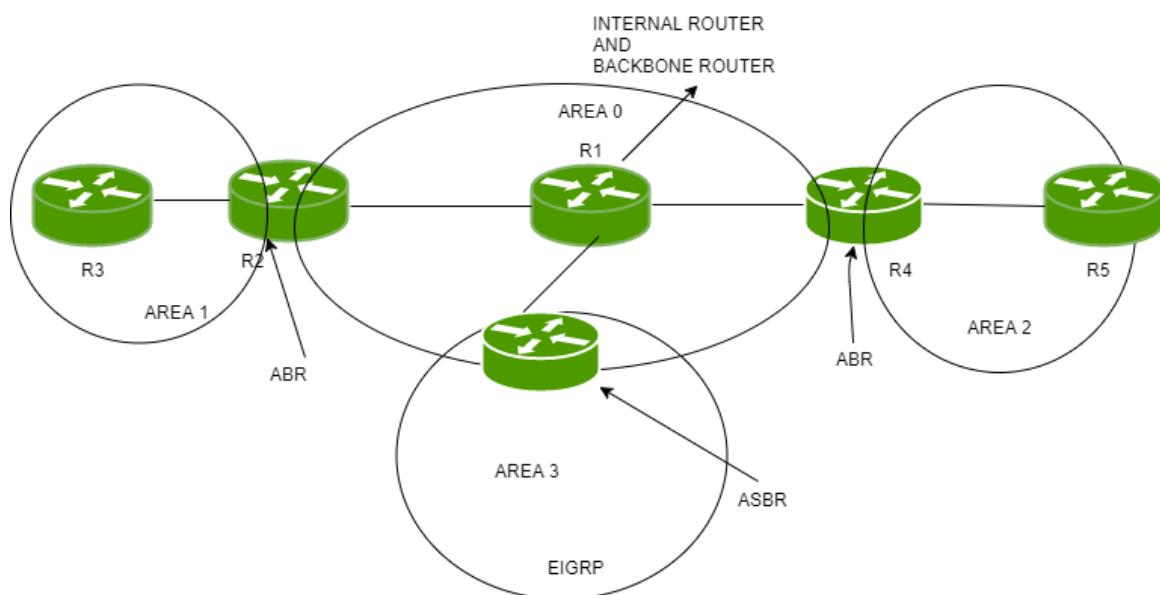
## **STAR TOPOLOGY**

# **PROTOCOLS**

## **ROUTING PROTOCOL**

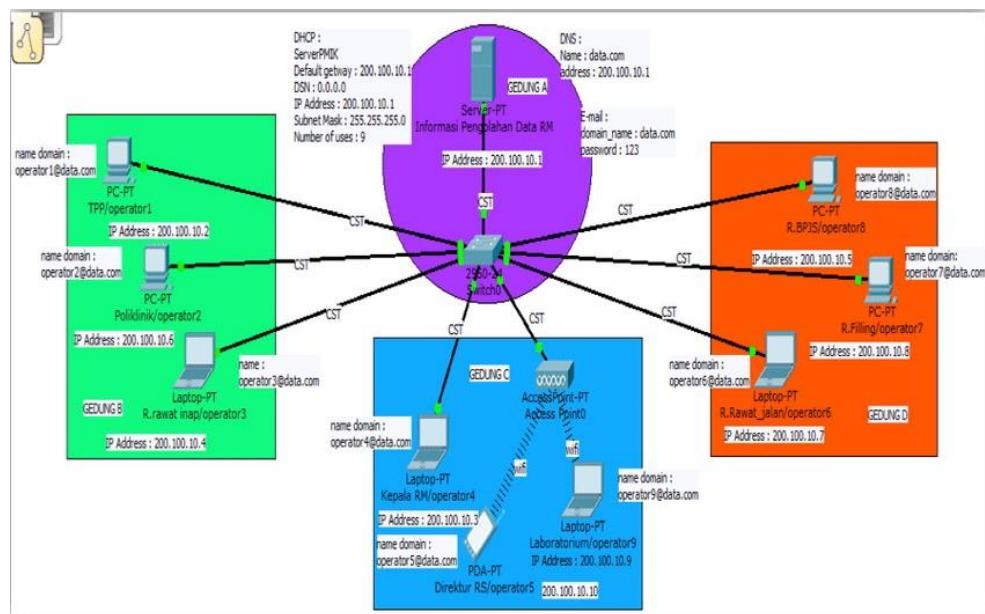
### **6.1 Open Shortest Path First (OSPF)**

- Open Shortest Path First (OSPF) is a link-state routing protocol that was developed for IP networks and is based on the Shortest Path First (SPF) algorithm. OSPF is an Interior Gateway Protocol (IGP).
- In an OSPF network, routers or systems within the same area maintain an identical link-state database that describes the topology of the area.
- Each router or system in the area generates its link-state database from the link-state advertisements (LSAs) that it receives from all the other routers or systems in the same area and the LSAs that itself generates.
- An LSA is a packet that contains information about neighbors and path costs. Based on the link-state database, each router or system calculates a shortest-path spanning tree, with itself as the root, using the SPF algorithm.



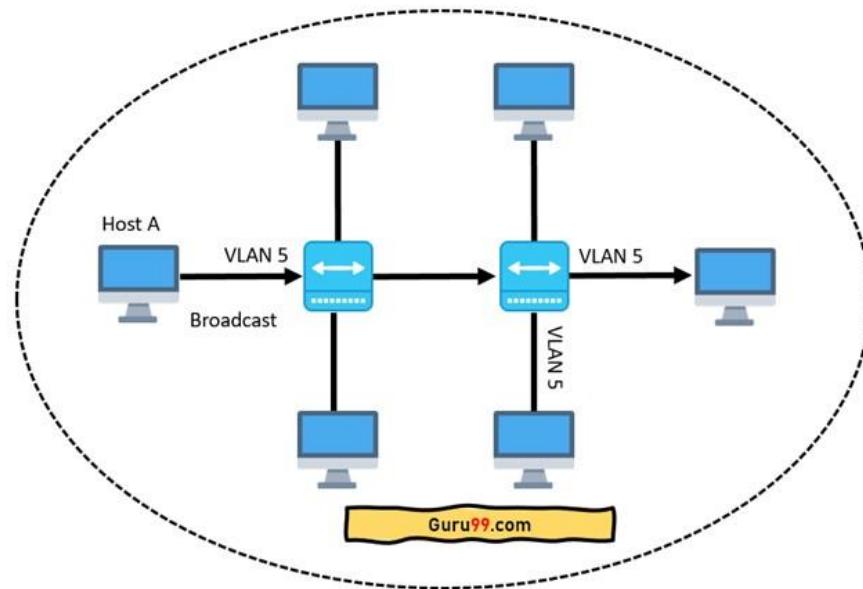
## 6.2 DHCP SERVER

- Dynamic host configuration protocol that automatically provides an ip address and other related configuration information such as subnet mask and default gateway.
- DHCP allows host to obtain required TCP/IP configuration information from DHCP server.
- DHCP minimizes configuration errors caused by manual IP address configuration. Such as typographical error or address conflicts caused by the assignment of an IP address to more than one computer at the same time
- One of the key vulnerabilities of DHCP has been the use of so-called man in the middle (MITM) attacks.
- Which the attacker secretly intercepts and relays message between two parties who believe they are communicating directly with each other.
- DHCP relay agent is any TCP/IP host which is used to forward request and replies between DHCP server and client when the server is present on the different network. Relay agent receive DHCP message and the Generate a new DHCP message to send out on another INTERFACE.



## 6.3 VLAN

- VLAN is a custom network which is created from one or more local area networks. It enables a group of devices available in multiple networks to be combined into one logical network.
- Combined into one logical network. The result becomes a virtual LAN that is administered like a physical LAN. The full form of VLAN is defined as Virtual Local Area Network.



- Here is step by step details of how VLAN works:
- VLANs in networking are identified by a number.
- A Valid range is 1-4094. On a VLAN switch, you assign ports with the proper VLAN number.
- The switch then allows data which needs to be sent between various ports having the same VLAN.
- Since almost all networks are larger than a single switch, there should be a way to send traffic between two switches.
- One simple and easy way to do this is to assign a port on each network switch with a VLAN and run a cable between them.

## **6.4 FTP SERVER**

- File Transfer Protocol Server is a computer that provides file storage and access services on the Internet. They provide services in accordance with the FTP protocol. FTP, the file transfer protocol is a set of standard protocols for file transfer on the network, using the client/server model. FTP is a protocol specifically used to transfer files.
- FTP is a client/server system. Users use a client that supports the FTP protocol to connect to a server program on a remote host. The user issues a command on the client, and the remote host server executes the command issued by the user after receiving the command, and returns the execution result to the client.
- Simply put, the user sends a command to the server, asking the server to send a file to the user. The server responds and sends the file to the client. The user receives the file and places it in the user's working directory.
- This process is carried out by the FTP server.

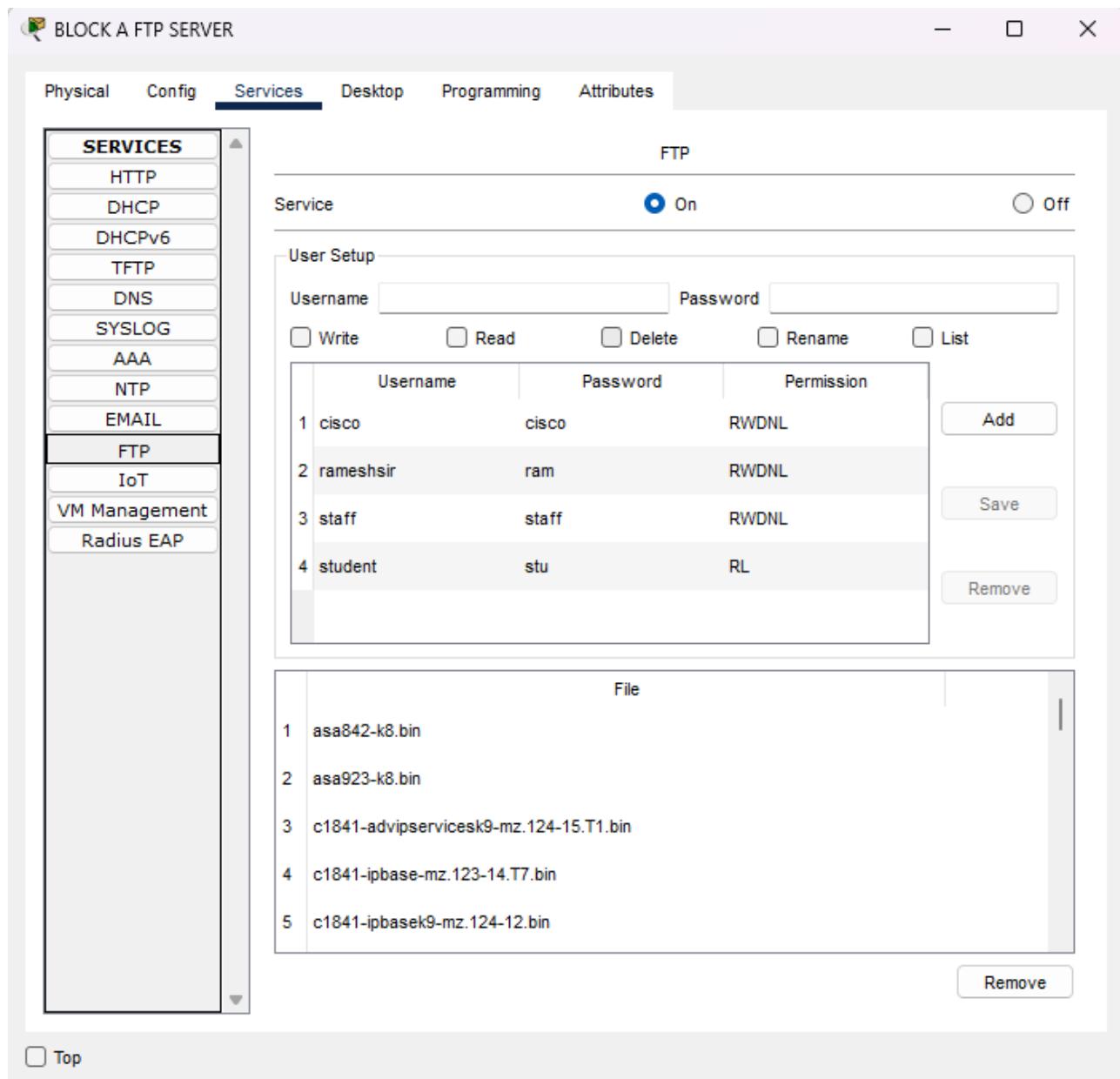


# **SERVER CONFIGURATION**

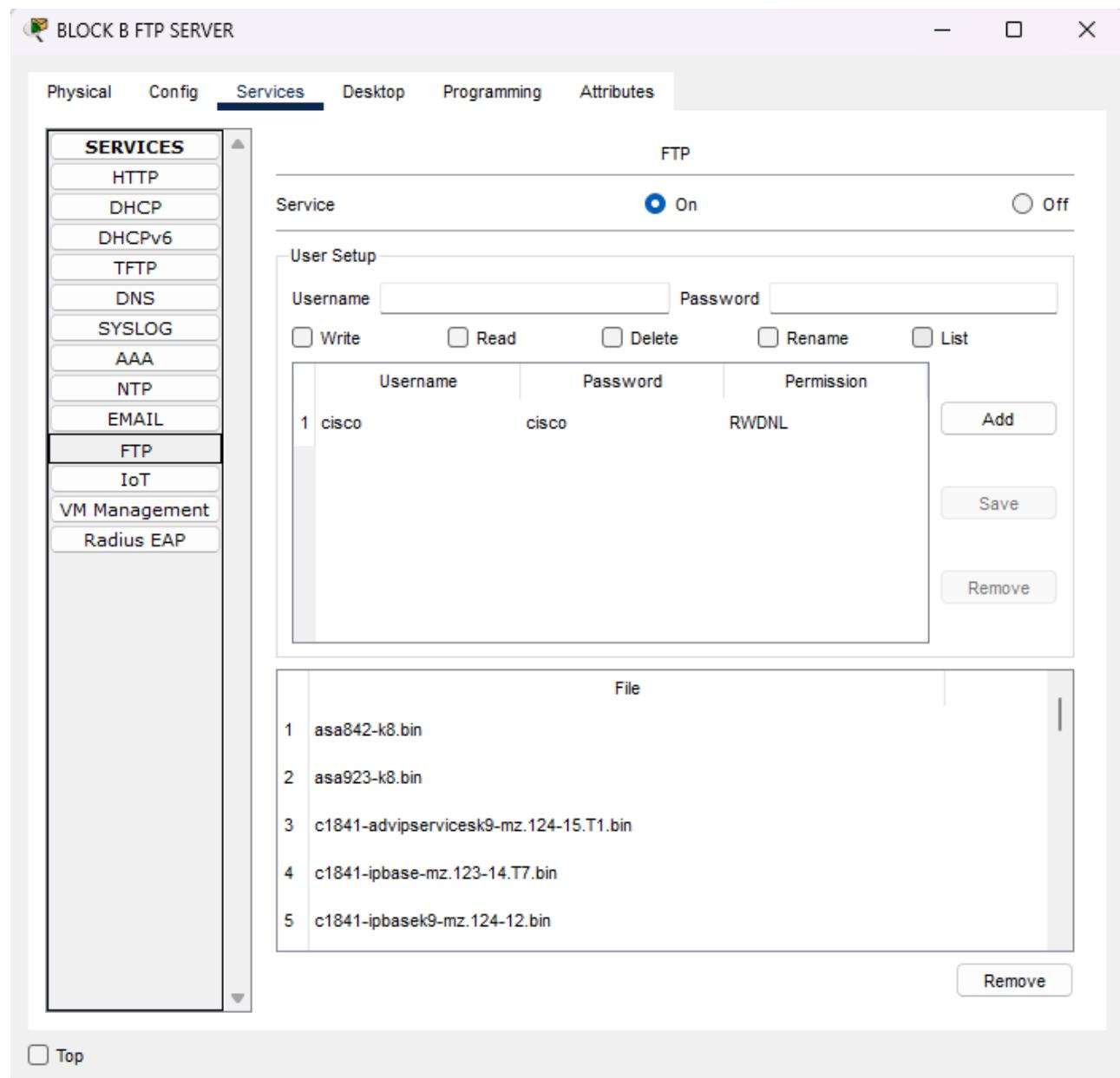
## **SERVER CONFIGURATION**

### **7.1 FTP SERVER**

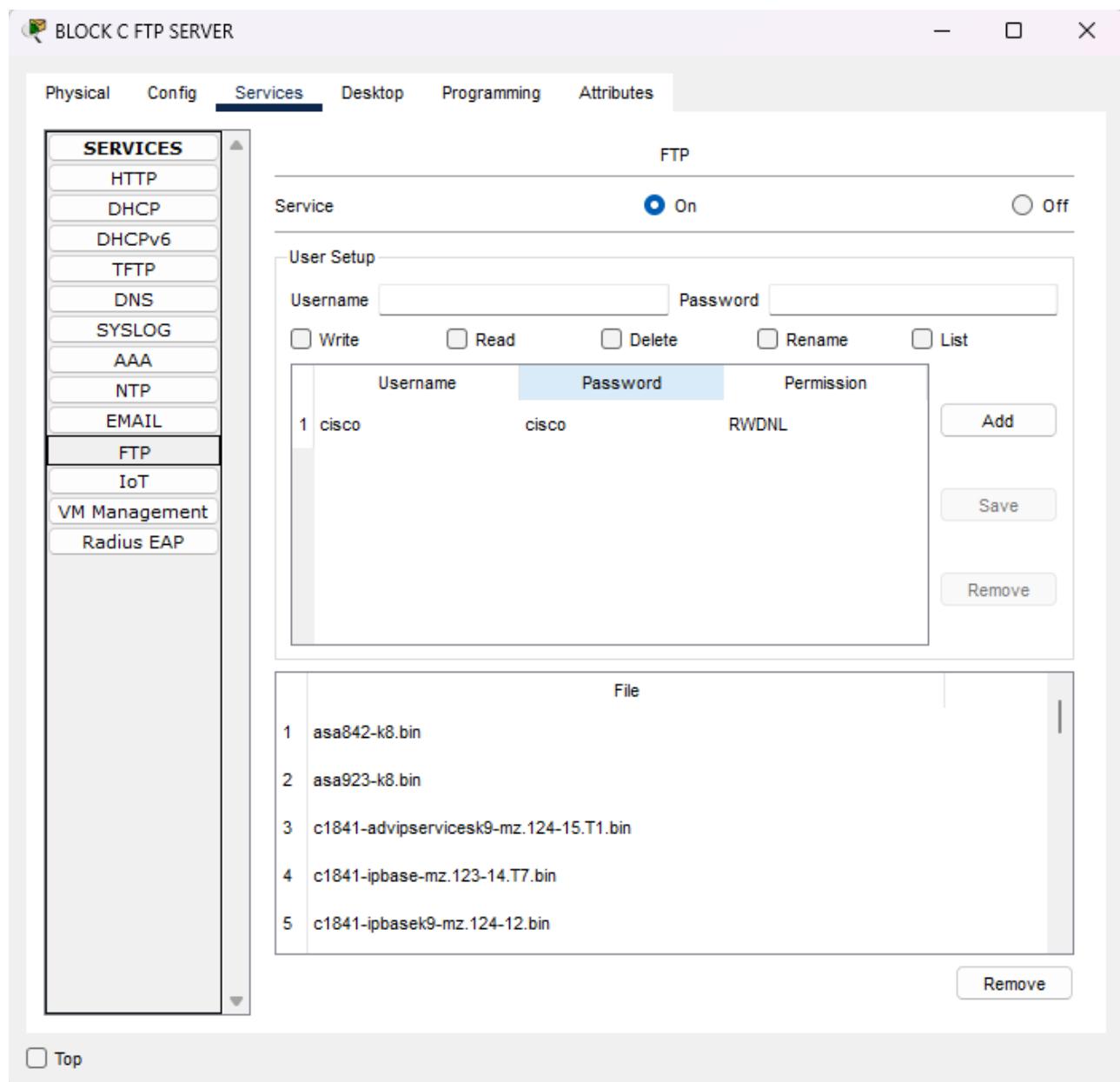
#### **BLOCK – A**



## BLOCK – B



# BLOCK – C



## REGULAR BLOCK

The screenshot shows the configuration interface for a REGULAR BLOCK device. The top navigation bar includes tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The Services tab is currently selected. On the left, a sidebar lists various services: HTTP, DHCP, DHCPv6, TFTP, DNS, SYSLOG, AAA, NTP, EMAIL, **FTP**, IoT, VM Management, and Radius EAP. The 'FTP' service is highlighted with a blue background.

The main configuration area is titled 'FTP'. It contains two sections: 'User Setup' and 'File'.

**User Setup:** This section allows configuration of user accounts. It includes fields for Username and Password, and checkboxes for Write, Read, Delete, Rename, and List permissions. A table lists existing users:

	Username	Password	Permission
1	cisco	cisco	RWDNL
2	staff	mtncstaff	RWDNL
3	Student	student	RL

Buttons for Add, Save, and Remove are available for managing users.

**File:** This section lists files available via FTP. The listed files are:

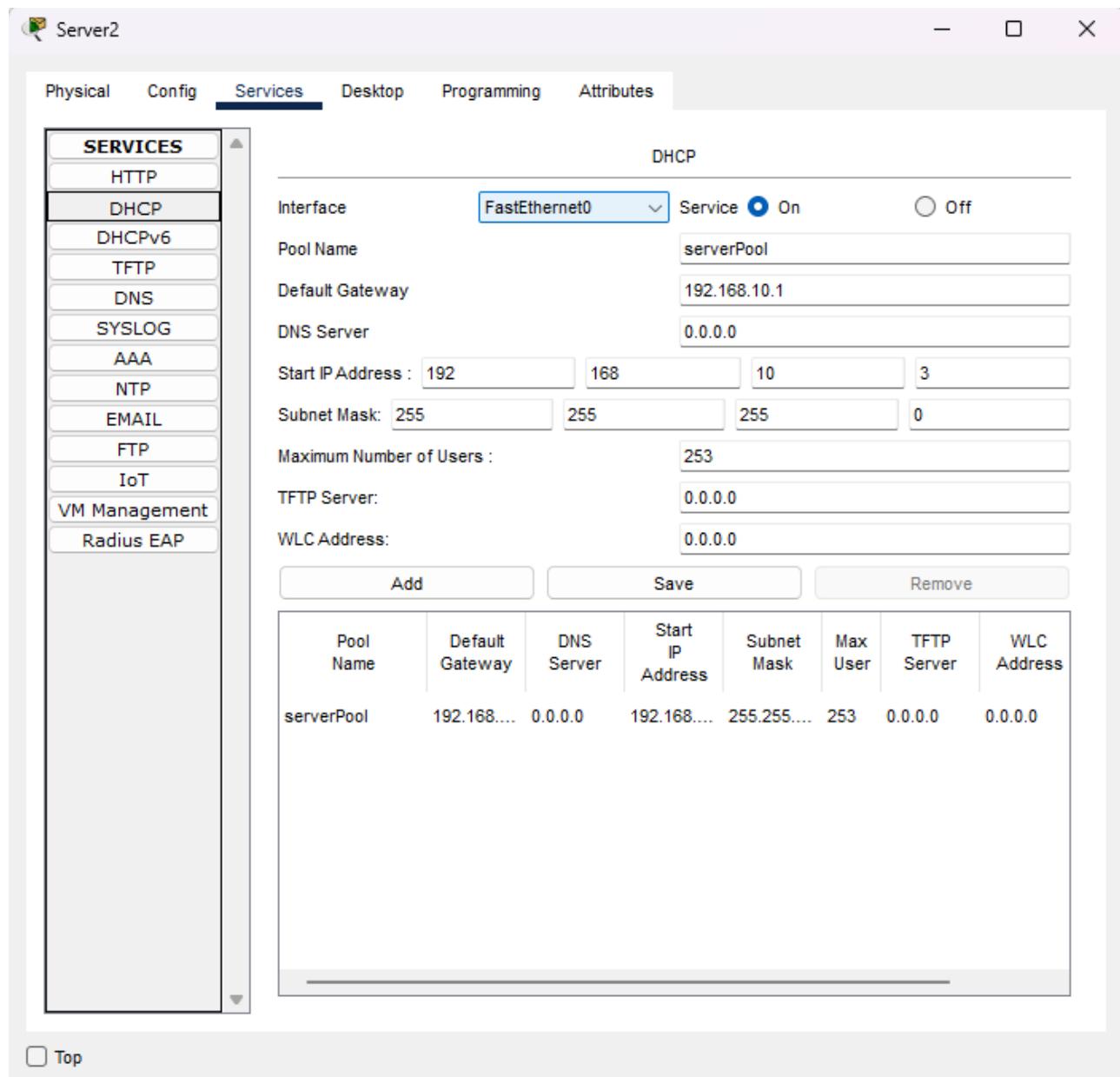
- 1 asa842-k8.bin
- 2 asa923-k8.bin
- 3 c1841-advpipsk9-mz.124-15.T1.bin
- 4 c1841-ipbase-mz.123-14.T7.bin
- 5 c1841-ipbasek9-mz.124-12.bin

A 'Remove' button is located at the bottom right of this section.

