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Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
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Course Title: Computer Networking Lab
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Project Name:

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[For Teachers use only: Don't Write Anything inside this box]

Lab Project Status

Marks:

Signature:

Comments:

Date:

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Chapter-1

1. Introduction

1.1 Overview

The hospital management system network design project aims to create a smart and efficient network for a hospital using Cisco Packet Tracer. This project integrates IoT devices such as cameras, fire alarms, smart LED lights, doors, windows, and fans, making the hospital environment more automated and easy to manage.

All these devices are connected to a central server, allowing them to be controlled from the server room using a smartphone. The design includes different rooms and cabins necessary for a hospital, ensuring a complete and practical setup. This network provides enhanced security, convenience, and energy efficiency, contributing to a modern healthcare facility.

1.2 Motivation

The motivation behind this project is to create a modern and efficient hospital environment that enhances patient care and staff productivity. By integrating IoT devices and smart technologies, we aim to simplify the management of hospital facilities, improve security, and reduce energy consumption.

In today's world, technology plays a vital role in improving healthcare systems. Automating tasks like monitoring, controlling devices, and ensuring safety can save time and reduce human error. This project is designed to demonstrate how a smart hospital network can provide better service to patients while making hospital operations smoother and more reliable.

1.3 Problem Definition

1.3.1 Problem Statement

Problem Statement

Managing a hospital's operations manually can be time-consuming, prone to errors, and inefficient. Traditional systems often lack centralized control, making it challenging to monitor and manage critical facilities like patient rooms, security systems, and energy consumption. In addition, ensuring the safety and comfort of patients and staff requires constant supervision, which can lead to higher operational costs and resource usage. Hospitals need a solution that integrates smart technologies to automate tasks, enhance security, and provide centralized control over essential devices and systems.

This project addresses these challenges by designing a hospital management system network that incorporates IoT devices and smart technologies, enabling seamless control and monitoring through a centralized server accessible via a smartphone.

1.3.2 Complex Engineering Problem

Name of the P Attributes	How to Address
P1: Depth of knowledge required	Requires knowledge of networking, IoT device integration, and hospital facility requirements to ensure proper design and functionality.
P2: Range of conflicting requirements	Balancing patient safety, energy efficiency, and ease of control while addressing the hospital's budget constraints.
P3: Depth of analysis required	Involves analyzing device compatibility, network capacity, and reliability to ensure smooth operations.
P4: Familiarity of issues	Common issues include network failures, IoT security vulnerabilities, and power outages, which need proactive mitigation strategies
P5: Extent of applicable codes	Adheres to networking standards (e.g., IEEE 802.11) and hospital safety regulations for devices and infrastructure
P6: Extent of stakeholder involvement and conflicting requirements	Includes collaboration with hospital management, IT experts, and healthcare staff to meet diverse needs without causing conflicts
P7: Interdependence	All IoT devices and the network are interdependent; failure in one area (e.g., server) may impact overall functionality, requiring robust redundancy planning.

1.4 Objectives

- To design a secure and efficient hospital network using Cisco Packet Tracer.
- To implement VLAN segmentation and inter-VLAN routing for better performance.
- To configure DHCP for dynamic IP allocation.
- To enable secure remote access with SSH and VPN.
- To use OSPF for efficient routing.
- To ensure wireless connectivity for all departments.
- To enforce access control and port security for data protection.
- To achieve high availability and redundancy in the network.

1.5 Application

This project can be implemented in real hospitals to improve data security, streamline communication, and manage patient records effectively. It connects departments, ensures reliable internet and wireless access, supports secure remote management, and enables safe data sharing between branches. The network design prepares the hospital for future growth while maintaining cost-efficiency and operational reliability.

Chapter 2

Design/Development/Implementation of the Project

2.1 Introduction

This project focuses on designing, developing, and implementing a secure and efficient network infrastructure for a hospital management system. The aim is to create a reliable network that connects various departments, ensures secure communication, and supports critical hospital operations. By using Cisco Packet Tracer, we develop a network with VLAN segmentation, dynamic IP allocation via DHCP, and secure remote access through SSH and VPN. The project also incorporates routing with OSPF, port security, and wireless connectivity for seamless operations. The design ensures data confidentiality, integrity, and availability, making it a robust solution for managing patient records, staff communication, and hospital resources efficiently.

2.2 Projects Details

1. Admin management Room

From Here we can control all the IOT and smart devices of our Hospital by a mobile phone.

Devices:

PC , 1 printer, web cam, smart fan and mobile device .

2. Cardiology Department

Devices:

PC , 1 printer, and a webcam.

3. Operation Theater (OT)

Devices:

PC , 1 printer, web cam, smart LED, Humiture monitor, Humidity monitor, AC

4. Word 1

Devices:

PC , 1 printer, webcam and smart fan.

5. Pathology laboratory

Devices:

PCs , 1 printer, webcam and smart fan.

6. incentive care unit(ICU)

Devices:

PC , printer, web cam, smart fan, Humiture monitor, Humidity monitor , Humidifier, smart led and

AC.

7. Emergency Department.

Devices:

PCs, 1 printer, webcam and Light.

8. Guest Room

Devices:

AC, webcam, smart light, Door, Window

9. Cafeteria

Devices:

webcam, window, light, smart door, window , AC .

10. Server Room

Devices:

PC , printer, web cam, SMTP server, FTP Server,DNS, smart Door, light, lawn sprinkler, smoke detector .

11. Reception

Devices:

PC , printer, webcam, smart fan, Door, window, lawn sprinkler, smoke detector, siren

12. pharmacy

Devices:

3PC , webcam

13. Dermatology department

Devices:

PC , web cam.

14. Neurology

Devices:

PC , printer, webcam, AC.

15. Doctors Cabin

Devices:

PC , printer, web cam, Bluetooth Speaker .

How They Work Together

In the hospital network, each room and department has IoT devices controlled from the Admin Management Room via a mobile phone.

- **Admin Room** manages all devices, including PCs, printers, webcams, smart fans, and mobile devices.
- **Departments** like Cardiology, OT, ICU, and others have devices like PCs, printers, webcams, smart fans, and climate control devices for smooth operations.
- **The Guest Room** and **Cafeteria** feature smart lights, AC, doors, and windows for comfort.
- The **Server Room** controls all network devices and security, including servers, cameras, smoke detectors, and lawn sprinklers.
- **Reception** also has security devices and comfort features.

All devices work together to automate and streamline hospital operations, ensuring efficiency and safety.