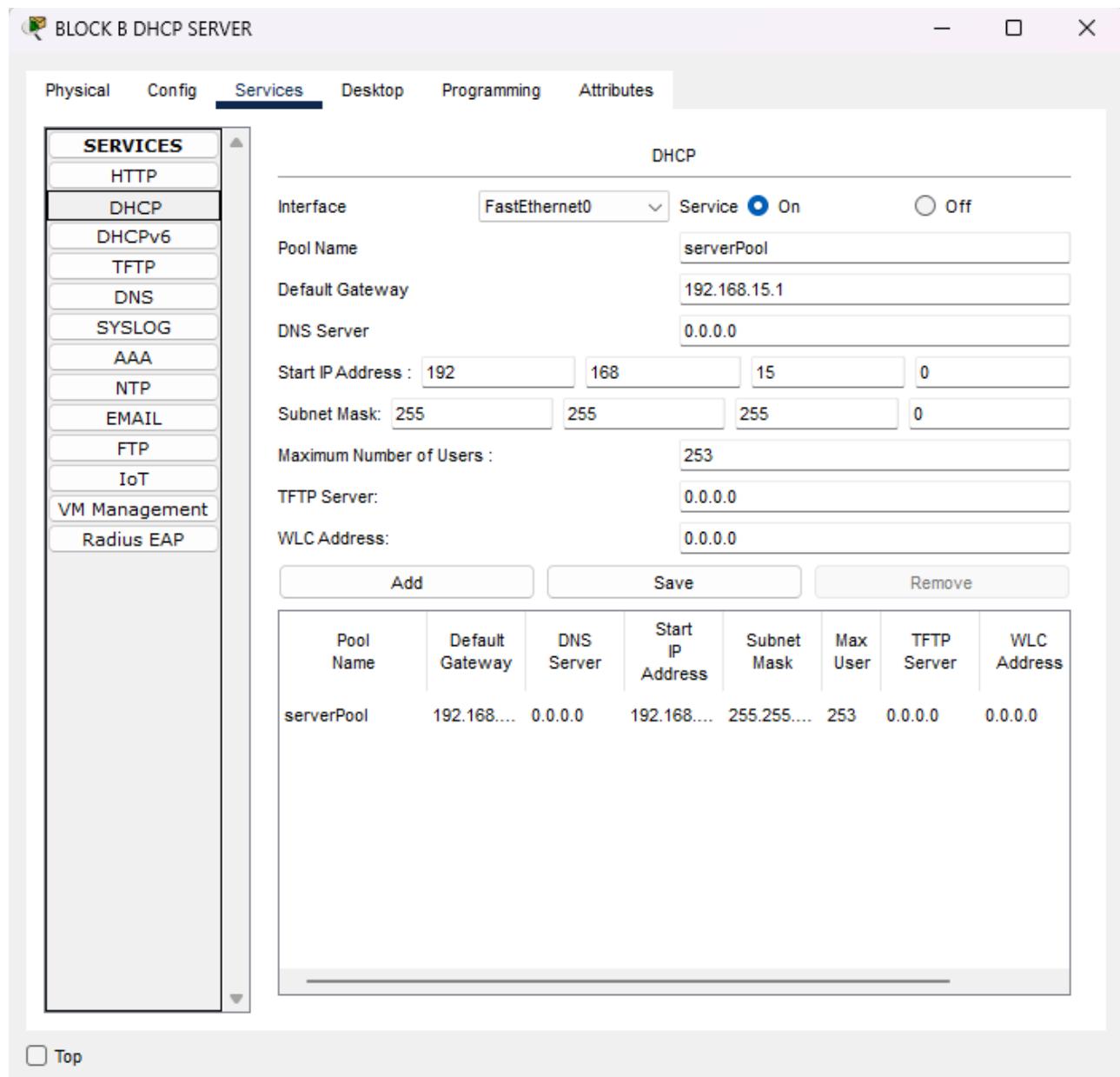
At the bottom left, there is a checkbox labeled 'Top'.

## 7.2 DHCP SERVER

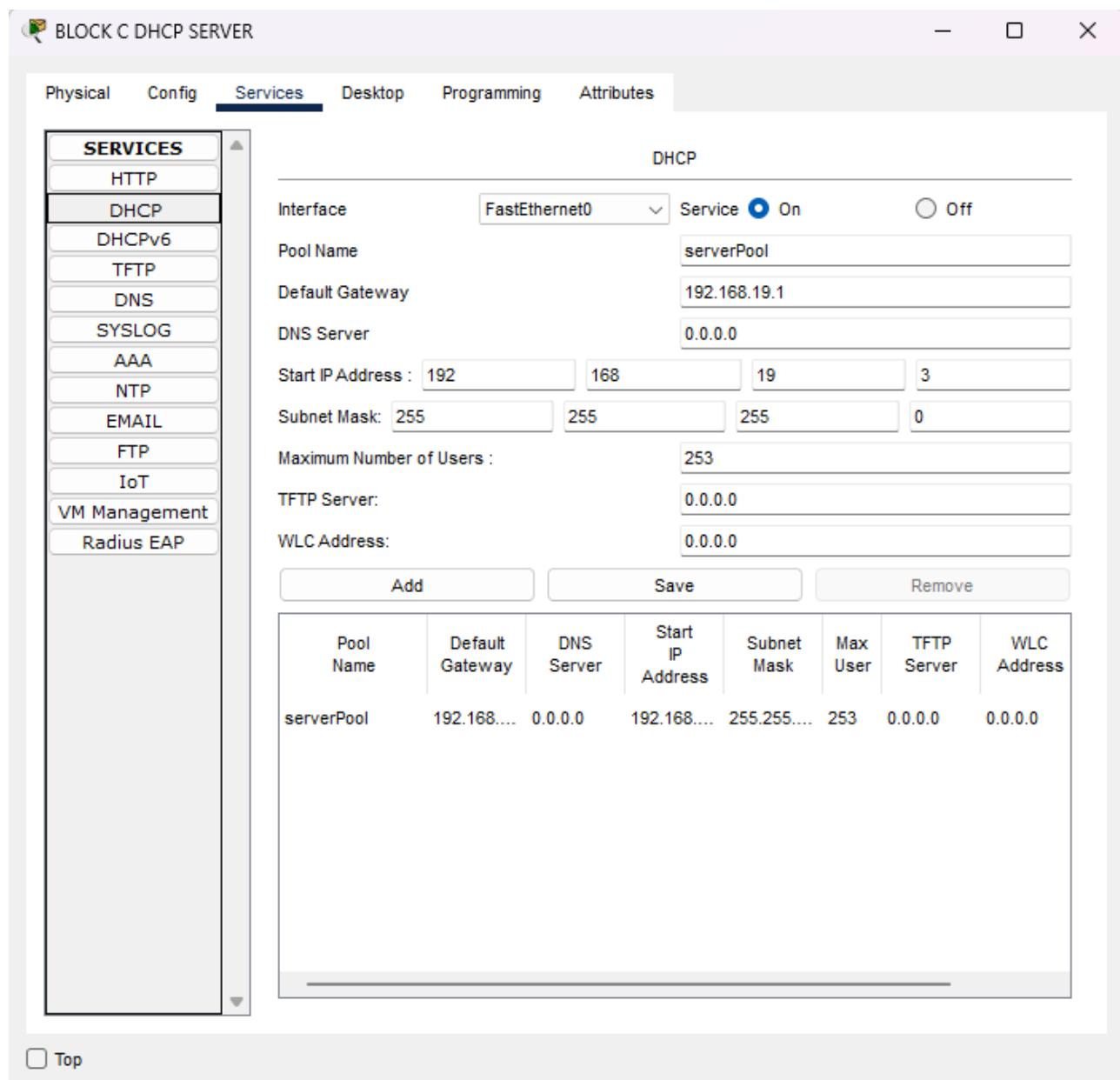
### BLOCK – A



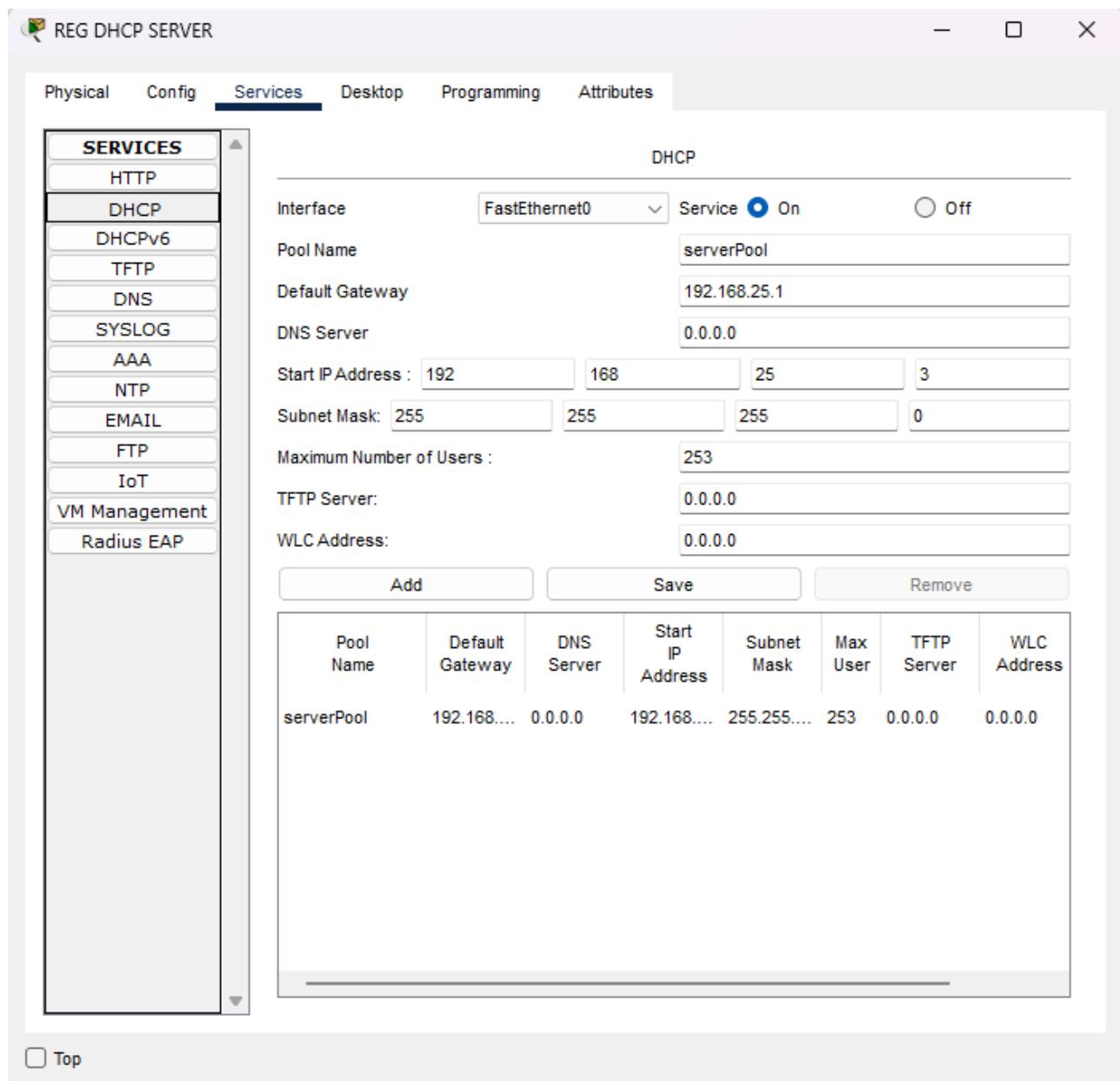
## BLOCK – B



## BLOCK – C



## REGULAR BLOCK



# **IOT DEVICE CONFIGURATION**

# IOT AIR CONDITIONER

LAB 1 - AC - 1

Specifications Physical Config Attributes

**GLOBAL**

Settings  
Algorithm Settings  
Files

**INTERFACE**

Wireless0  
Bluetooth

**Wireless0**

Port Status  On

Bandwidth 300 Mbps

MAC Address 0060.470D.73DE

SSID HomeGateway

Authentication

Disabled  WEP WEP Key  
 WPA-PSK  WPA2-PSK PSK Pass Phrase  
 WPA  WPA2 User ID  
 802.1X Method: Password  
MD5  
User Name  
Password

Encryption Type Disabled

IP Configuration

DHCP  
 Static

IPv4 Address 192.168.25.114  
Subnet Mask 255.255.255.0

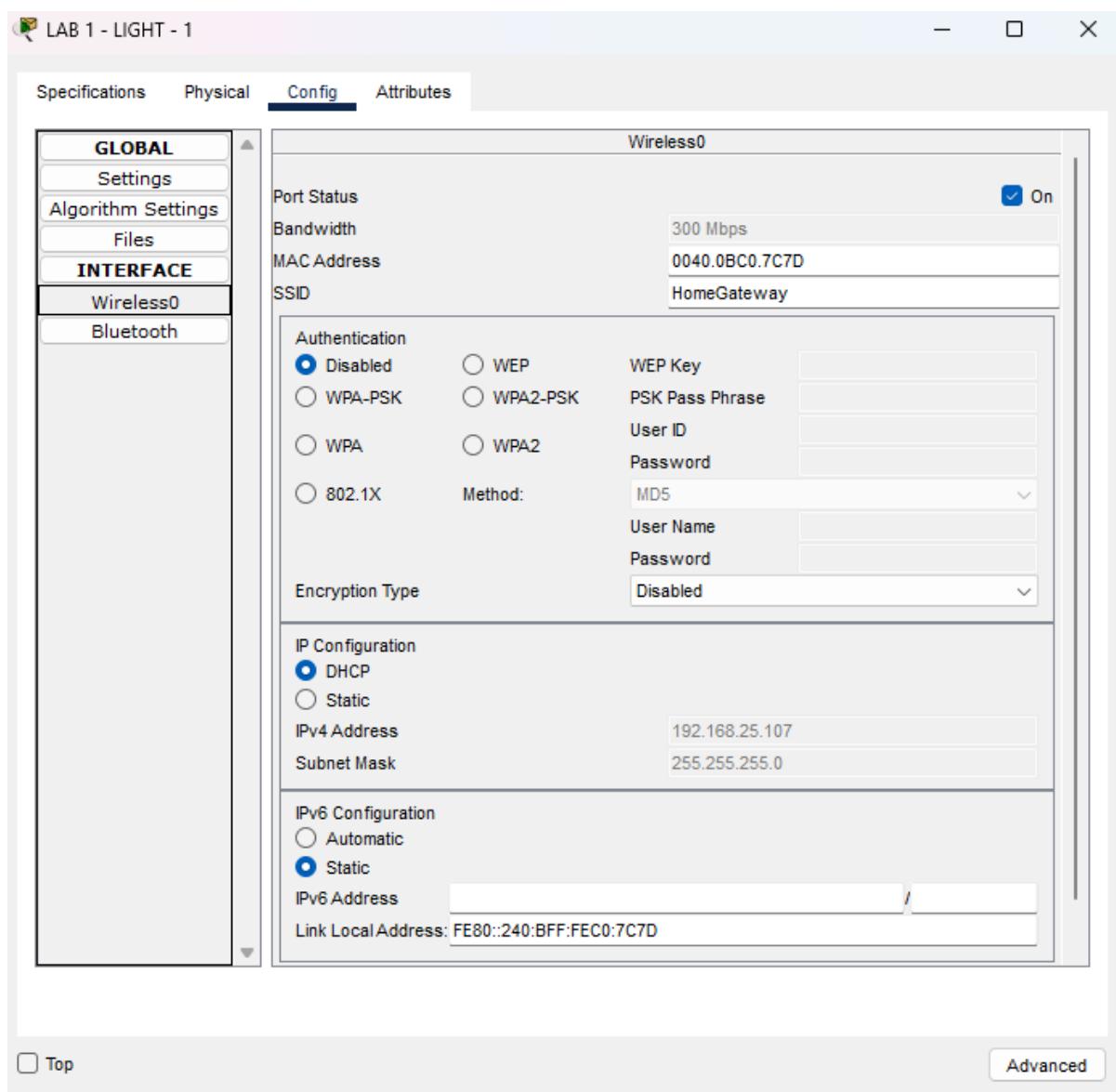
IPv6 Configuration

Automatic  
 Static

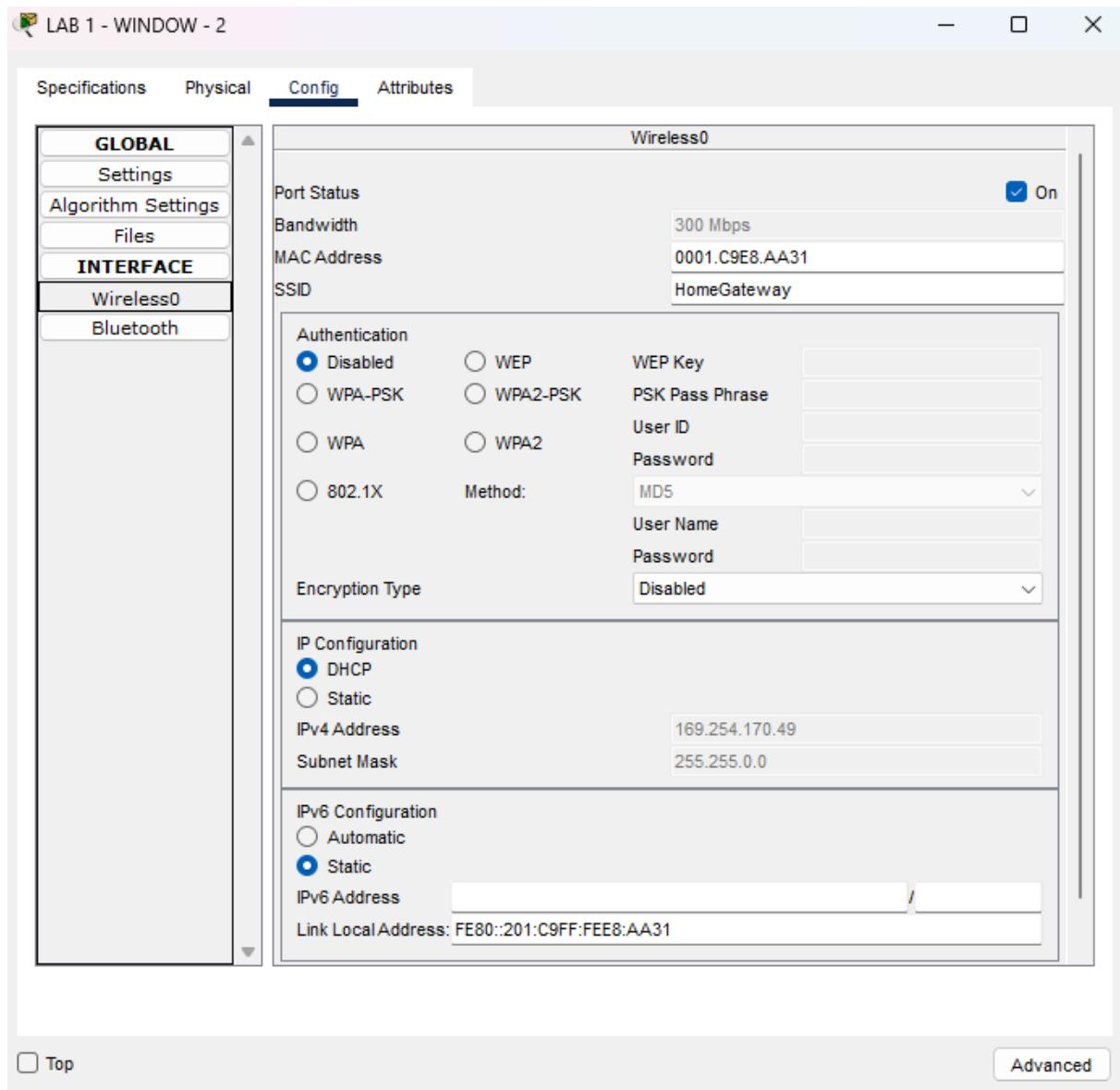
IPv6 Address  
Link Local Address: FE80::260:47FF:FE0D:73DE