2.3 Implementation

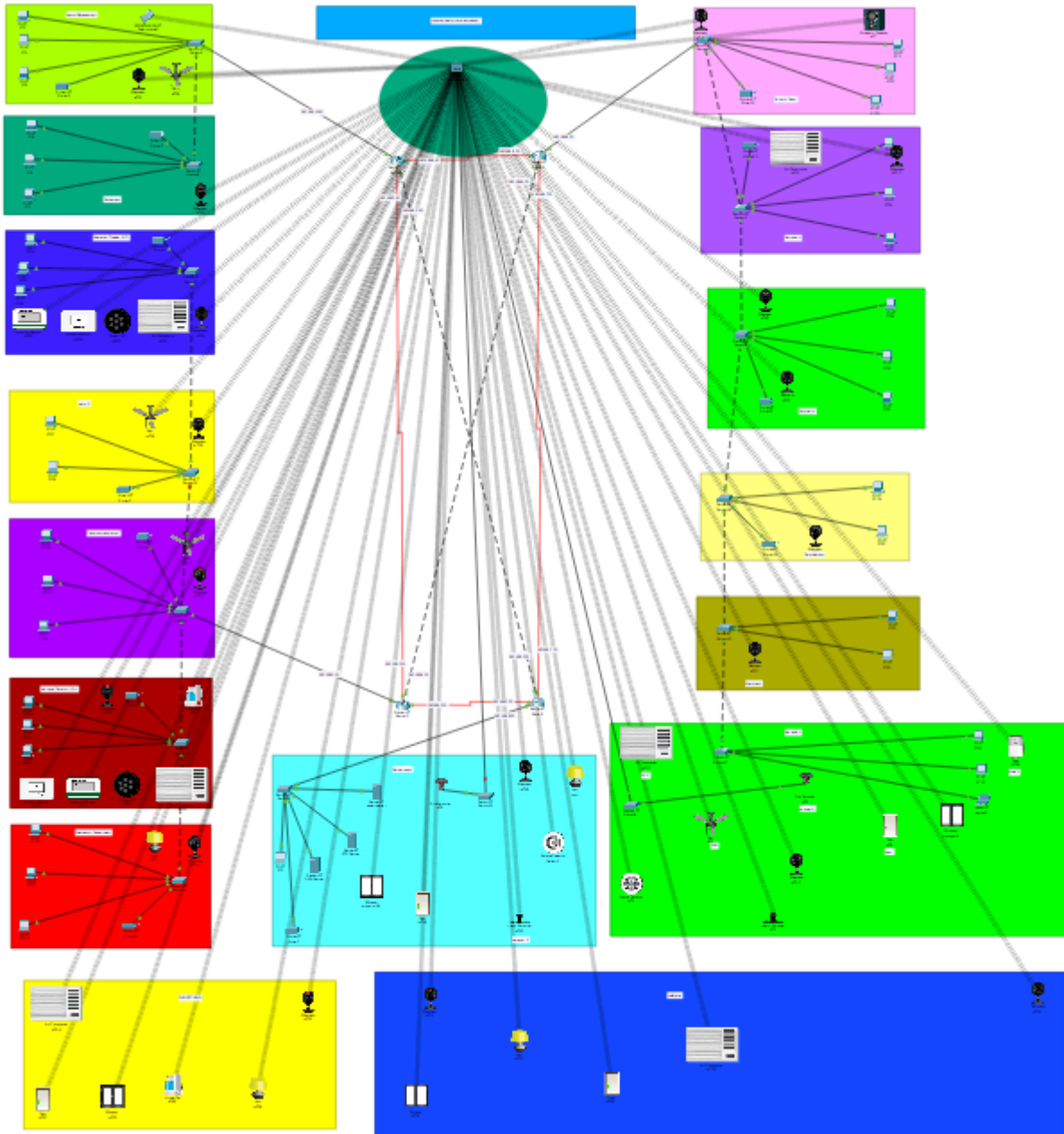
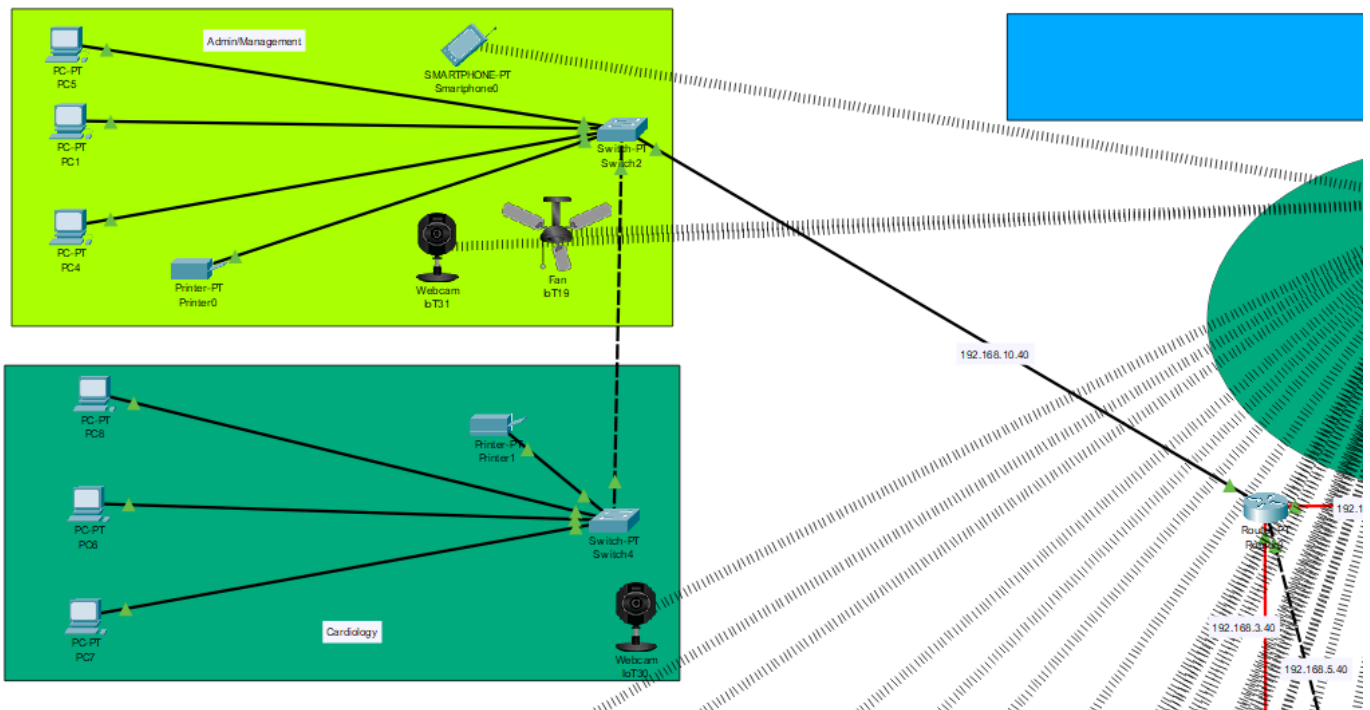


Figure: Hospital network full design

There are 4 routers and 10 different networks. All the networks are connected to each other with dynamic and static connection. Let us show each network ip configuration one by one.