Top Advanced

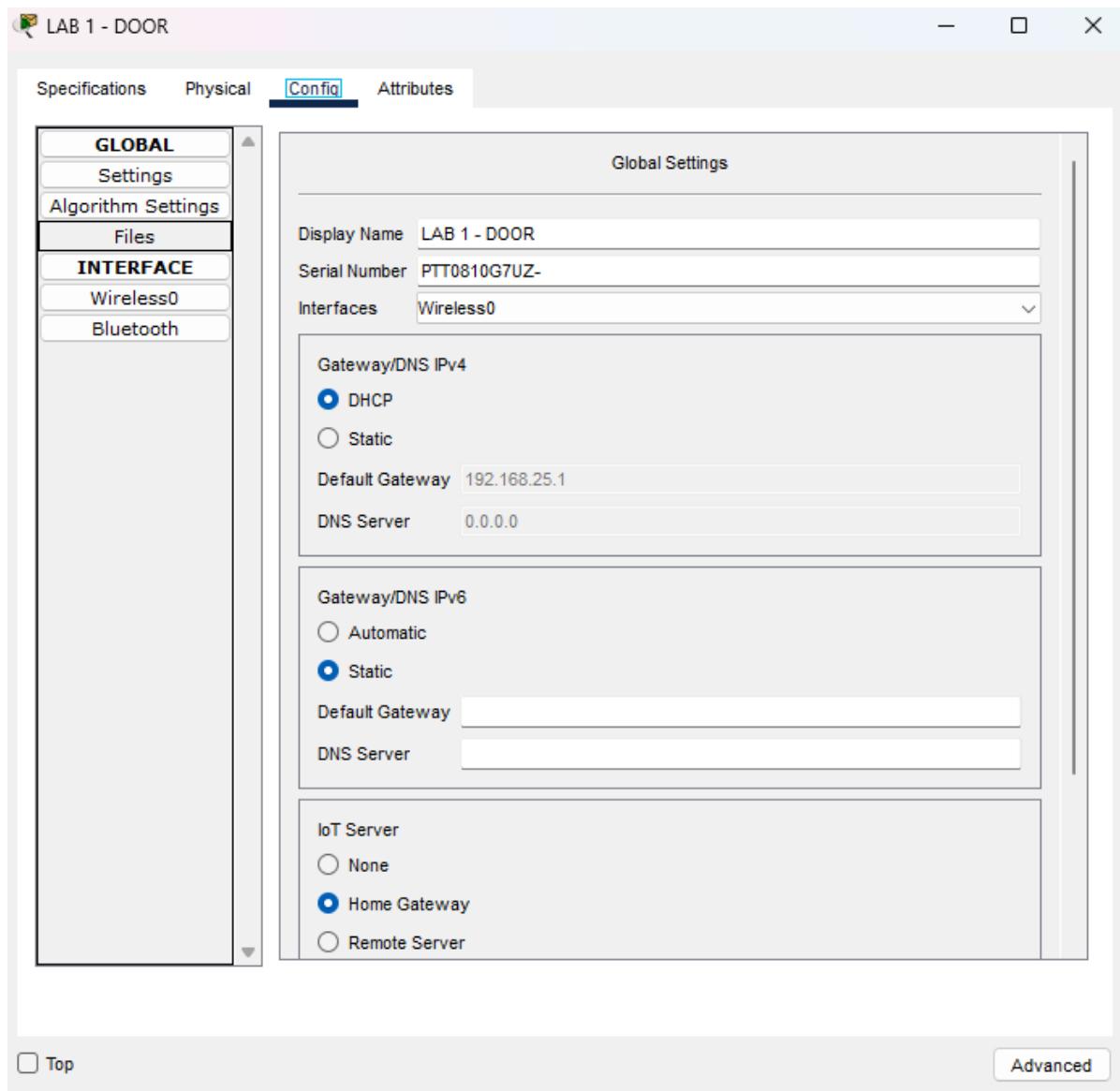
# IOT LIGHT



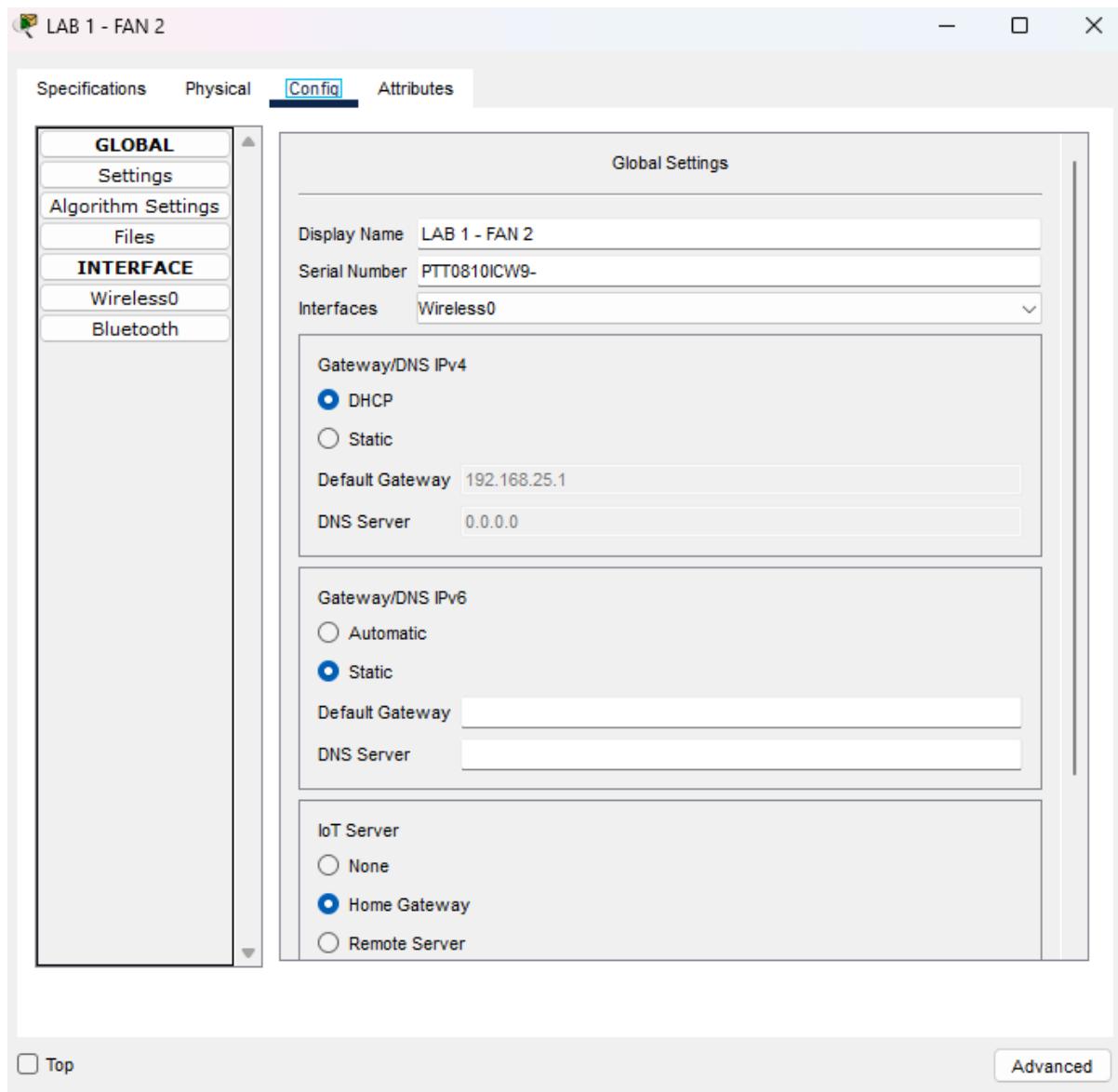
# IOT WINDOWS



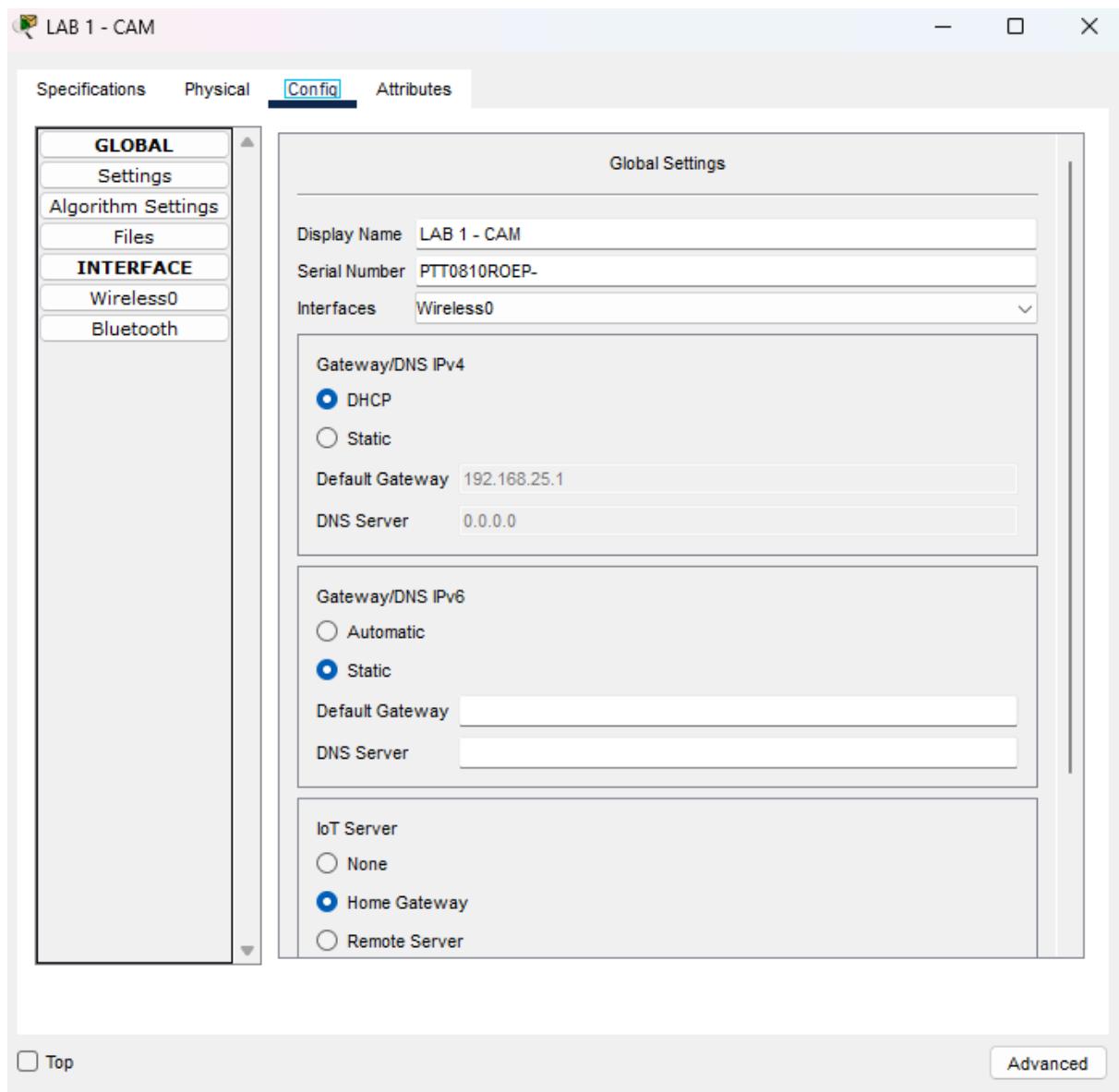
# IOT DOOR



# IOT FAN



# IOT CAMERA



# **ADDRESS PLANING**

## **ADDRESS PLANING**

<b>BLOCK A</b>	
LABS, DEPARTMENT	172.17.16.0
DHCP	172.17.16.2
FTP	172.16.16.2

<b>BLOCK B</b>	
LABS, DEPARTMENT	172.19.16.0
DHCP	172.19.16.2
FTP	172.18.16.2

<b>BLOCK C</b>	
LABS, DEPARTMENT	172.21.16.0
DHCP	172.21.16.2
FTP	172.20.16.2

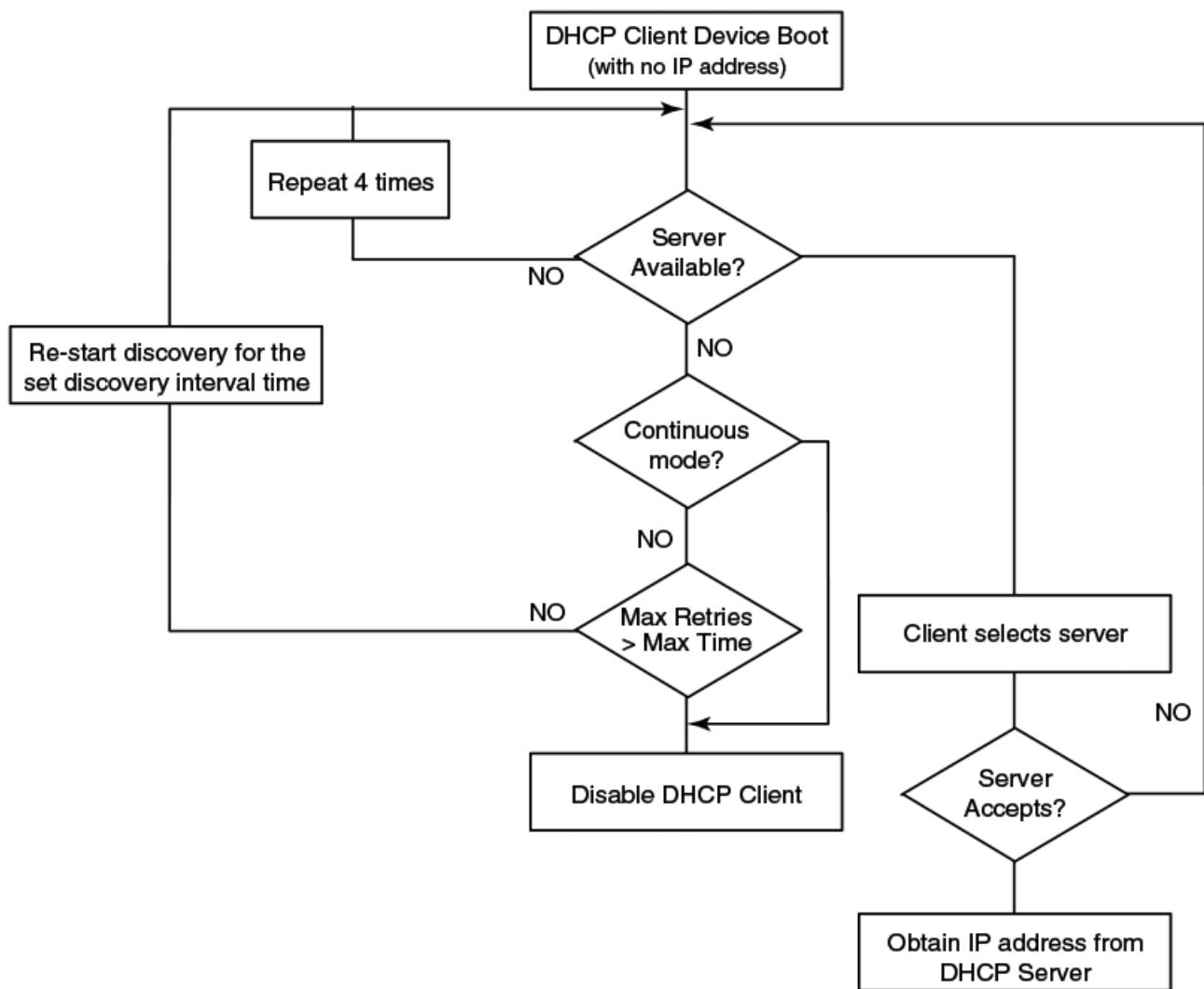
<b>REGULAR BLOCK</b>	
LABS, DEPARTMENT	172.21.16.0
DHCP	172.21.16.2
FTP	172.22.16.2

<b>OFFICE BLOCK</b>	
AIDED OFFICE	172.16.10.12 - 172.16.10.21
SELF FINANCE OFFICE	172.16.10.2 - 172.16.10.11
COE BLOCK	172.16.11.2 – 172.16.11.11

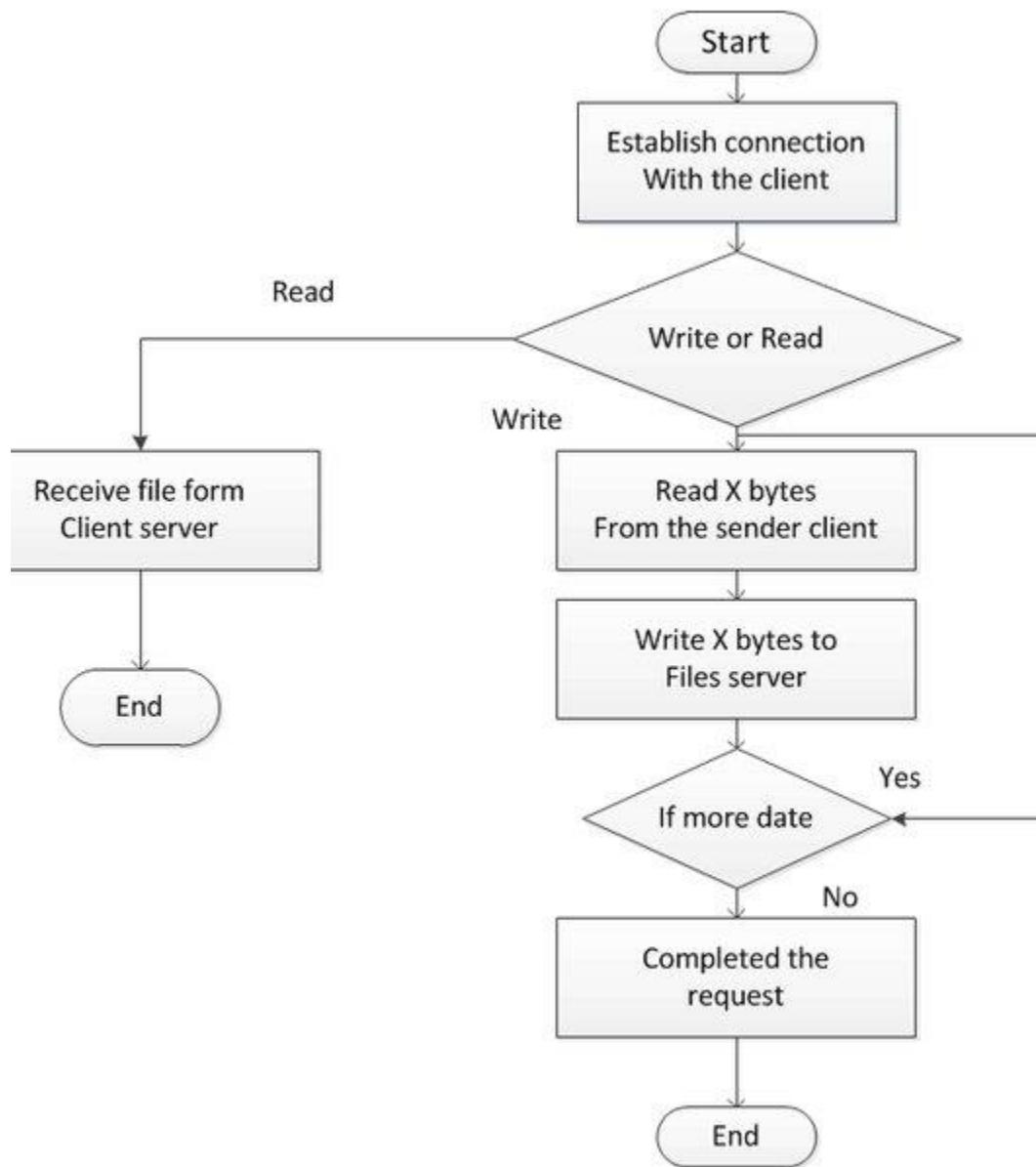
<b>NET CAFE</b>	
NETCAFE - 1	172.23.16.2 – 172.23.16.15
NETCAFE - 2	172.16.16.16 - 172.16.10.29

# **FLOW DIAGRAM**

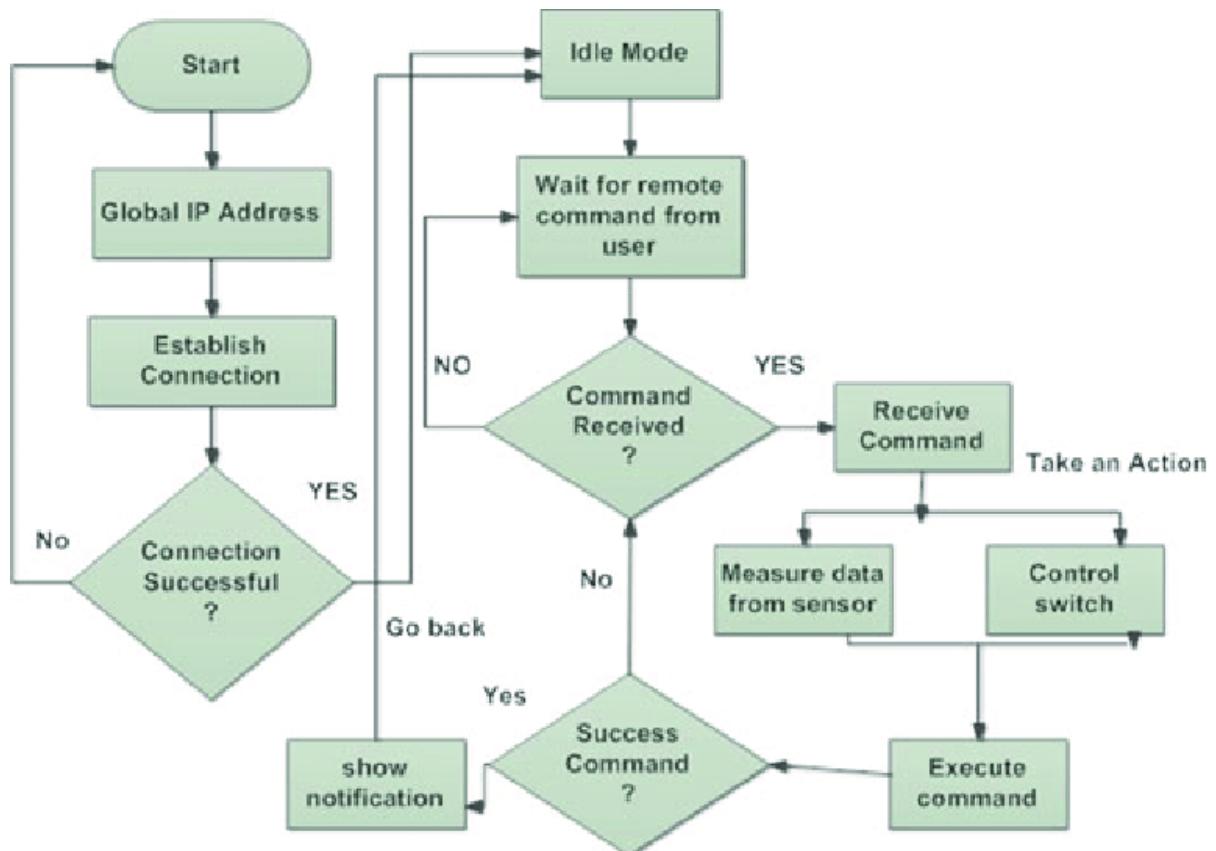
## FLOW DIAGRAM OF DHCP SERVER



## FLOW DIAGRAM OF FTP SERVER



## FLOW DIAGRAM OF IOT DEVICES



# **CODING**

## **CODINGS**

### **Router: Block A**

```
router> enable  
router# configuration terminal  
router# interface gig 0/0/0  
router# ip address 192.168.10.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface gig 0/0/1  
router# ip address 192.168.12.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/1/0  
router# ip address 10.0.0.2 255.0.0.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/1/1  
router# ip address 15.0.0.1 255.0.0.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 172.17.16.0 0.0.255.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 172.16.16.0 0.0.255.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 15.0.0.0 0.0.0.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 10.0.0.0 0.0.0.255 area 1  
router# no shutdown  
router# exit
```

## Router: Block B

```
router> enable  
router# configuration terminal  
router# interface gig 0/0/0  
router# ip address 192.168.14.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface gig 0/0/1  
router# ip address 192.168.15.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/1/0  
router# ip address 11.0.0.2 255.0.0.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/2/1  
router# ip address 16.0.0.1 255.0.0.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 172.19.16.0 0.0.255.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 172.18.16.0 0.0.255.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 11.0.0.0 0.0.0.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 16.0.0.0 0.0.0.255 area 1  
router# no shutdown  
router# exit
```

## Router: Block C

```
router> enable  
router# configuration terminal  
router# interface gig 0/0/0  
router# ip address 192.168.19.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface gig 0/0/1  
router# ip address 192.168.20.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface gig 0/0/2  
router# ip address 192.168.18.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/1/0  
router# ip address 12.0.0.2 255.0.0.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 172.21.16.0 0.0.255.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 172.20.16.0 0.0.255.255 area 1  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# router ospf 2  
router# network 12.0.0.0 0.0.0.255 area 1  
router# no shutdown  
router# exit
```

### **Router: Office Block\_Self**

```
router> enable  
router# configuration terminal  
router# interface gig 0/0/0  
router# ip address 192.168.19.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/1/0  
router# ip address 13.0.0.2 255.0.0.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/1/1  
router# ip address 20.0.0.1 255.0.0.0  
router# no shutdown  
router# exit
```

### **Router: Regular Block**

```
router> enable  
router# configuration terminal  
router# interface gig 0/0/0  
router# ip address 192.168.25.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface gig 0/0/1  
router# ip address 192.168.26.1 255.255.255.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface se 0/1/0  
router# ip address 14.0.0.2 255.0.0.0  
router# no shutdown  
router# exit
```

## **Router: COE**

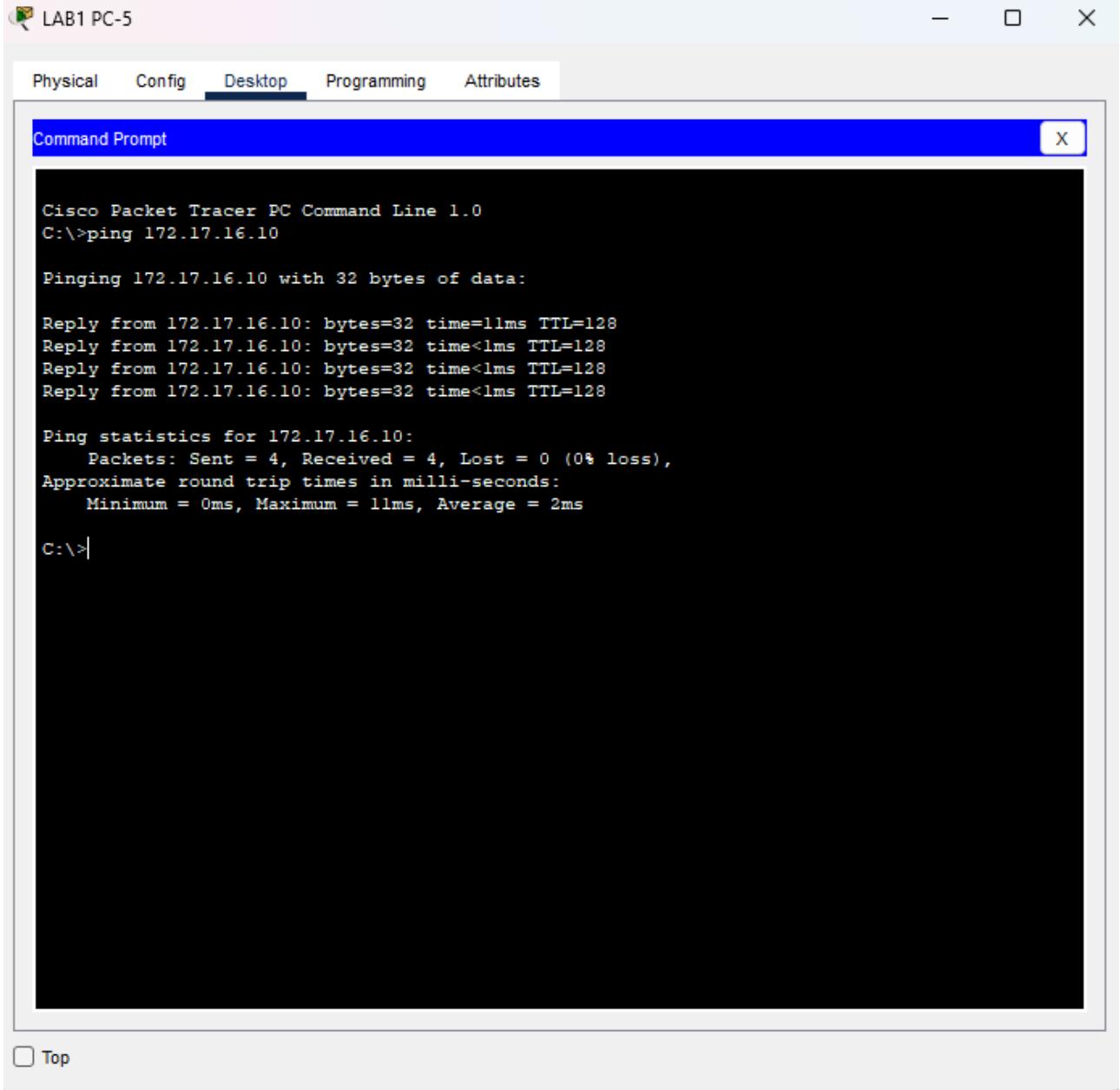
```
router> enable  
router# configuration terminal  
router# interface gig 0/0/0  
router# ip address 30.0.0.1 255.0.0.0  
router# no shutdown  
router# exit
```

```
router# configuration terminal  
router# interface gig 0/0/0  
router# ip address 192.168.21.1 255.255.255.0  
router# no shutdown  
router# exit
```