Network-1

This is connected to the admin management and cardiology department.



Physical Config **Desktop** Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.10.1

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.10.40

DNS Server: 192.168.6.3

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

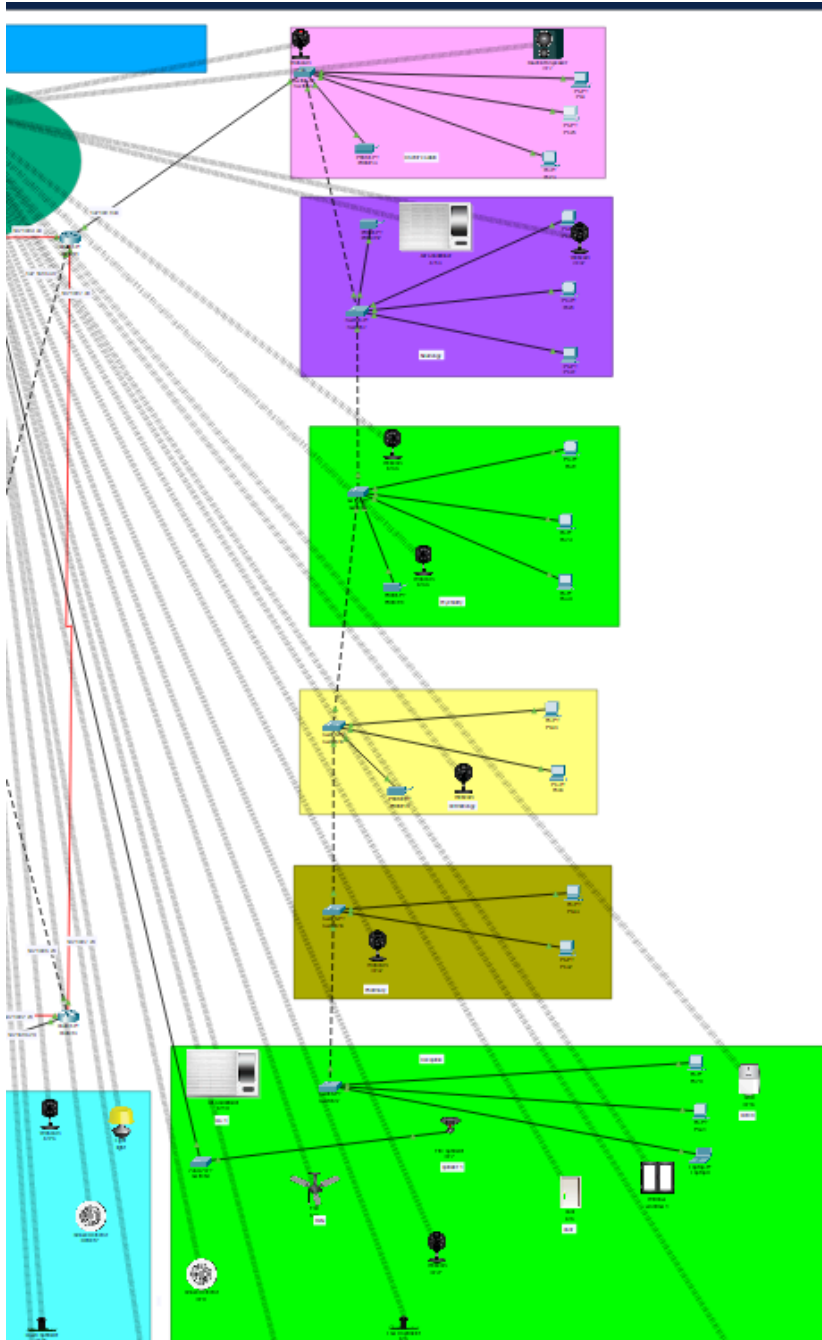
Link Local Address: FE80::209:7CFF:FE69:9E55