# **TESTING**

## TESTING

### ROUTING TEST :



The screenshot shows a window titled "LAB1 PC-5" with a tab bar at the top: Physical, Config, Desktop (which is selected), Programming, and Attributes. Below the tabs is a blue header bar labeled "Command Prompt". The main area of the window is a black terminal window displaying the output of a ping command. The output is as follows:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.17.16.10

Pinging 172.17.16.10 with 32 bytes of data:

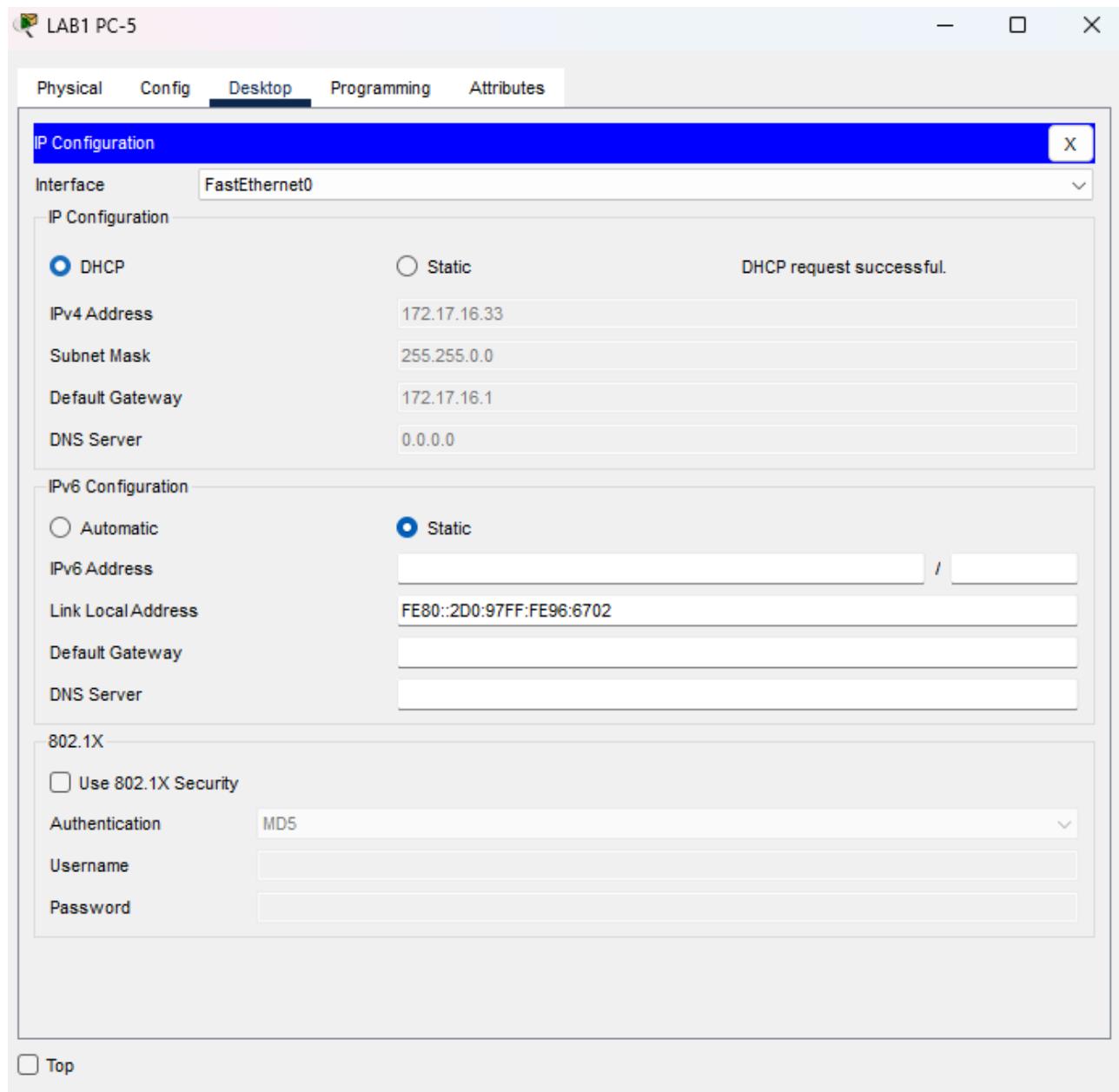
Reply from 172.17.16.10: bytes=32 time=11ms TTL=128
Reply from 172.17.16.10: bytes=32 time<1ms TTL=128
Reply from 172.17.16.10: bytes=32 time<1ms TTL=128
Reply from 172.17.16.10: bytes=32 time<1ms TTL=128

Ping statistics for 172.17.16.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 2ms

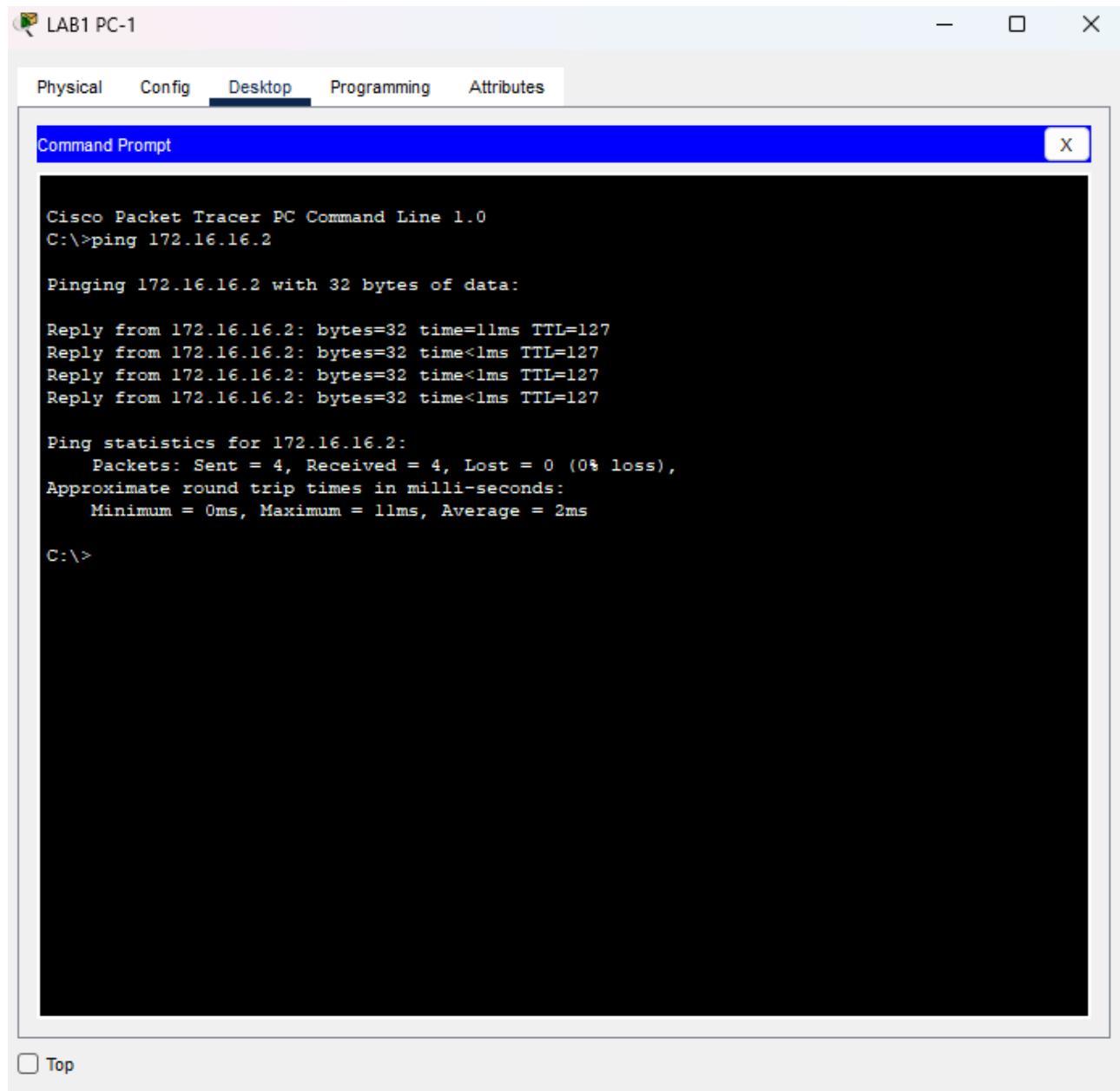
C:\>
```

At the bottom left of the terminal window, there is a small checkbox labeled "Top".

## DHCP SERVER TEST :



## FTP SERVER TEST :



The screenshot shows a window titled "LAB1 PC-1" with tabs for Physical, Config, Desktop (which is selected), Programming, and Attributes. A sub-window titled "Command Prompt" contains the following text:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.16.2

Pinging 172.16.16.2 with 32 bytes of data:

Reply from 172.16.16.2: bytes=32 time=11ms TTL=127
Reply from 172.16.16.2: bytes=32 time<1ms TTL=127
Reply from 172.16.16.2: bytes=32 time<1ms TTL=127
Reply from 172.16.16.2: bytes=32 time<1ms TTL=127

Ping statistics for 172.16.16.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>
```

Top

LAB1 PC-1

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 172.16.16.2

Pinging 172.16.16.2 with 32 bytes of data:

Reply from 172.16.16.2: bytes=32 time=11ms TTL=127
Reply from 172.16.16.2: bytes=32 time<1ms TTL=127
Reply from 172.16.16.2: bytes=32 time<1ms TTL=127
Reply from 172.16.16.2: bytes=32 time<1ms TTL=127

Ping statistics for 172.16.16.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 11ms, Average = 2ms

C:\>ftp 172.16.16.2
Trying to connect...172.16.16.2
Connected to 172.16.16.2
220- Welcome to PT Ftp server
Username:staff
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>
```

Top

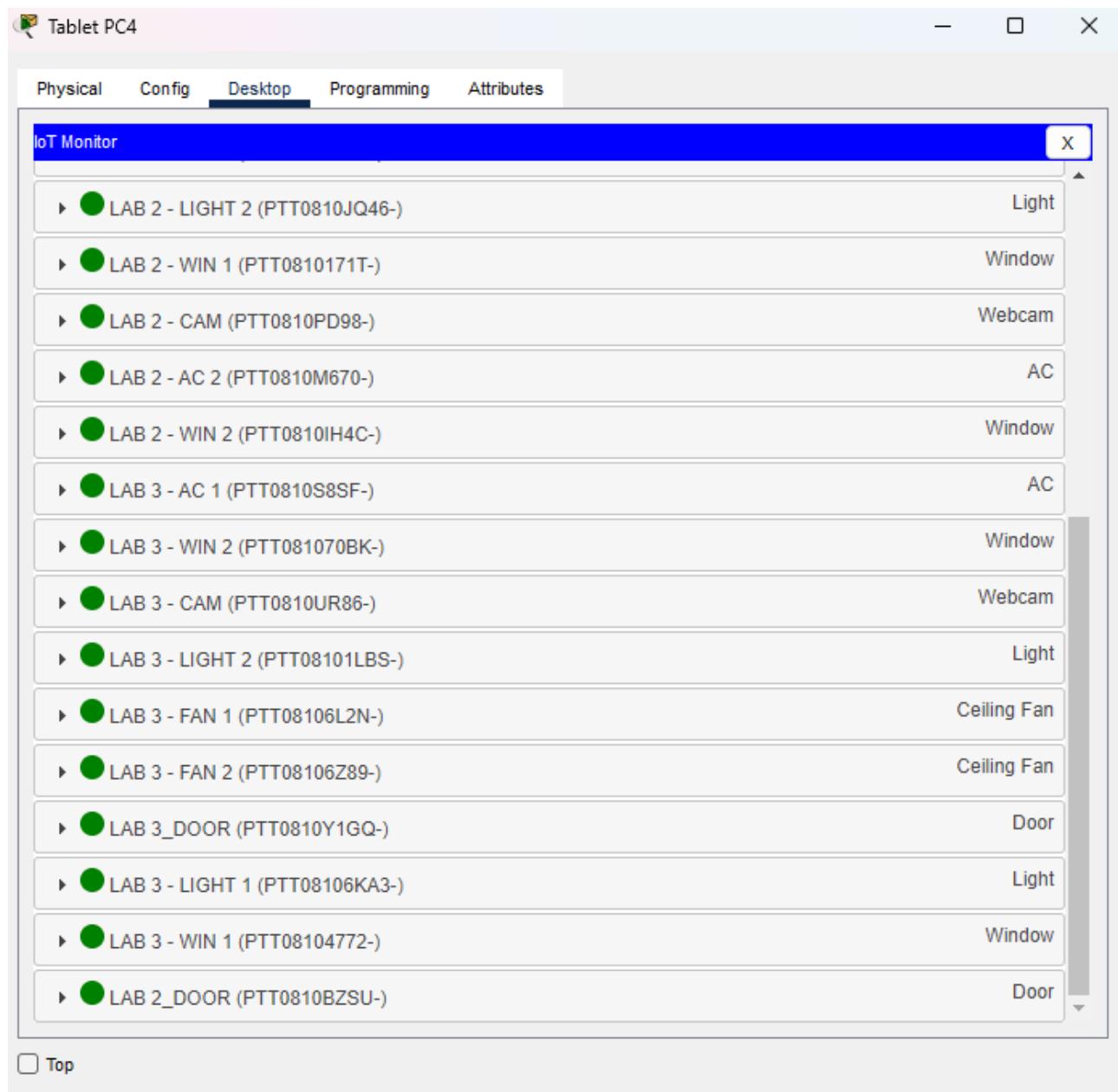
## IOT DEVICES TEST

### AIDED BLOCK

The screenshot shows a window titled "Tablet PC4" with the "Desktop" tab selected in the top navigation bar. The main area is titled "IoT Monitor" and "IoT Server - Devices". It lists 18 devices, each with a green circular icon and a status indicator (green dot). The devices are categorized by type:

Device Name	Type
LAB 1 - AC 1 (PTT08104TEP-)	AC
LAB 1 - FAN 1 (PTT0810C6VD-)	Ceiling Fan
LAB 1 - LIGHT 1 (PTT0810F90N-)	Light
LAB 1 - WIN 2 (PTT0810T166-)	Window
LAB 1_DOOR (PTT0810ZU3U-)	Door
LAB 1 - AC 2 (PTT08101UR3-)	AC
LAB 1 - WIN 1 (PTT08105316-)	Window
LAB 2 - AC 1 (PTT08101820-)	AC
LAB 2 - LIGHT 1 (PTT0810A1SF-)	Light
LAB 2 - FAN 1 (PTT08109N49-)	Ceiling Fan
LAB 2 - LIGHT 2 (PTT0810JQ46-)	Light
LAB 2 - WIN 1 (PTT0810171T-)	Window
LAB 2 - CAM (PTT0810PD98-)	Webcam
LAB 2 - AC 2 (PTT0810M670-)	AC
LAB 2 - WIN 2 (PTT0810JQ46-)	Window

At the bottom left, there is a checkbox labeled "Top".



# BLOCK A

Tablet PC0

Physical Config Desktop **Programming** Attributes

IoT Monitor

IoT Server - Devices

Home | Conditions | Editor | Log Out

▶ ● LAB 1 - AC - 2 (PTT08109N0O-)	AC
▶ ● LAB 1 - LIGHT - 2 (PTT0810IJ6G-)	Light
▶ ● LAB 1 - WINDOW - 1 (PTT0810JO57-)	Window
▶ ● LAB - 2 - DOOR (PTT08107S90-)	Door
▶ ● LAB - 2 - WINDOWS - 1 (PTT08109D3Z-)	Window
▶ ● LAB 2 - AC - 1 (PTT081057E9-)	AC
▶ ● LAB 2 - LIGHT - 1 (PTT08106P9J-)	Light
▶ ● LAB 2 - LIGHT - 2 (PTT0810R79T-)	Light
▶ ● LAB 2 - AC - 2 (PTT0810C9W1-)	AC
▶ ● LAB - 2 - WINDOWS - 2 (PTT081016RG-)	Window
▶ ● LAB - 3 - WINDOWS - 1 (PTT0810413L-)	Window
▶ ● LAB 3 - LIGHT - 1 (PTT0810RMZW-)	Light
▶ ● LAB - 3 - AC - 2 (PTT08100C15-)	AC
▶ ● LAB - 3 - AC - 1 (PTT0810508L-)	AC
▶ ● LAB - 3 - DOOR (PTT0810N4C0-)	Door

Top

Tablet PC0

Physical Config Desktop **Desktop** Programming Attributes

IoT Monitor

▶ ●	LAB 1 - WINDOW - 1 (PTT0810JO57-)	Window
▶ ●	LAB - 2 - DOOR (PTT08107S90-)	Door
▶ ●	LAB - 2 - WINDOWS - 1 (PTT08109D3Z-)	Window
▶ ●	LAB 2 - AC - 1 (PTT081057E9-)	AC
▶ ●	LAB 2 - LIGHT - 1 (PTT08106P9J-)	Light
▶ ●	LAB 2 - LIGHT - 2 (PTT0810R79T-)	Light
▶ ●	LAB 2 - AC - 2 (PTT0810C9W1-)	AC
▶ ●	LAB - 2 - WINDOWS - 2 (PTT081016RG-)	Window
▶ ●	LAB - 3 - WINDOWS - 1 (PTT0810413L-)	Window
▶ ●	LAB 3 - LIGHT - 1 (PTT0810RMZW-)	Light
▶ ●	LAB - 3 - AC - 2 (PTT08100C15-)	AC
▶ ●	LAB - 3 - AC - 1 (PTT0810508L-)	AC
▶ ●	LAB - 3 - DOOR (PTT0810N46O-)	Door
▶ ●	LAB 3 - LIGHT - 3 (PTT0810T1IK-)	Light
▶ ●	LAB - 3 - WINDOWS - 2 (PTT08100XRA-)	Window

Top

## BLOCK B

Tablet PC1

Physical Config Desktop **Programming** Attributes

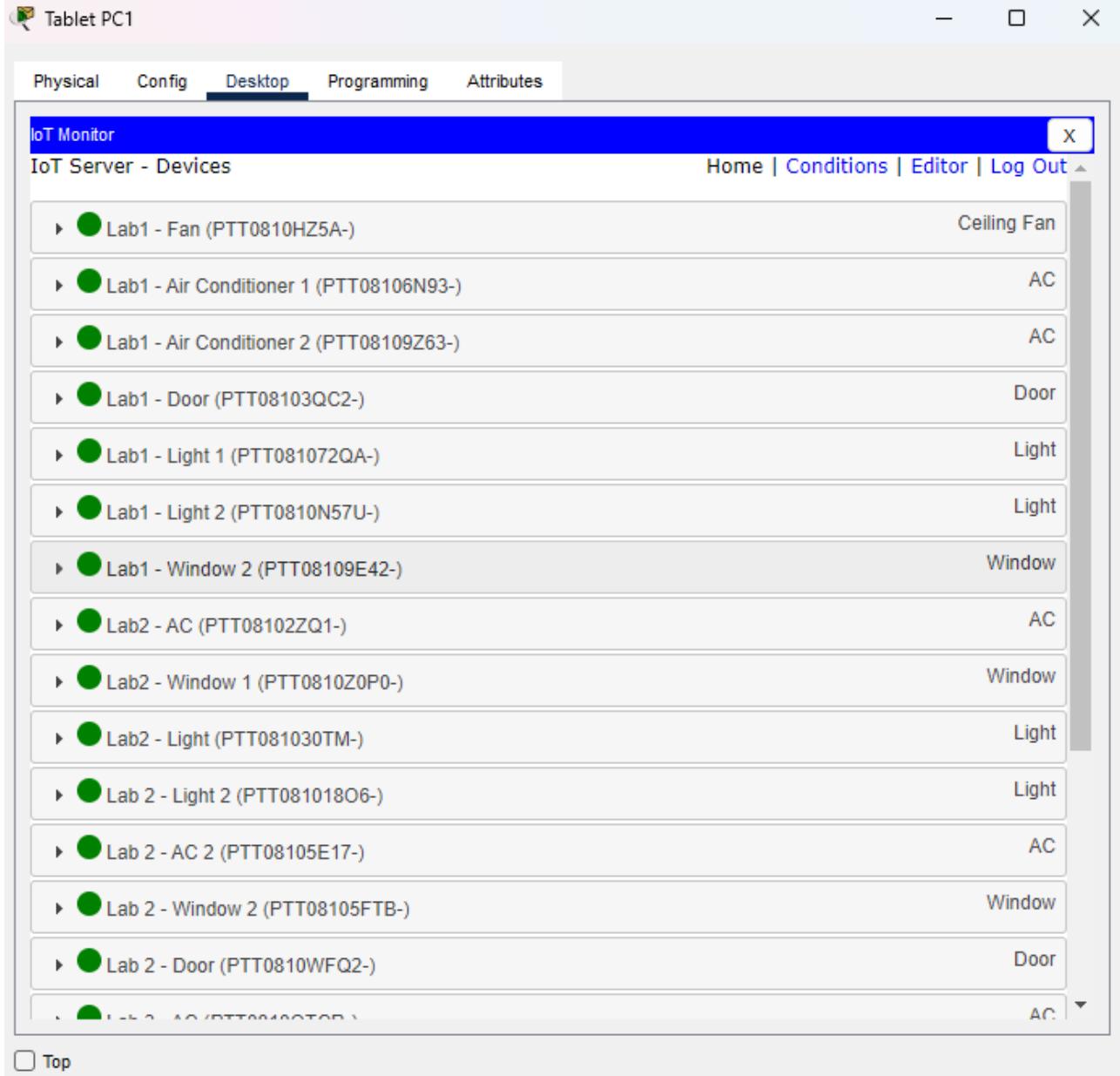
IoT Monitor

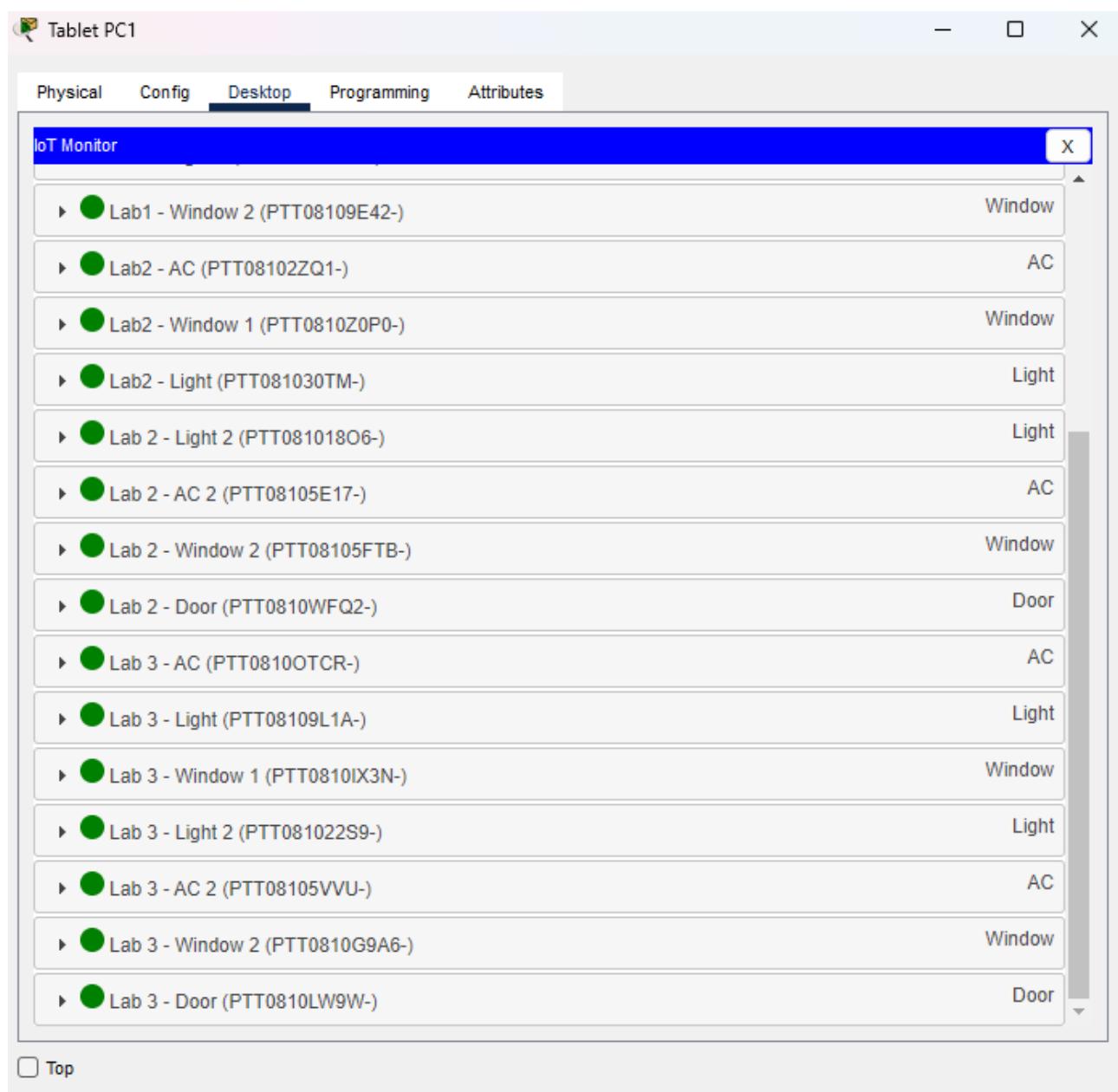
IoT Server - Devices

Home | Conditions | Editor | Log Out

▶ Lab1 - Fan (PTT0810HZ5A-)	Ceiling Fan
▶ Lab1 - Air Conditioner 1 (PTT08106N93-)	AC
▶ Lab1 - Air Conditioner 2 (PTT08109Z63-)	AC
▶ Lab1 - Door (PTT08103QC2-)	Door
▶ Lab1 - Light 1 (PTT081072QA-)	Light
▶ Lab1 - Light 2 (PTT0810N57U-)	Light
▶ Lab1 - Window 2 (PTT08109E42-)	Window
▶ Lab2 - AC (PTT08102ZQ1-)	AC
▶ Lab2 - Window 1 (PTT0810Z0P0-)	Window
▶ Lab2 - Light (PTT081030TM-)	Light
▶ Lab 2 - Light 2 (PTT081018O6-)	Light
▶ Lab 2 - AC 2 (PTT08105E17-)	AC
▶ Lab 2 - Window 2 (PTT08105FTB-)	Window
▶ Lab 2 - Door (PTT0810WFQ2-)	Door
▶ Lab 2 - AC (PTT0810ZQ1-)	AC

Top



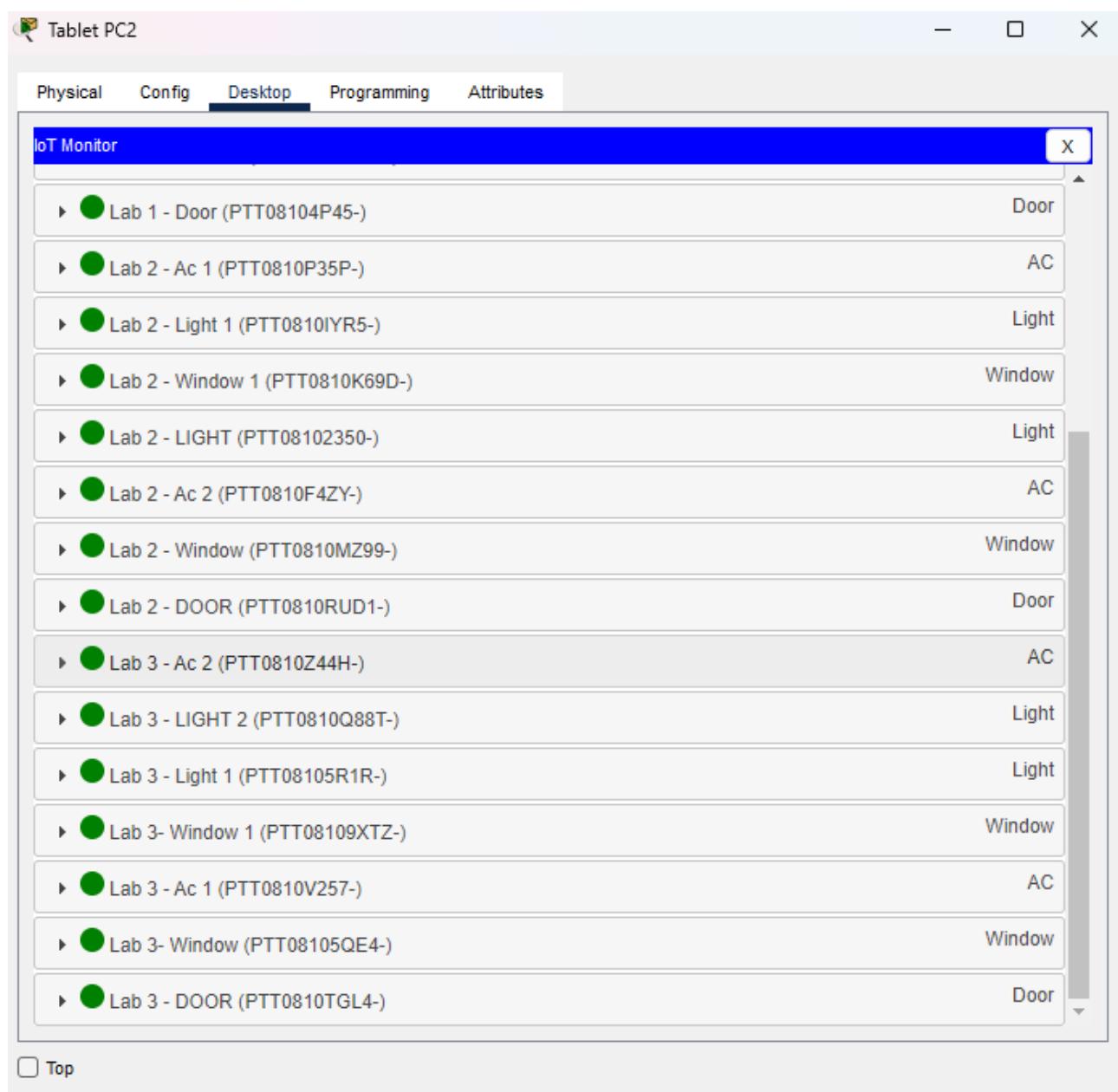


# BLOCK C

The screenshot shows a window titled "Tablet PC2" with the "Desktop" tab selected. The main area is titled "IoT Monitor" and displays a list of "IoT Server - Devices". The list includes the following items:

Device Name	Type
Lab 1 - Ac 2 (PTT08106E3A-)	AC
Lab 1 - Light 2 (PTT0810Q16Q-)	Light
Lab 1 - Window 2 (PTT0810S6BT-)	Window
Lab 1 - Light 1 (PTT08102N2O-)	Light
Lab 1 - Ac 1 (PTT081029N6-)	AC
Lab 1 - Window (PTT0810O0R5-)	Window
Lab 1 - Door (PTT08104P45-)	Door
Lab 2 - Ac 1 (PTT0810P35P-)	AC
Lab 2 - Light 1 (PTT0810IYR5-)	Light
Lab 2 - Window 1 (PTT0810K69D-)	Window
Lab 2 - LIGHT (PTT08102350-)	Light
Lab 2 - Ac 2 (PTT0810F4ZY-)	AC
Lab 2 - Window (PTT0810MZ99-)	Window
Lab 2 - DOOR (PTT0810RUD1-)	Door
Lab 2 - AC 2 (PTT0810Z74U-)	AC

At the bottom left of the window, there is a checkbox labeled "Top".



# **FUTURE ENHANCEMENT**

## **FUTURE ENHANCEMENT**

The project feature can be further enhanced with all authentication and logon information by encrypting the data when transmitted over user and the web site. In addition, it is possible to configure windows7 server networking for further firewall security so that all data that passes between a client and server is secured properly. Enhancing various element, which are not required for the current set of process, can further develop the project.

# **CONCLUSION**

## **CONCLUSION**

This “**Designing a Network Infrastructure for a College Campus**” has been developed successfully incorporating all the requirements. It provides security to the member’s personal information by giving a user id. This site has further enhancement facility to use the Infrastructure.

After the system has been implemented, the maintenances of the system should be very easy so that the forthcoming changes can be made easily. This has been developed is so flexible that the change can be made easily.

The quality factors like correctness, efficiency, usability, Maintainability portability, accuracy, error tolerance, expandability are insisted and tested successfully.

# BIBLIOGRAPHY

## **BIBLIOGRAPHY**

**i) Books referred:**

**1. CONFIGURATION AND IMPLEMENTATION**

The Complete Reference by SANSBOUND CCNA Book by  
Koti Reddy.

**2. CCNA PREPARATION LIBRARY (640-801)**

CCNA exam preparation book is authorized by Cisco

**3. CISCO CERTIFIED NETWORK ASSOCIATE STUDY  
GUIDE (640-802)**

Cisco Certified Network Associate Study Guide authored by  
Todd Lammle

**ii) Websites:**

[www.IoT4beginners.com](http://www.IoT4beginners.com)

[www.GeeksforGeeks.org](http://www.GeeksforGeeks.org)

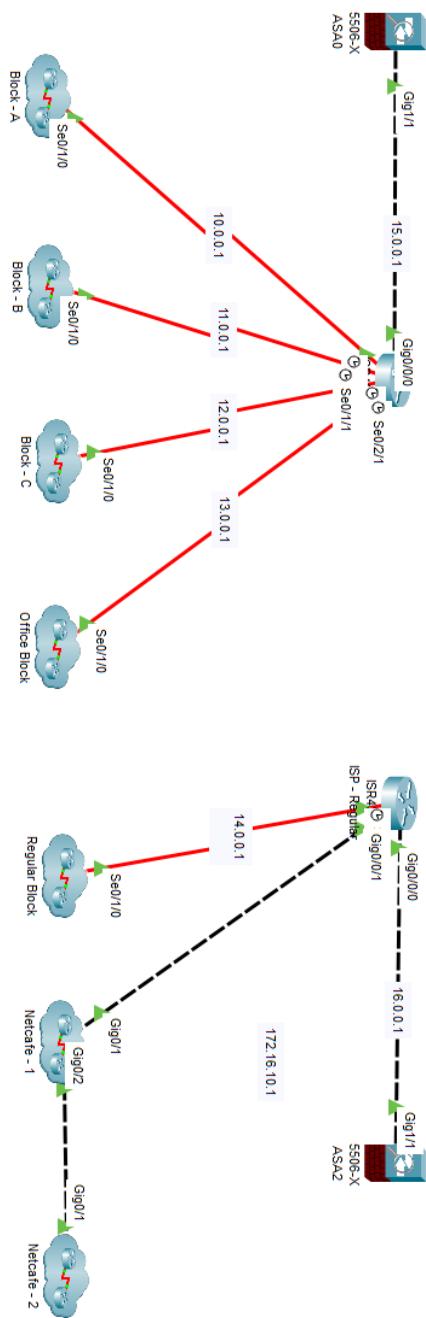
[www.microsoft.com](http://www.microsoft.com)

# **SCREENSHOT**

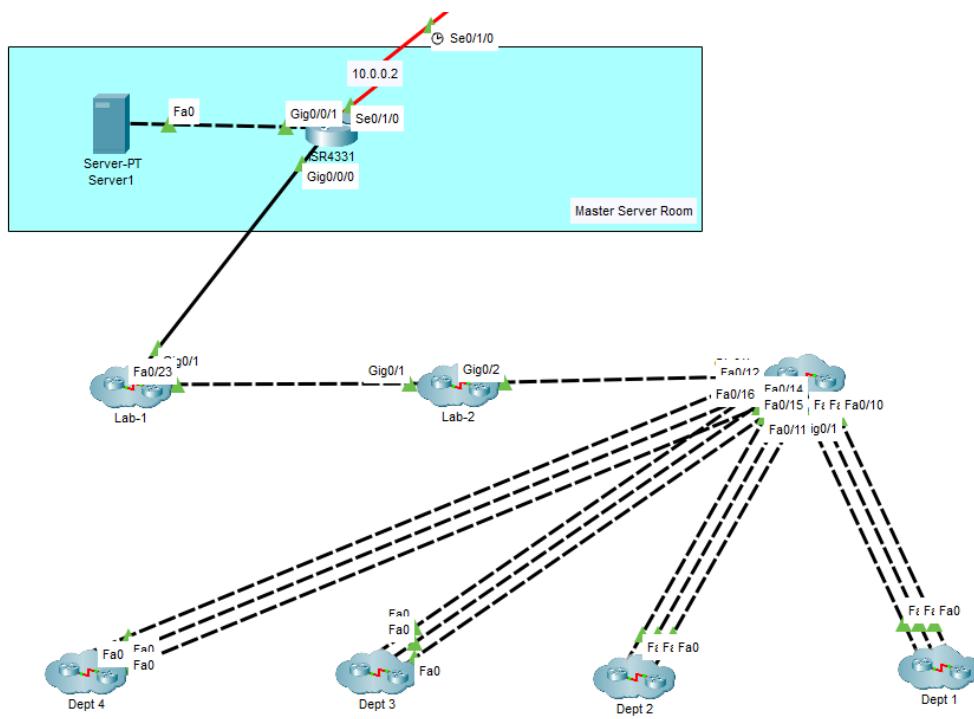
## SCREENSHOTS

### TOPOLOGY

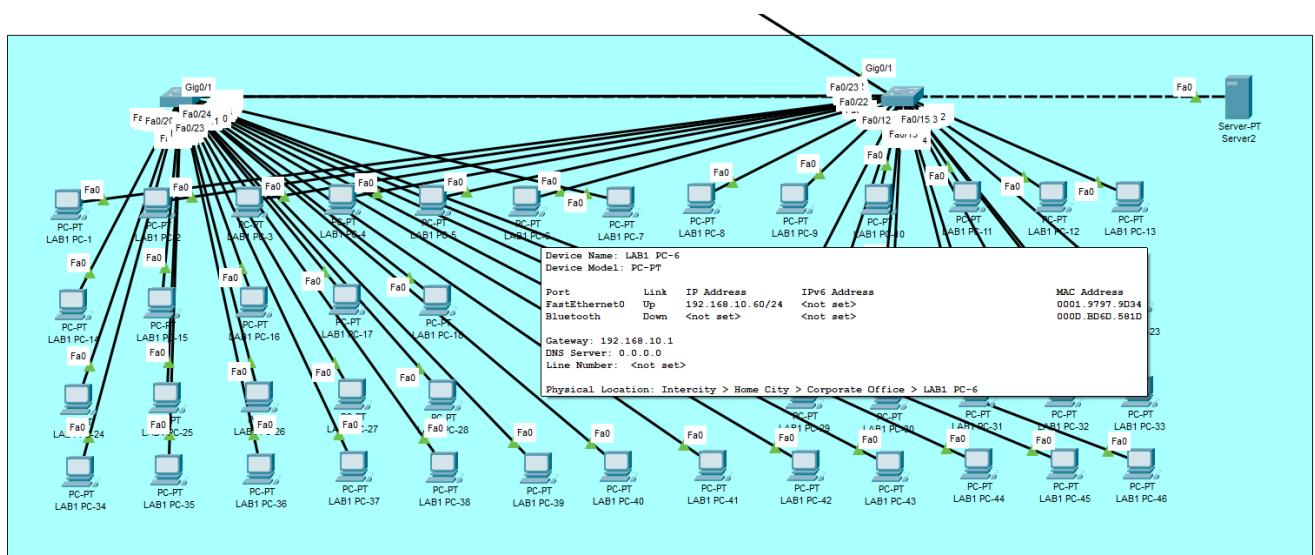
### OVERALL DESIGN



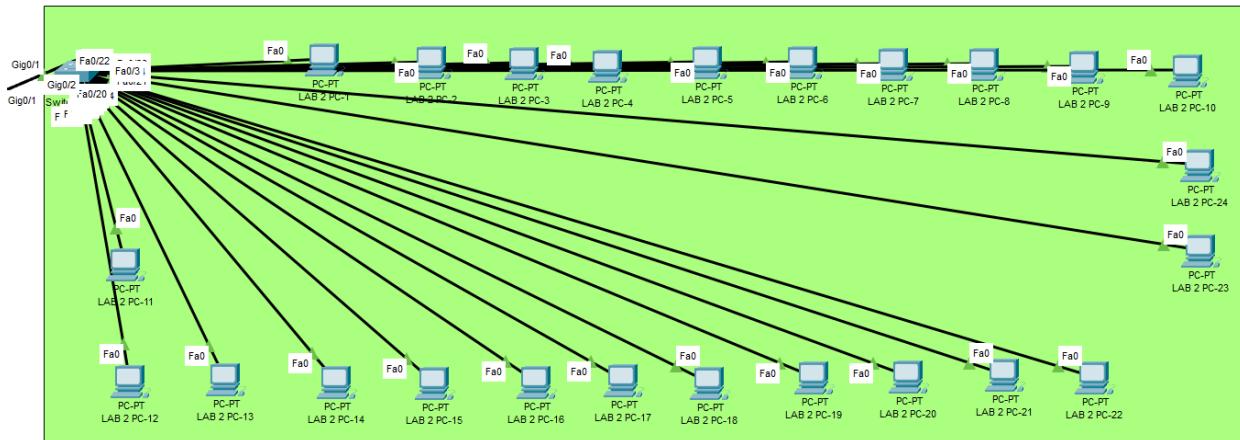
## BLOCK A



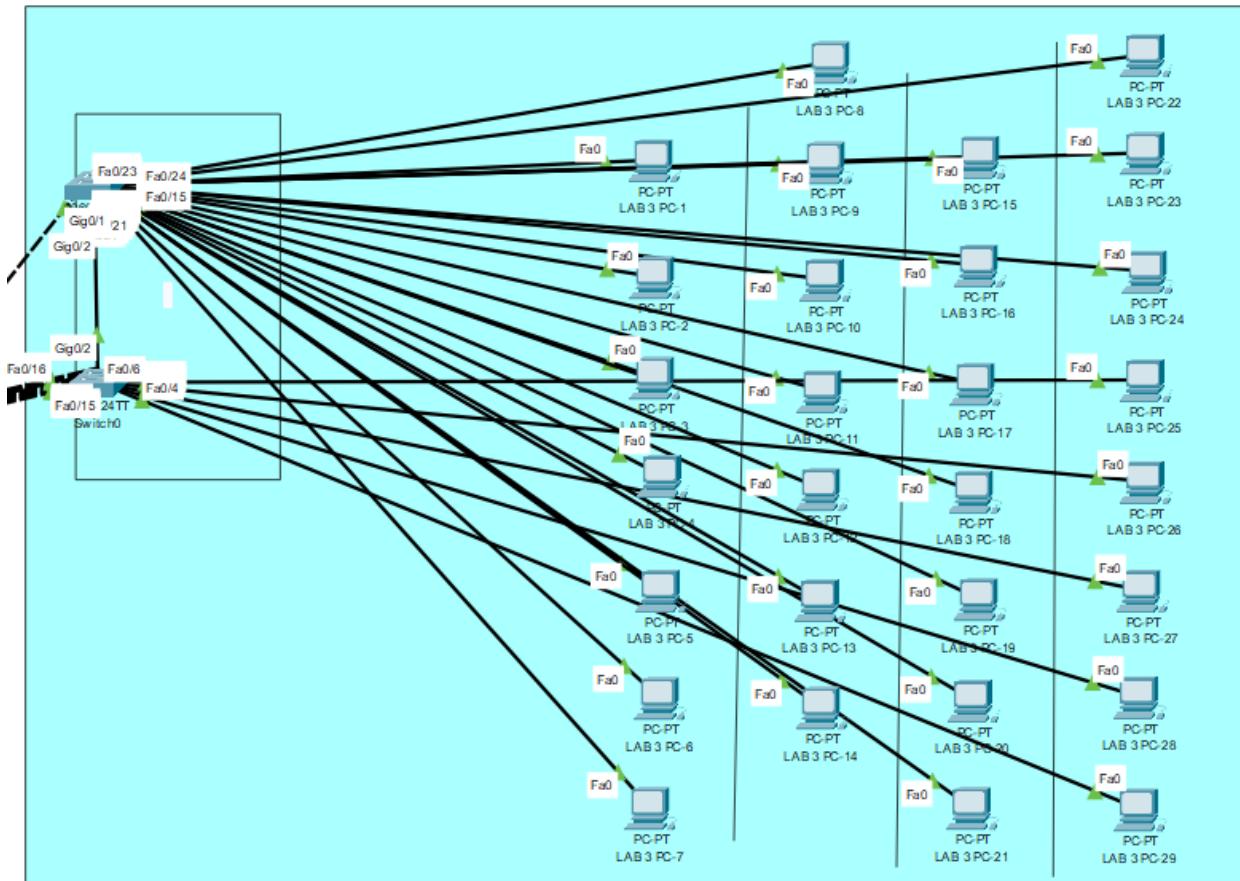
## BLOCK A – LAB 1



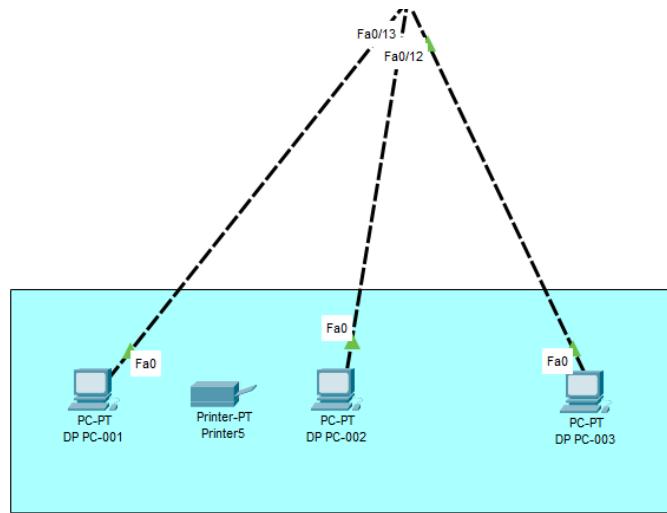
## BLOCK A – LAB 2



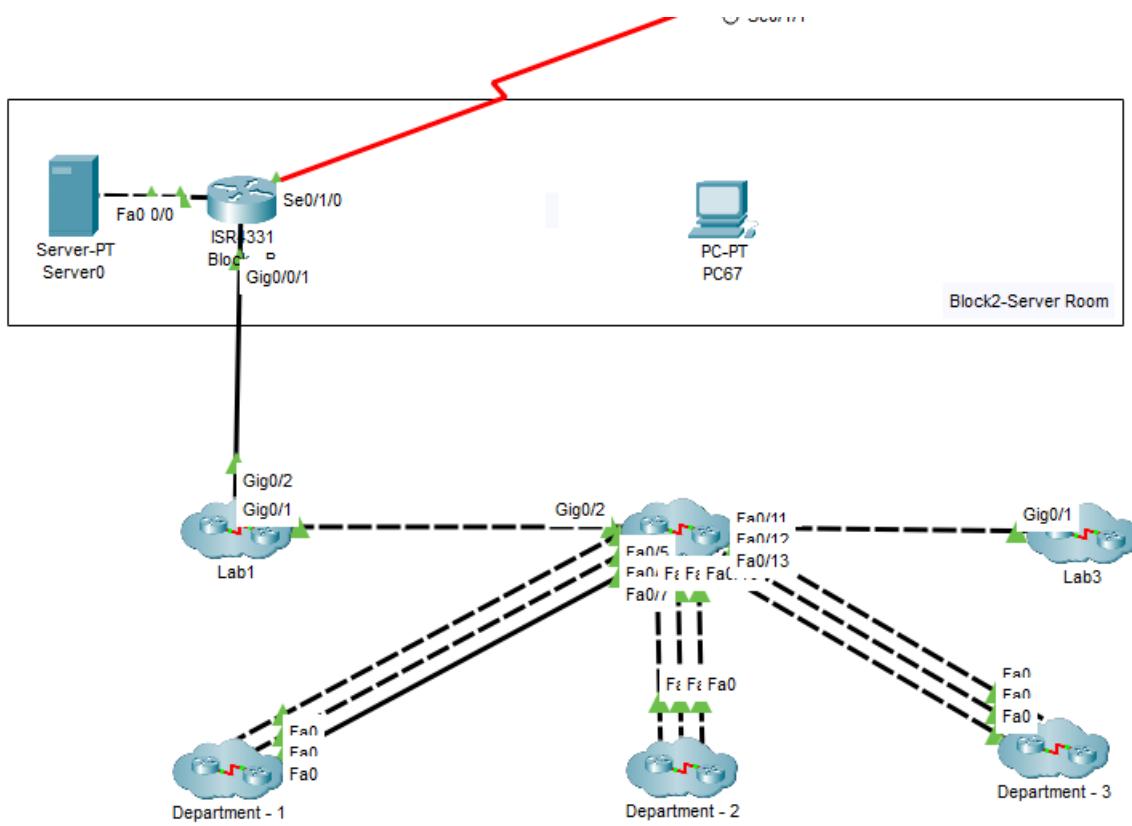
## BLOCK A – LAB 3



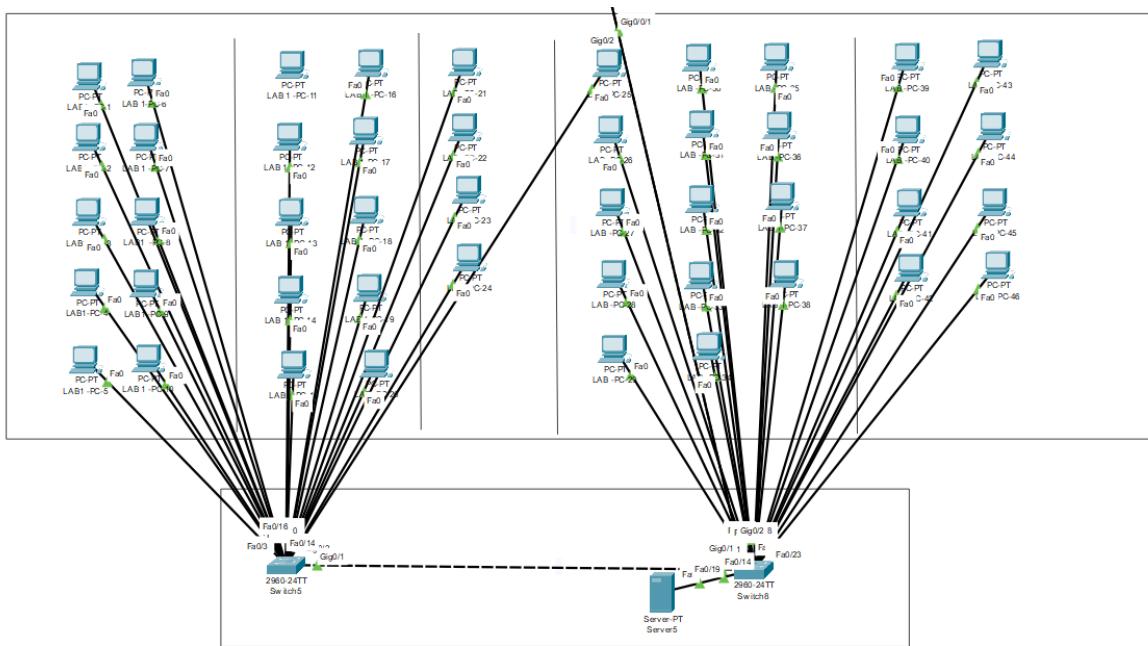
## BLOCK A – DEPARTMENT



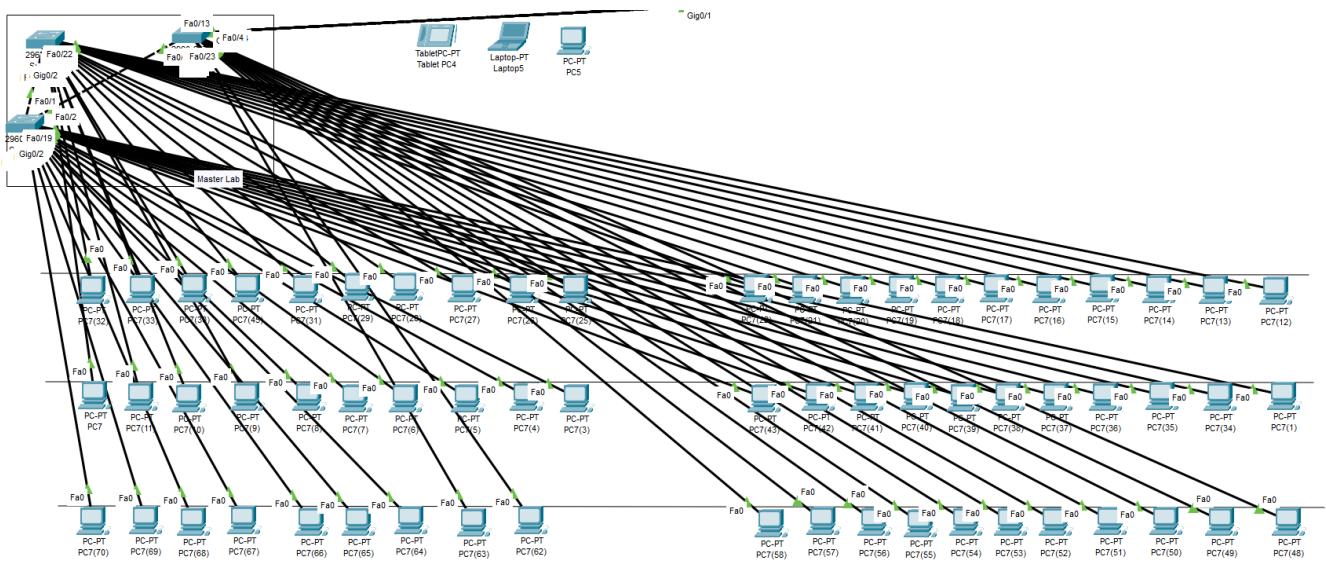
## BLOCK B



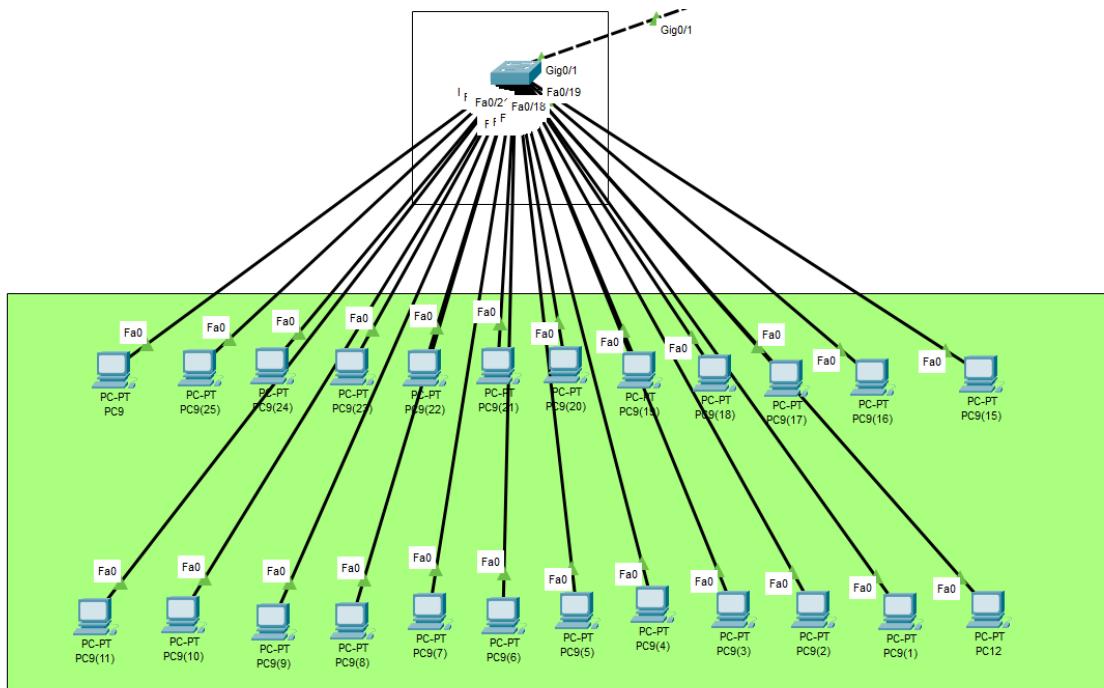
## BLOCK B – LAB 1



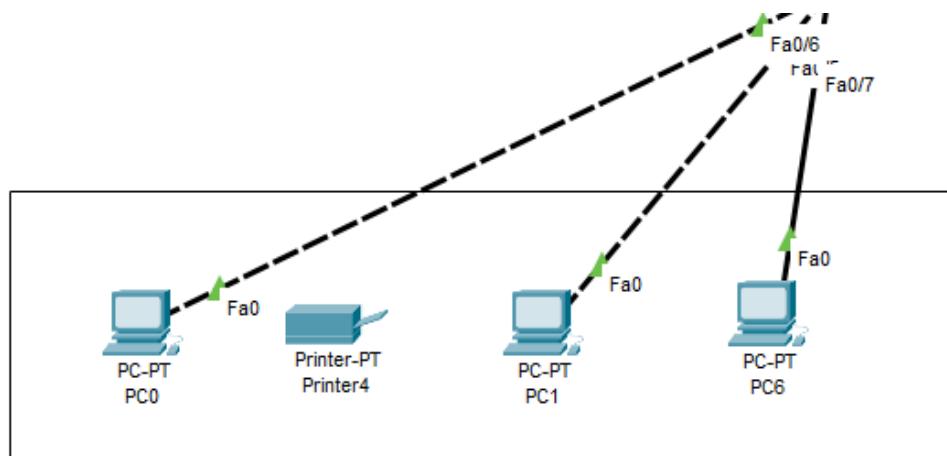
## BLOCK B – LAB 2



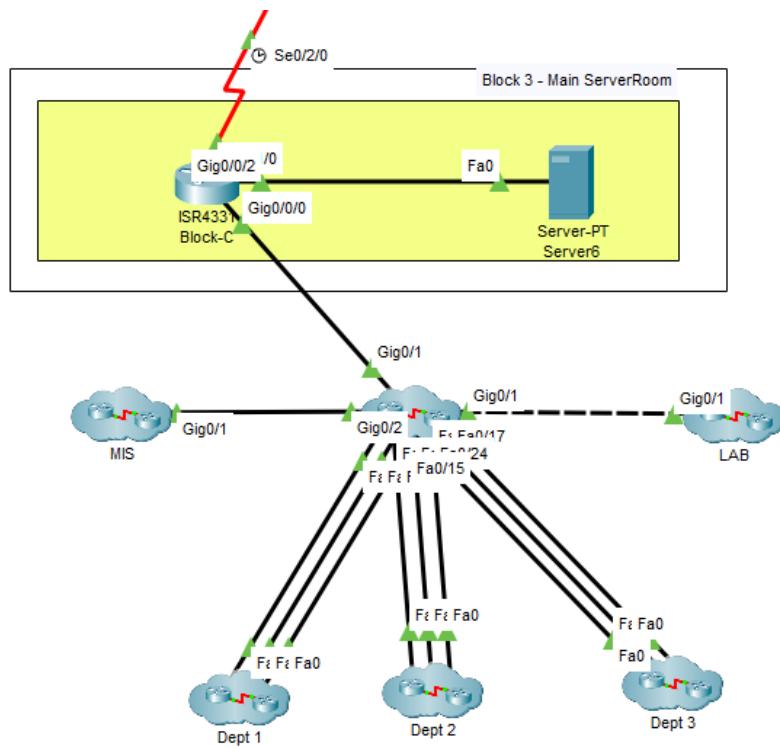
## BLOCK B – LAB 3



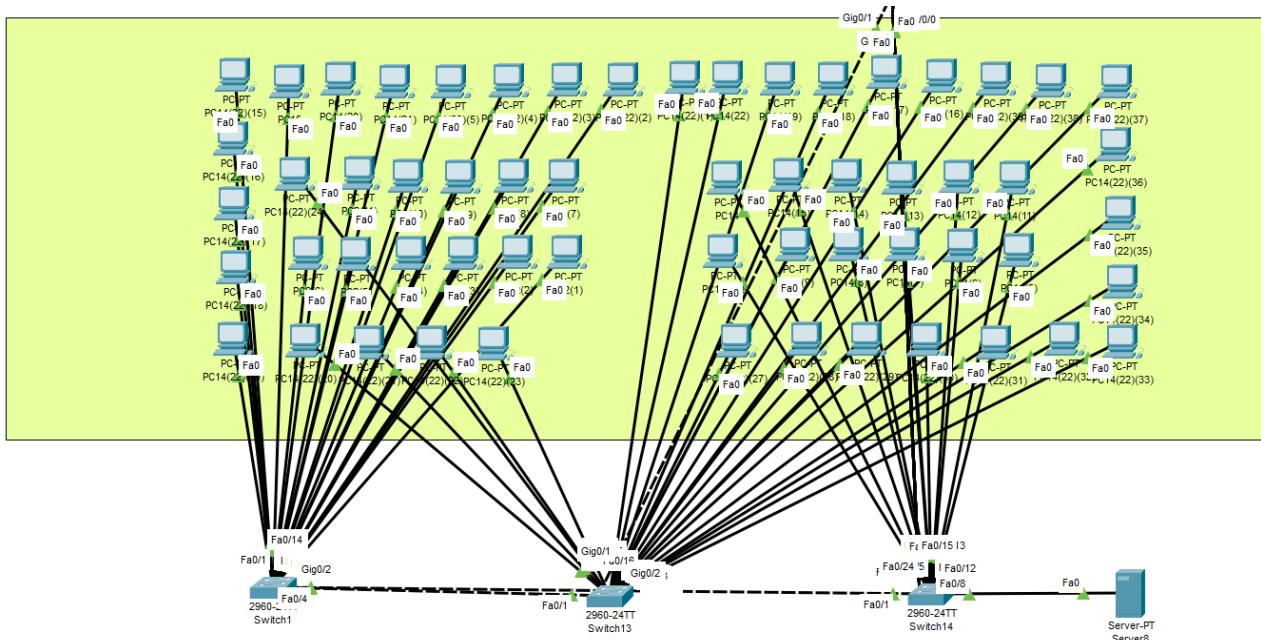
## BLOCK B – DEPARTMENT



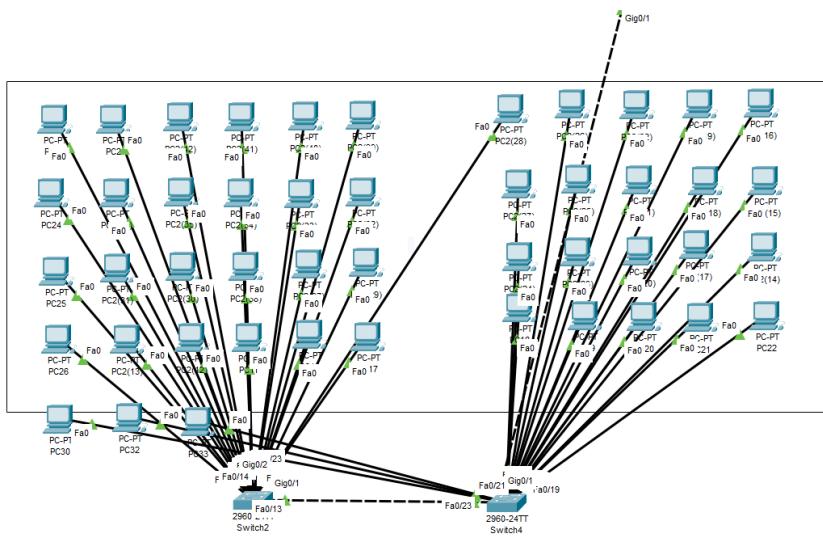
## BLOCK C



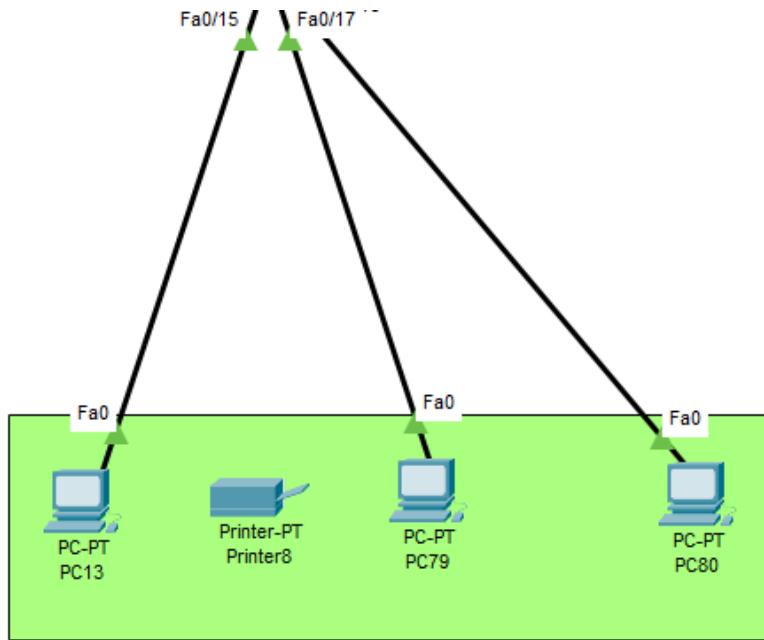
## BLOCK C – LAB 1



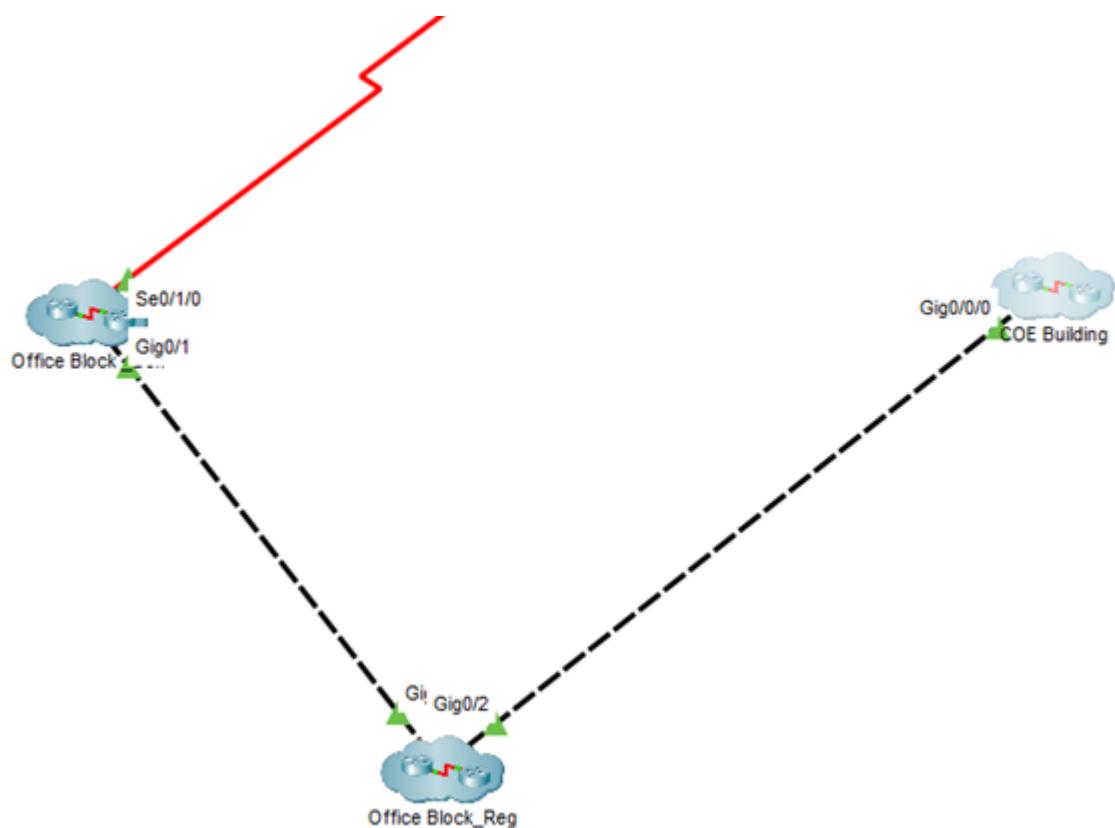
## BLOCK C – LAB 2



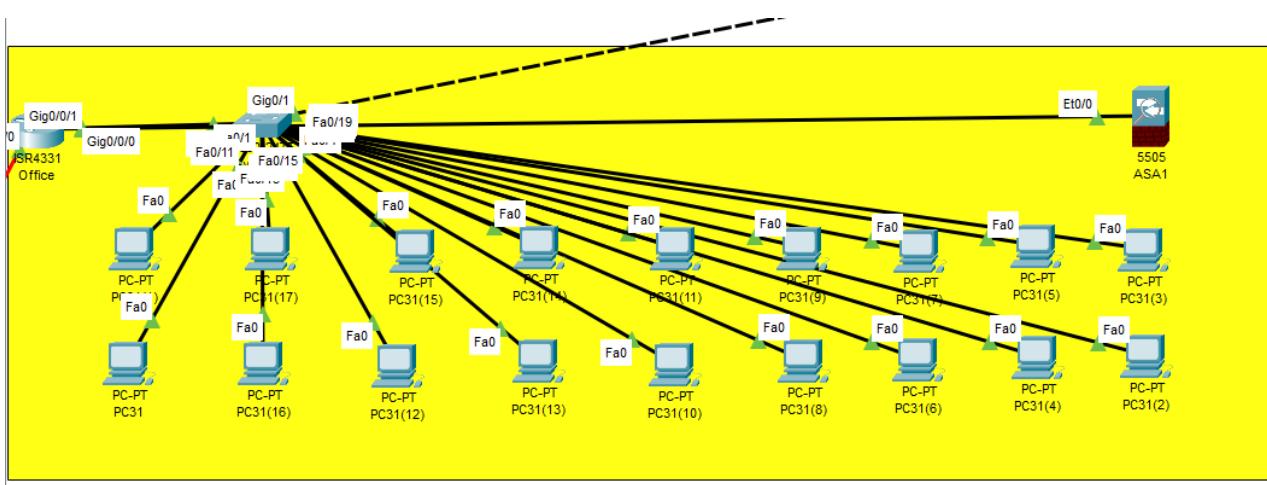
## BLOCK C – DEPARTMENT



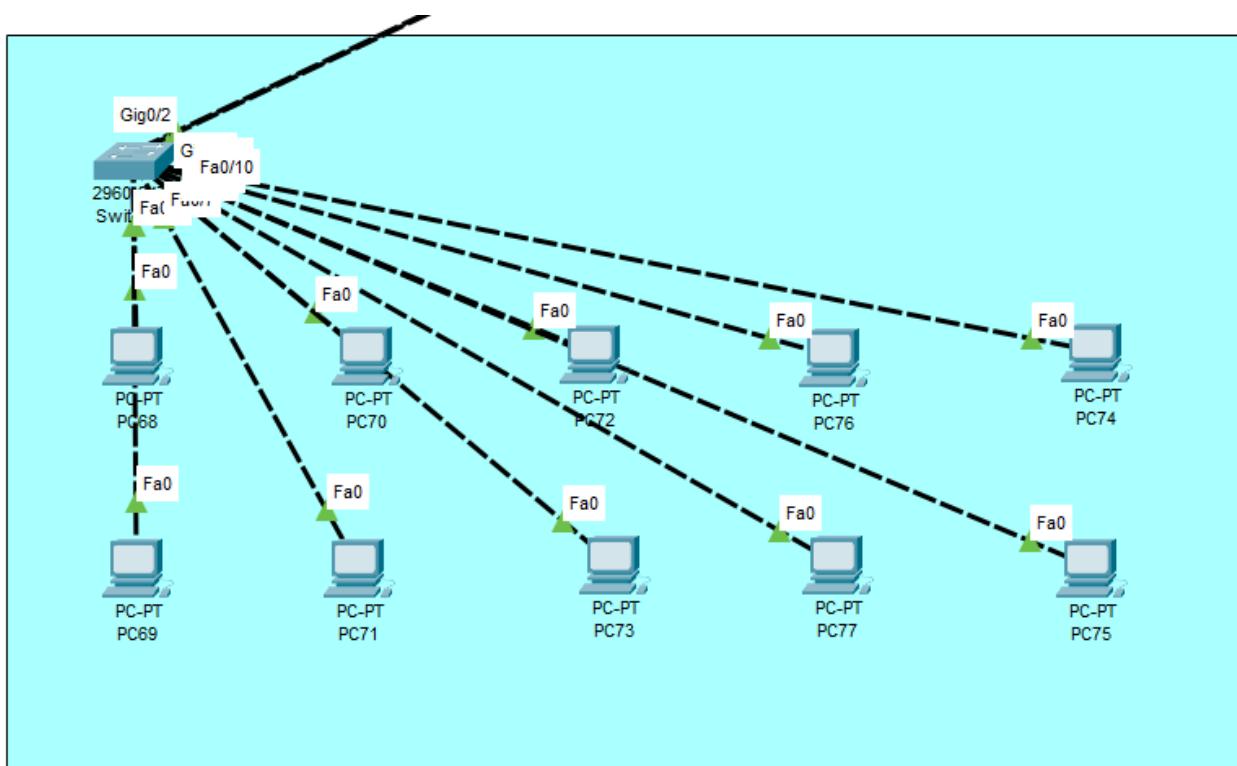
## OFFICE BLOCK



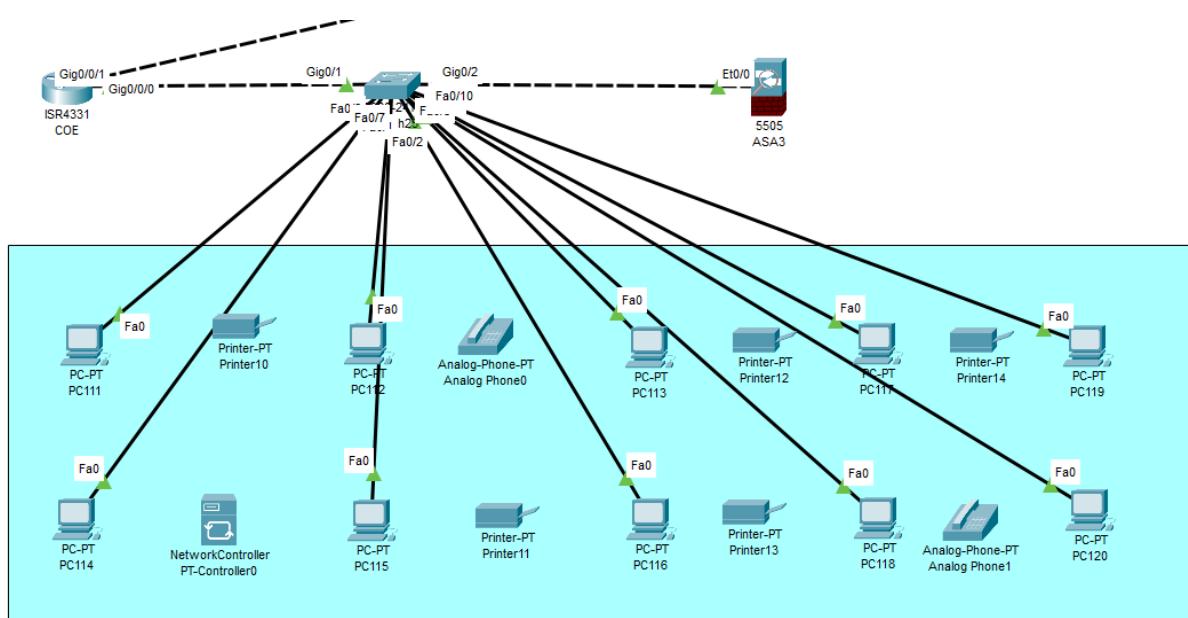
## OFFICE SELF



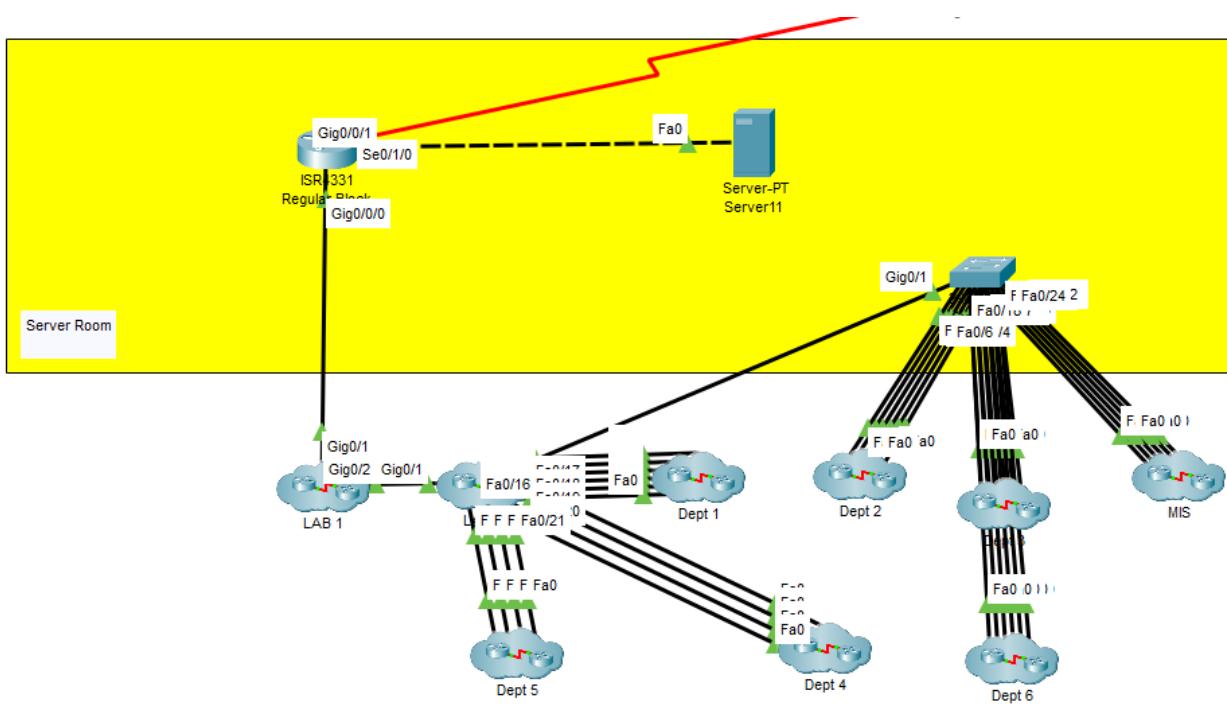
## OFFICE REGULAR



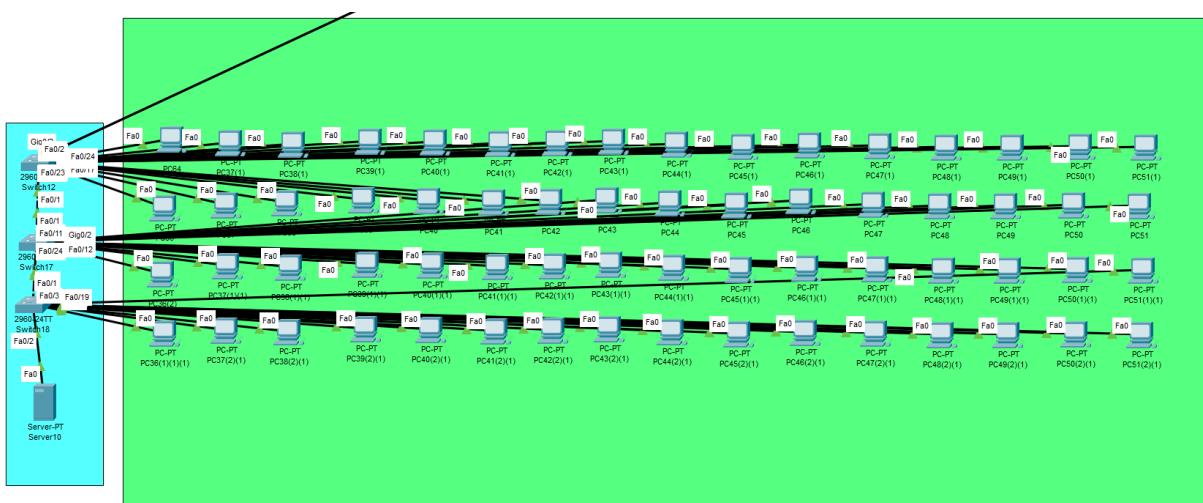
## COE



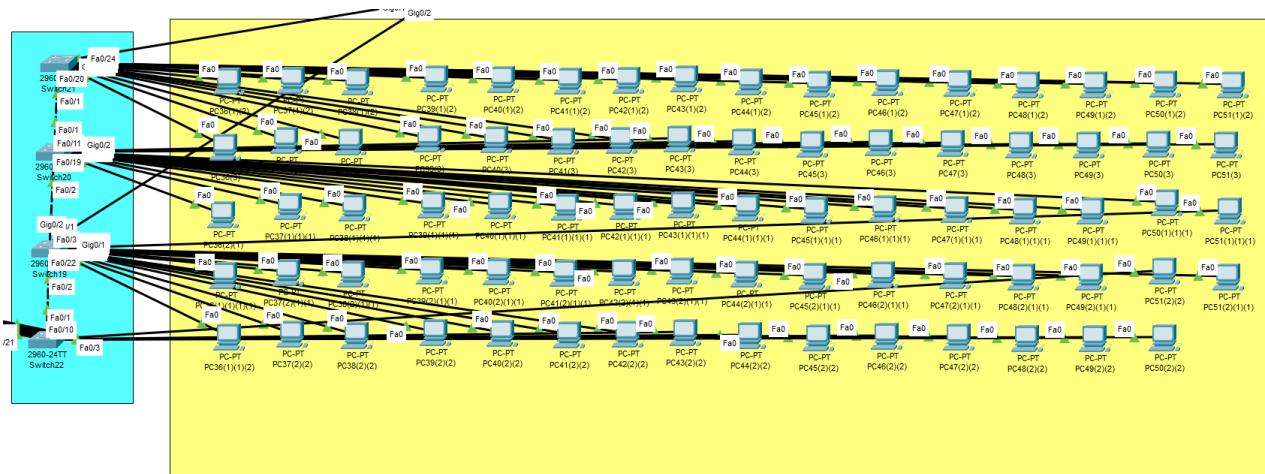
## REGULAR BLOCK



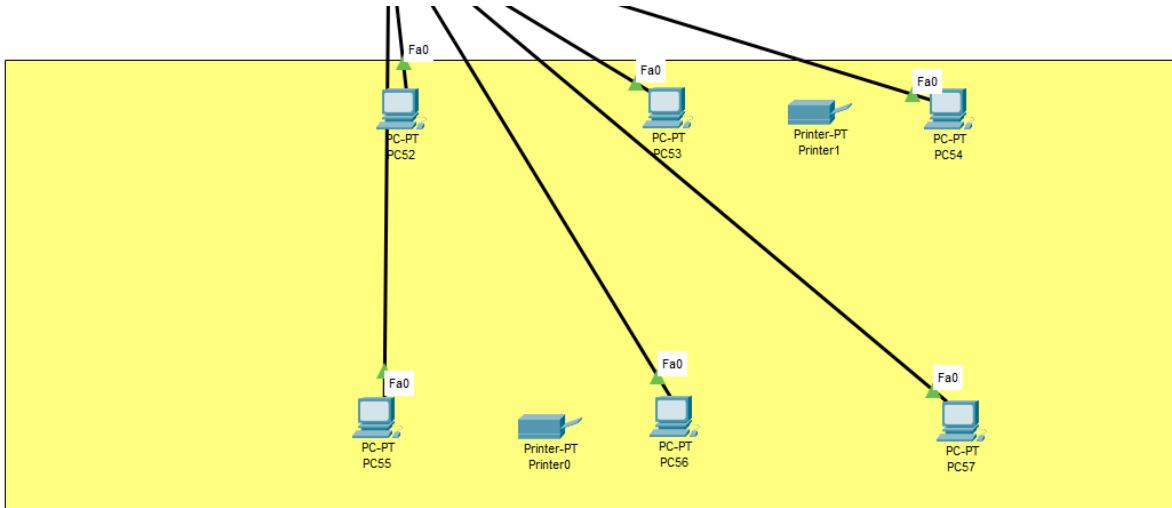
## REGULAR BLOCK LAB-1



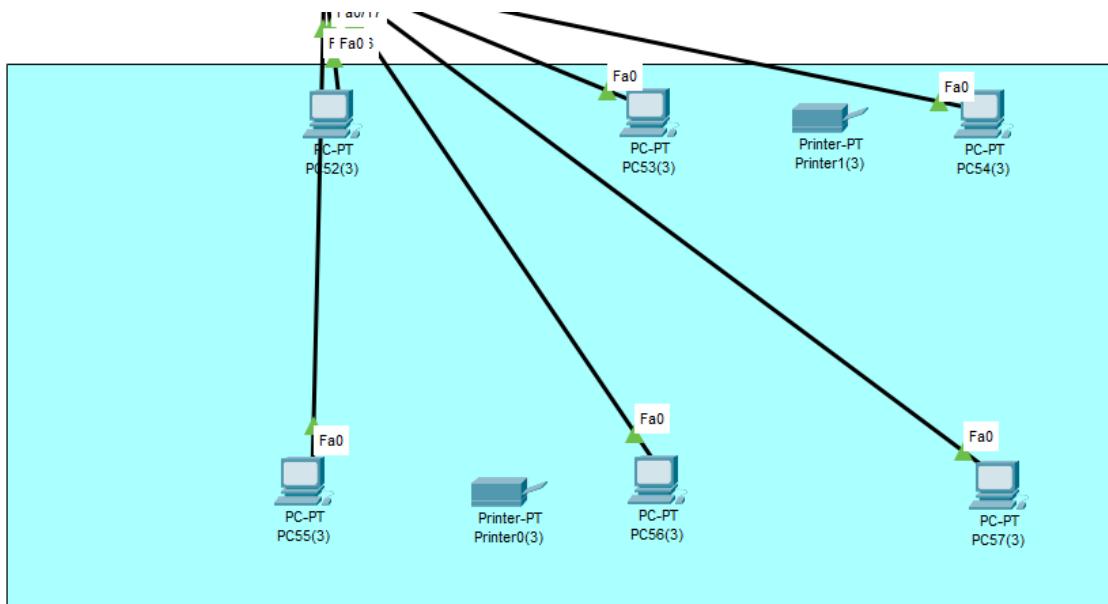
## REGULAR BLOCK LAB-2



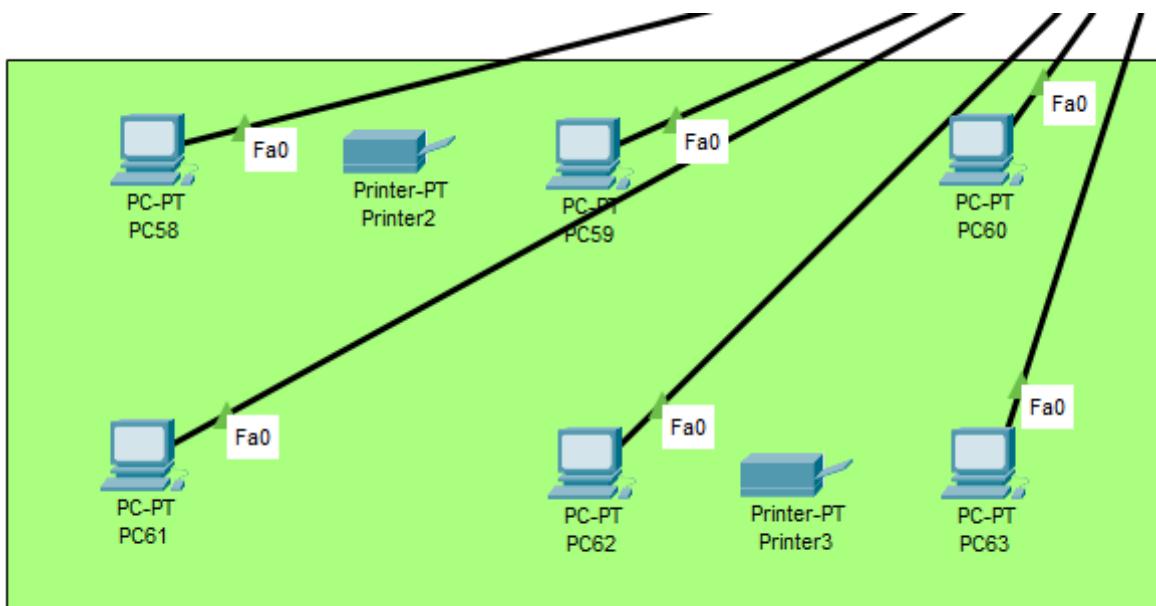
## REGULAR BLOCK DEPARTMENT- 1



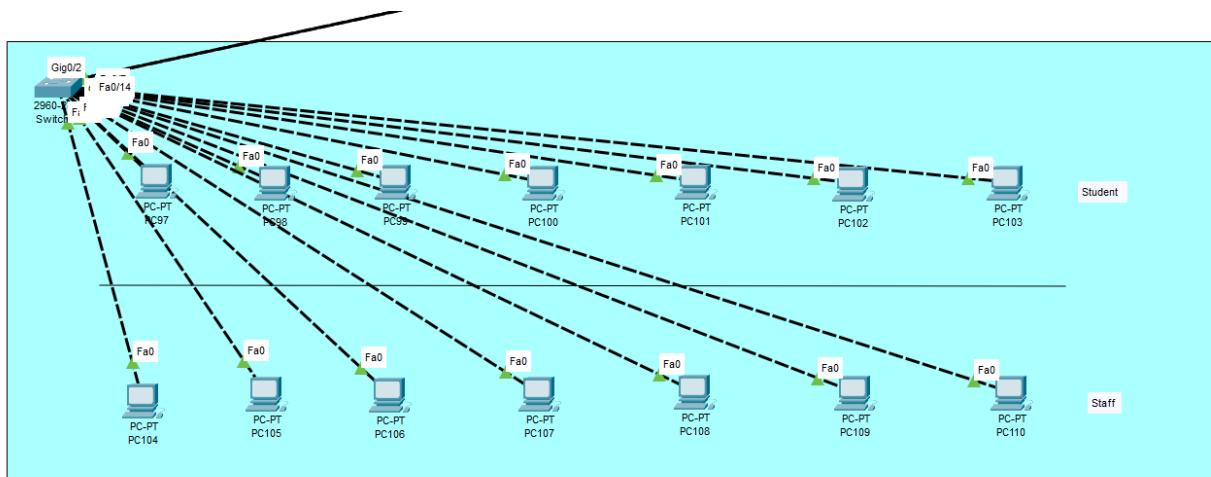
## REGULAR BLOCK DEPARTMENT -2



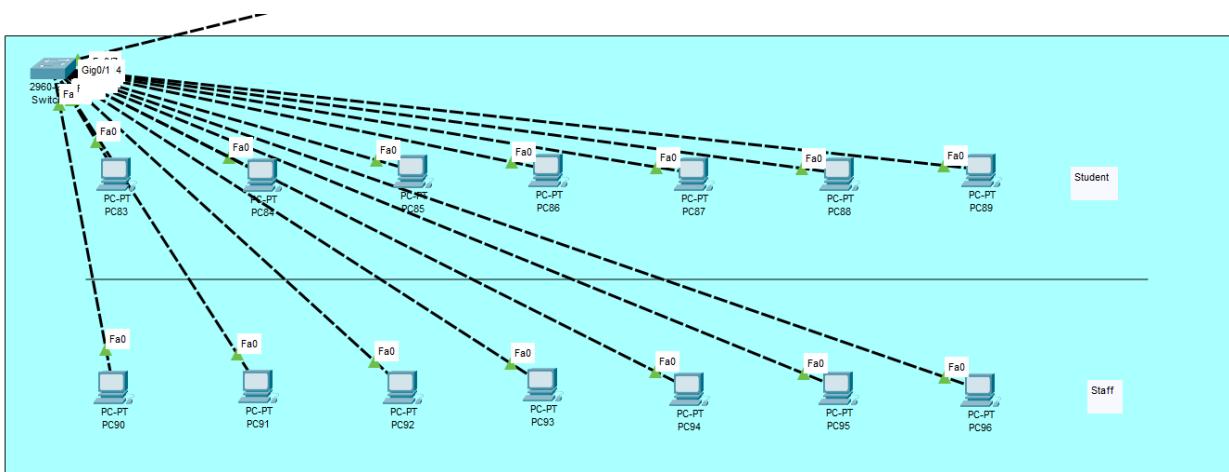
## MIS BLOCK REGULAR



## NETCAFE – 1

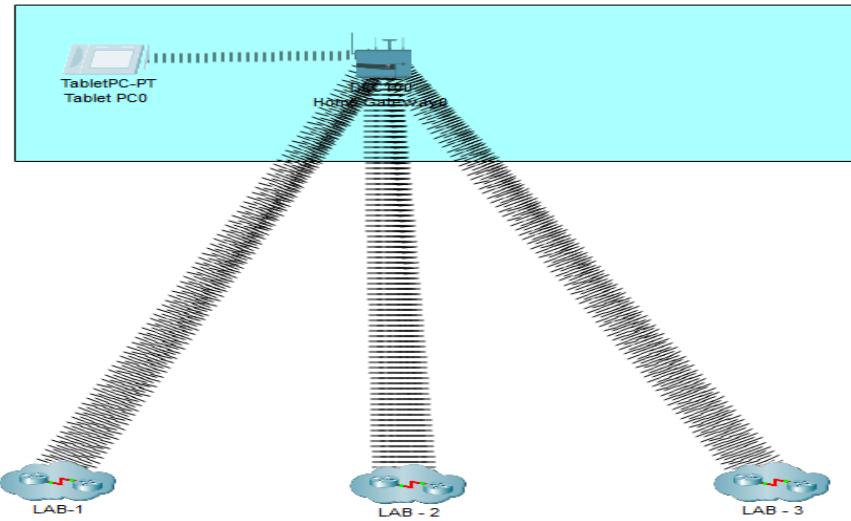


## NETCAFE – 2

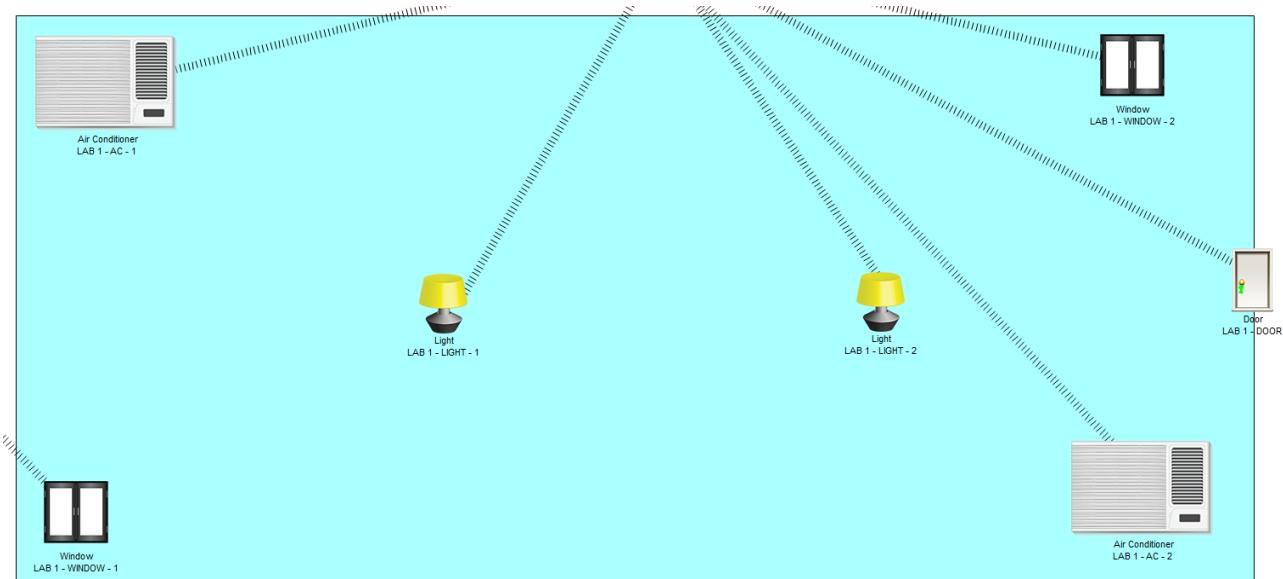


## IOT DEVICES

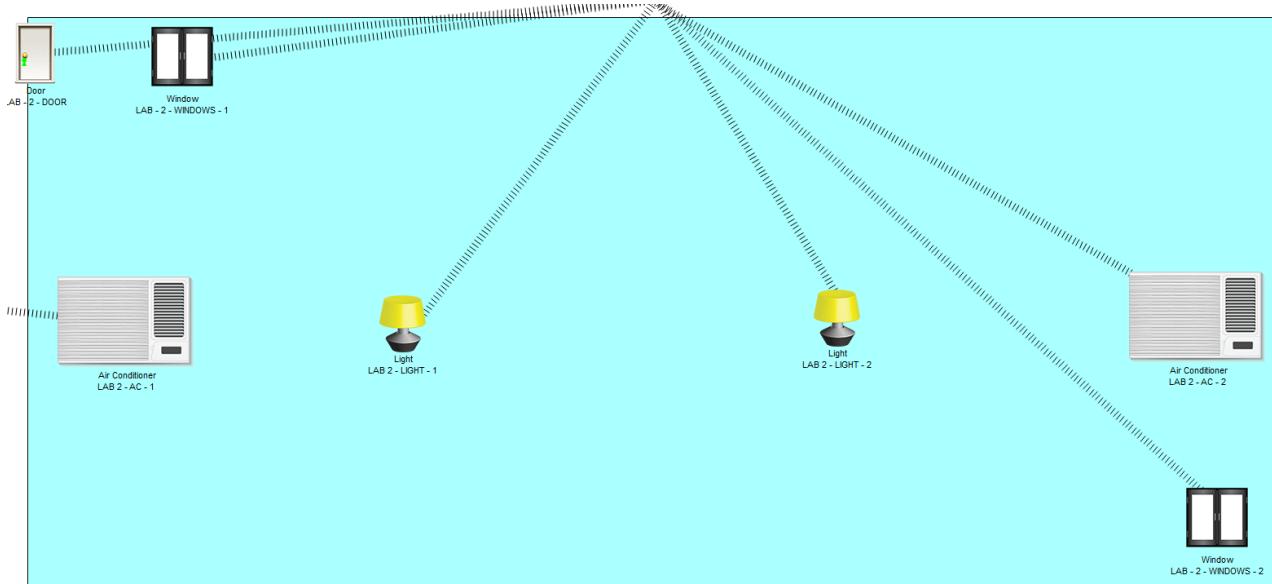
### BLOCK A



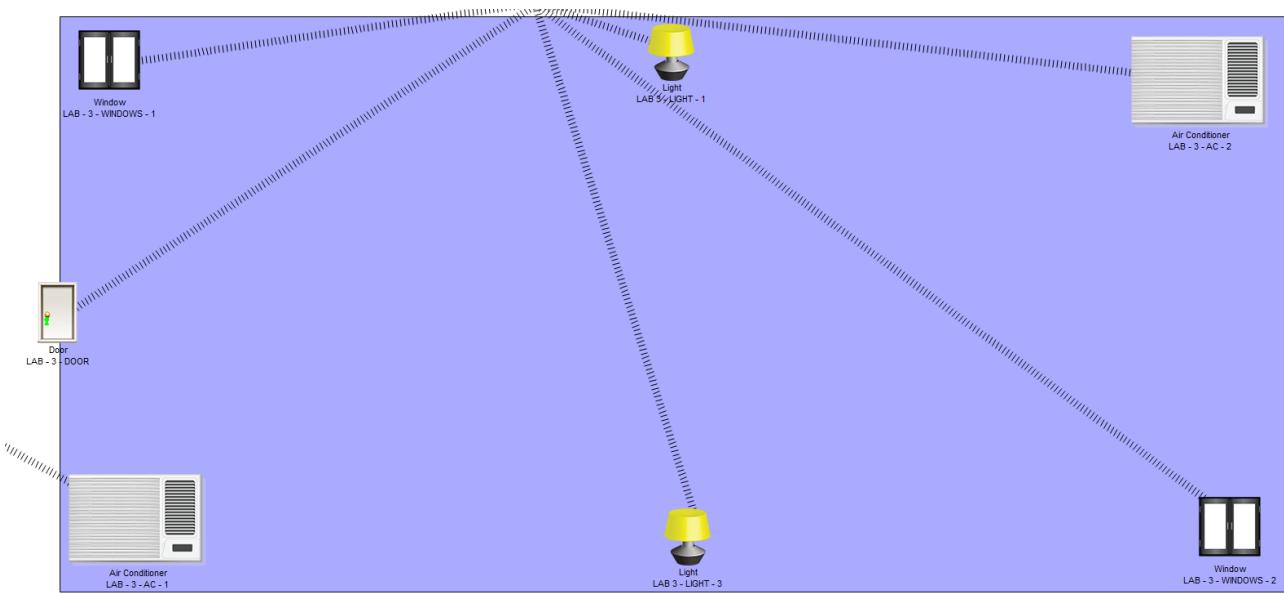
### BLOCK A LAB – 1 IoT



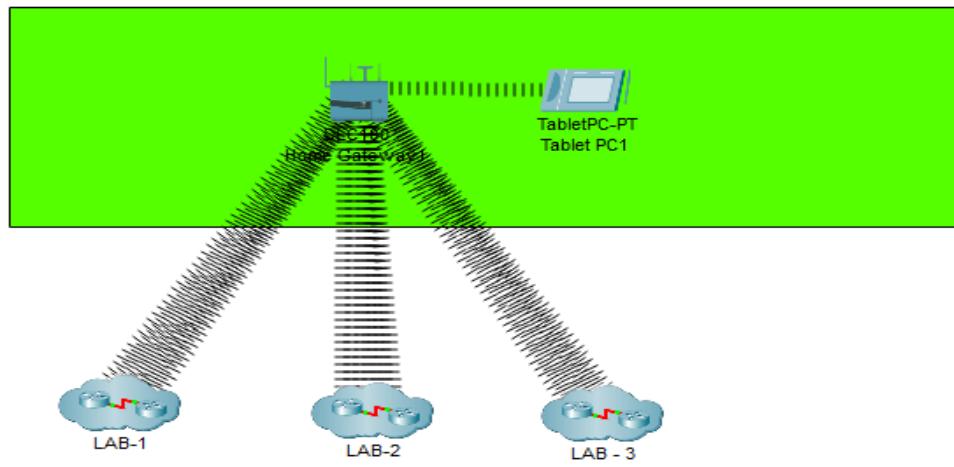
## BLOCK A LAB-2 -IoT



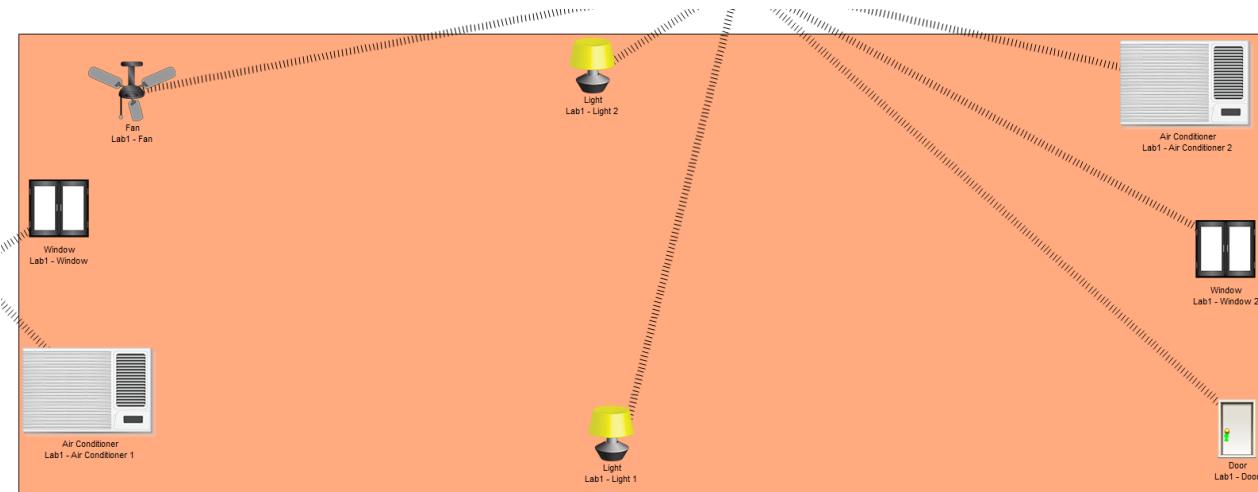
## BLOCK A LAB- 3-IoT



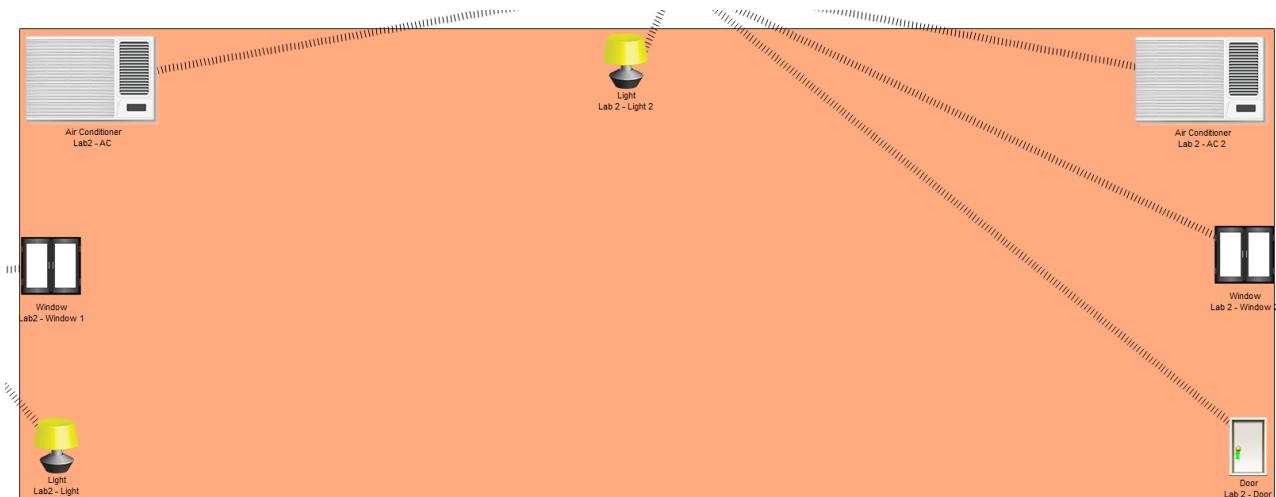
## BLOCK B IOT



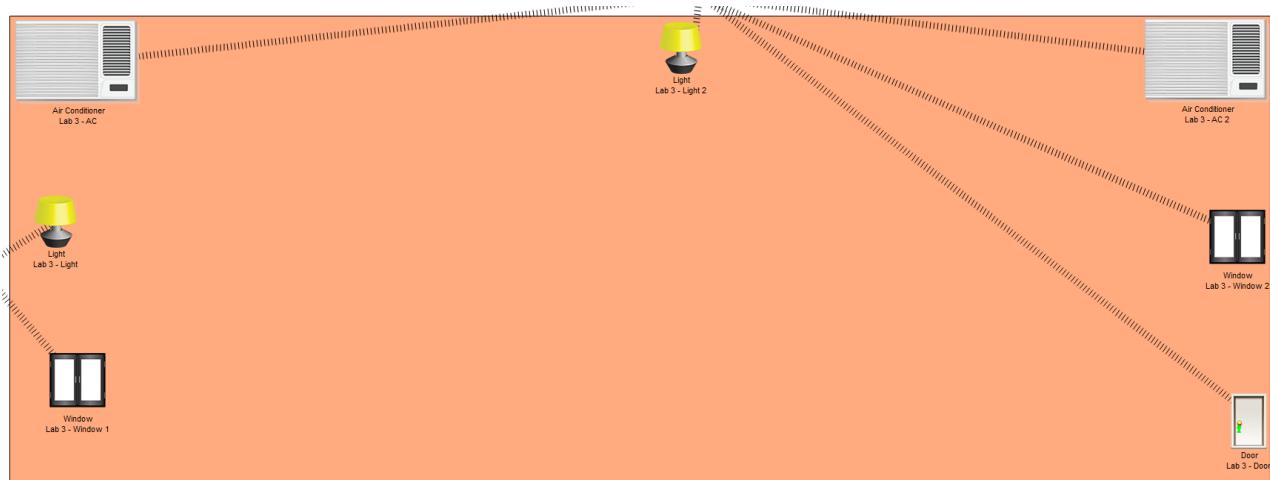
## BLOCK B LAB- 1-IoT



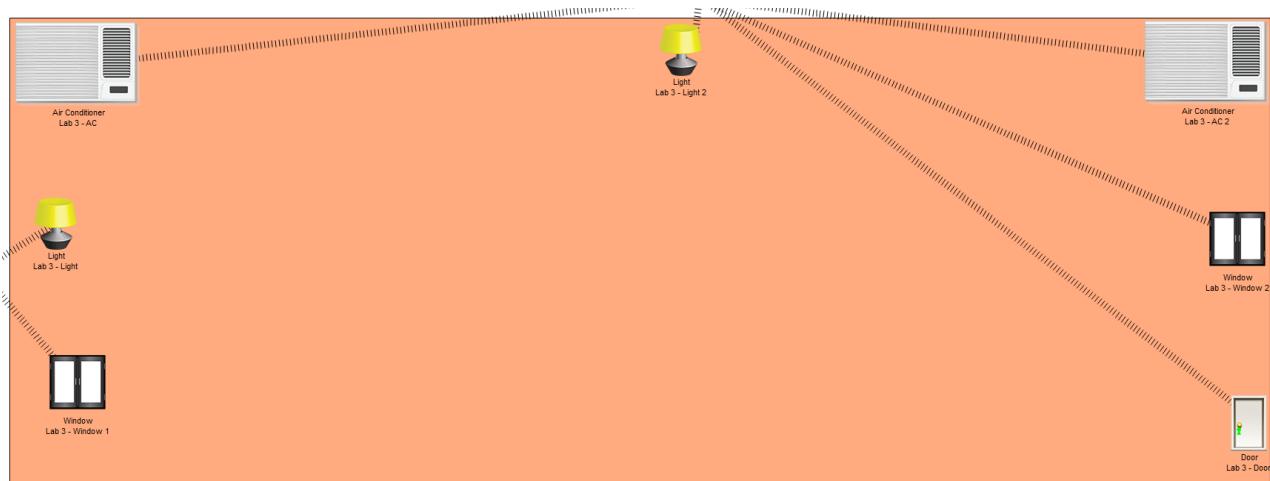
## BLOCK B LAB- 2-IoT



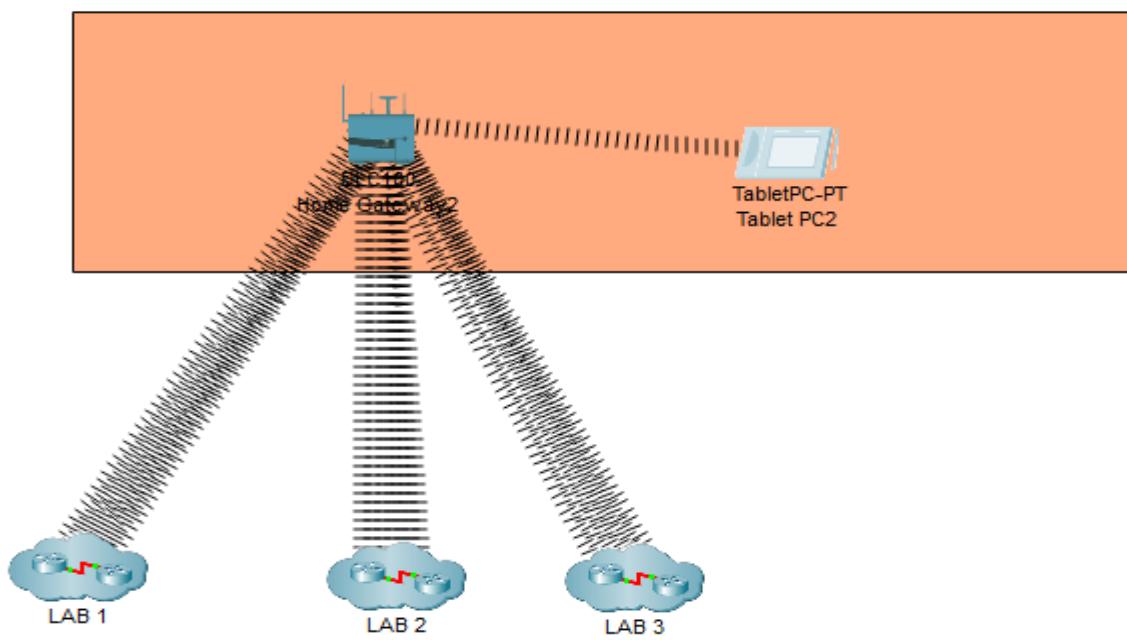
## BLOCK B LAB- 3-IoT



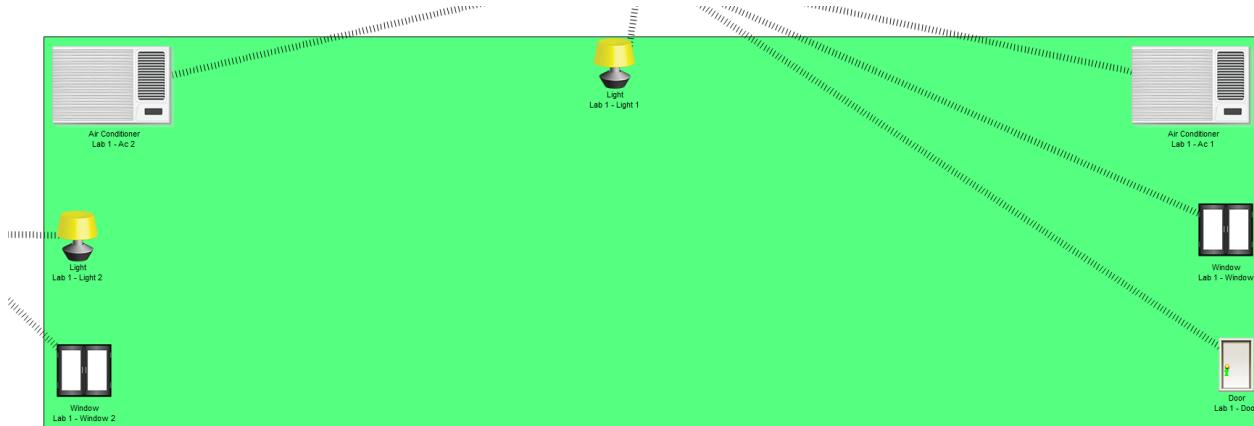
## BLOCK B LAB- 3-IoT



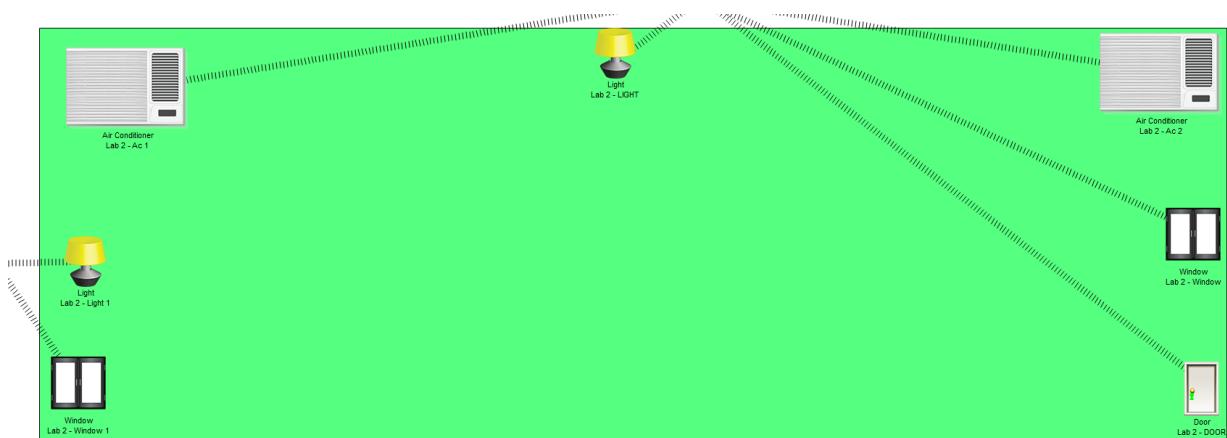
## BLOCK C IOT



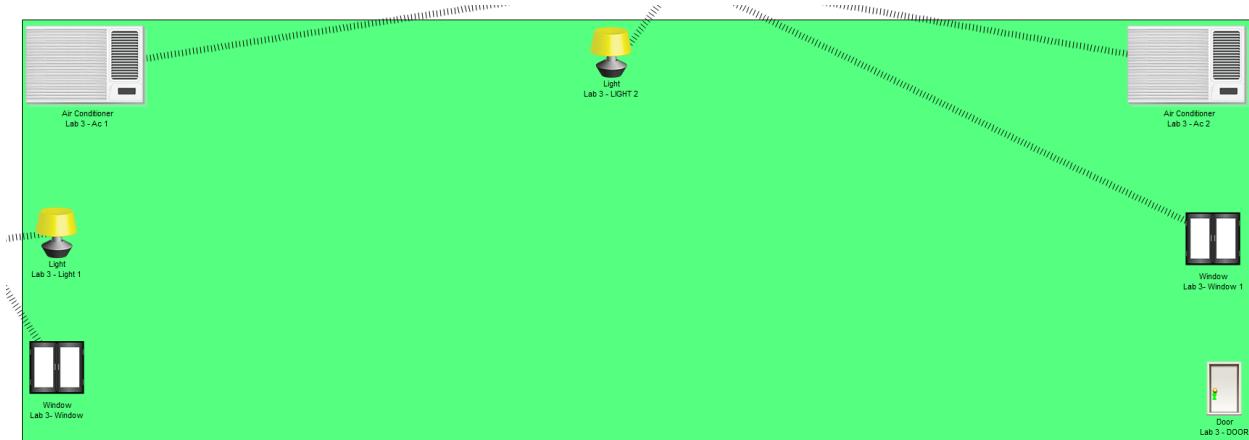
## BLOCK C LAB-1 IOT



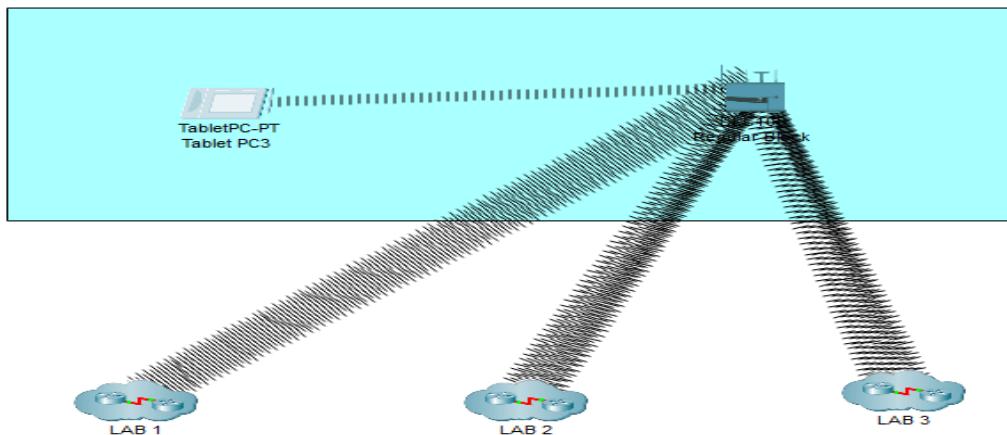
## BLOCK C LAB-2 IOT



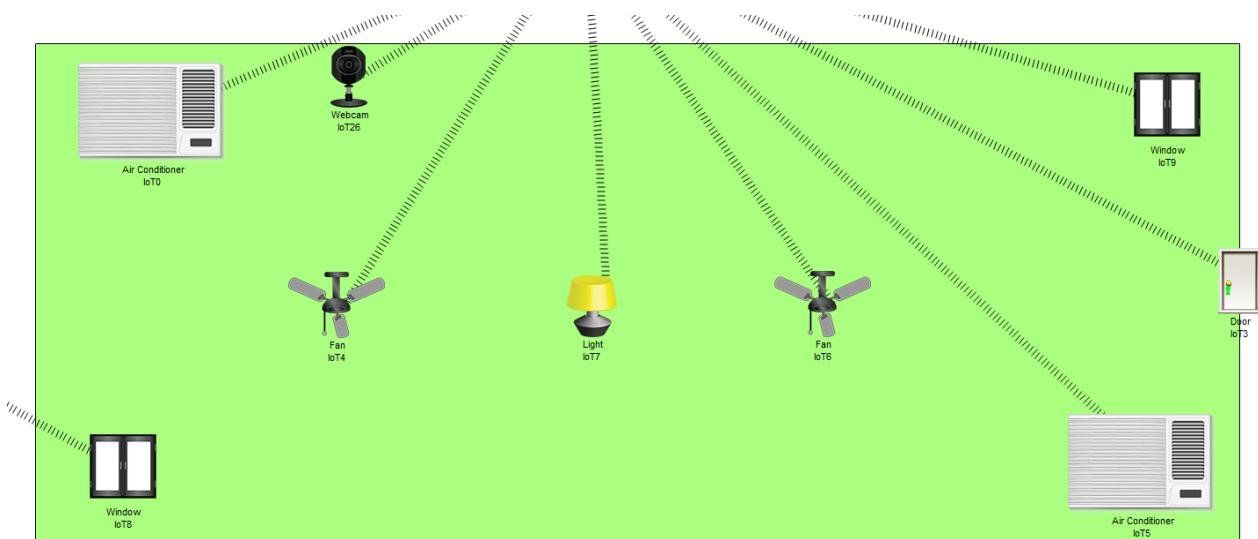
## BLOCK C LAB-3 IOT



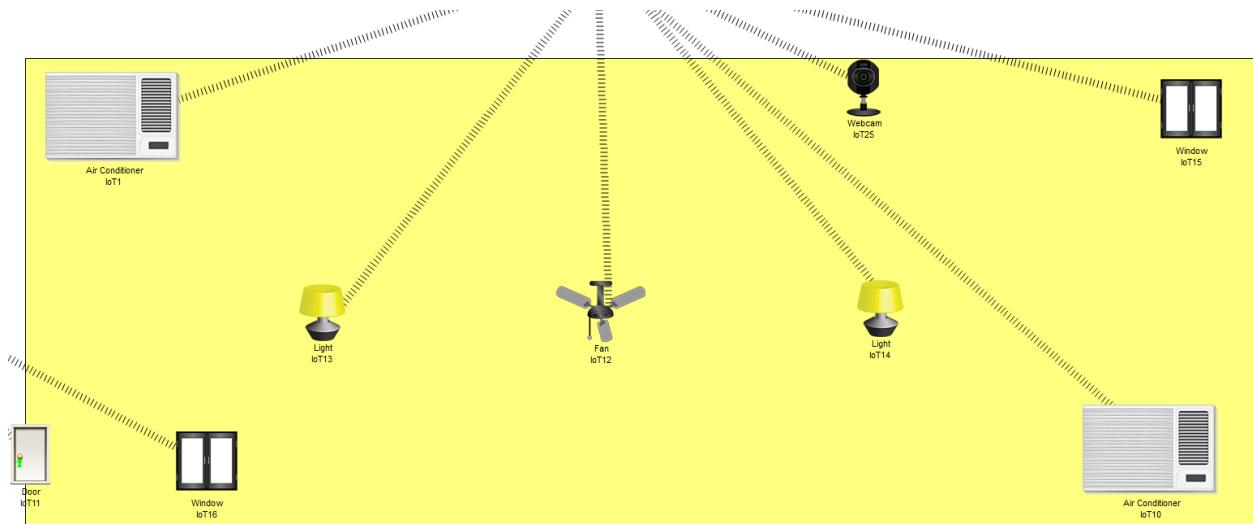
## REGULAR BLOCK IOT



### REGULAR BLOCK LAB-1 IOT



### REGULAR BLOCK LAB-2 IOT



### REGULAR BLOCK LAB-3 IOT