Default Gateway:

DNS Server:

802.1X

Network-2



PC23

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.8.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.8.30

DNS Server 192.168.6.3

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::230:F2FF:FE65:EC0B

Default Gateway

DNS Server

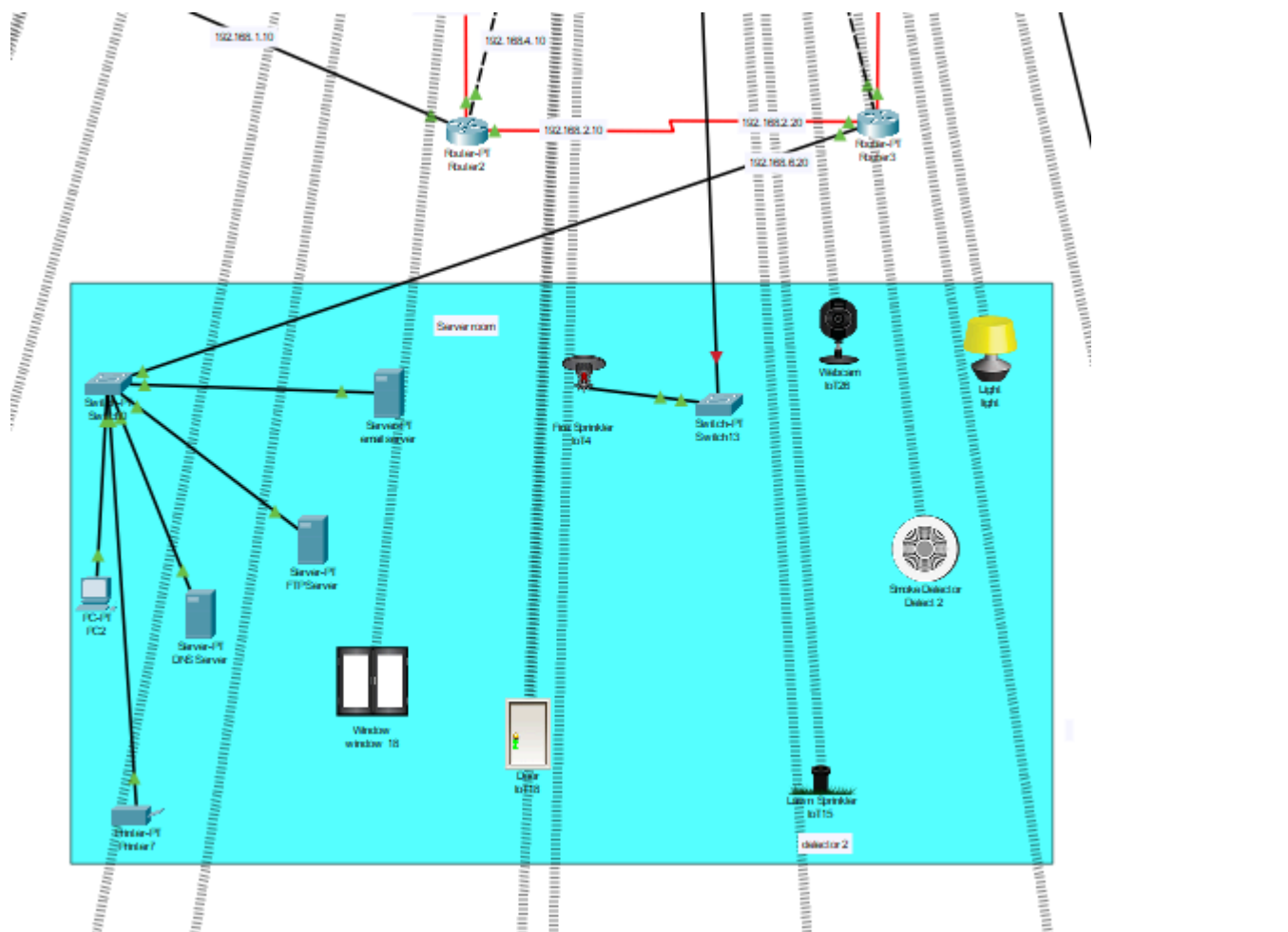
802.1X

☐ Use 802.1X Security

Authentication MD5

Username

Network-3



PC2

Physical Config **Desktop** Programming Attributes

IP Configuration [X]

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.6.1

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.6.20

DNS Server: 192.168.6.3

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: [] / []

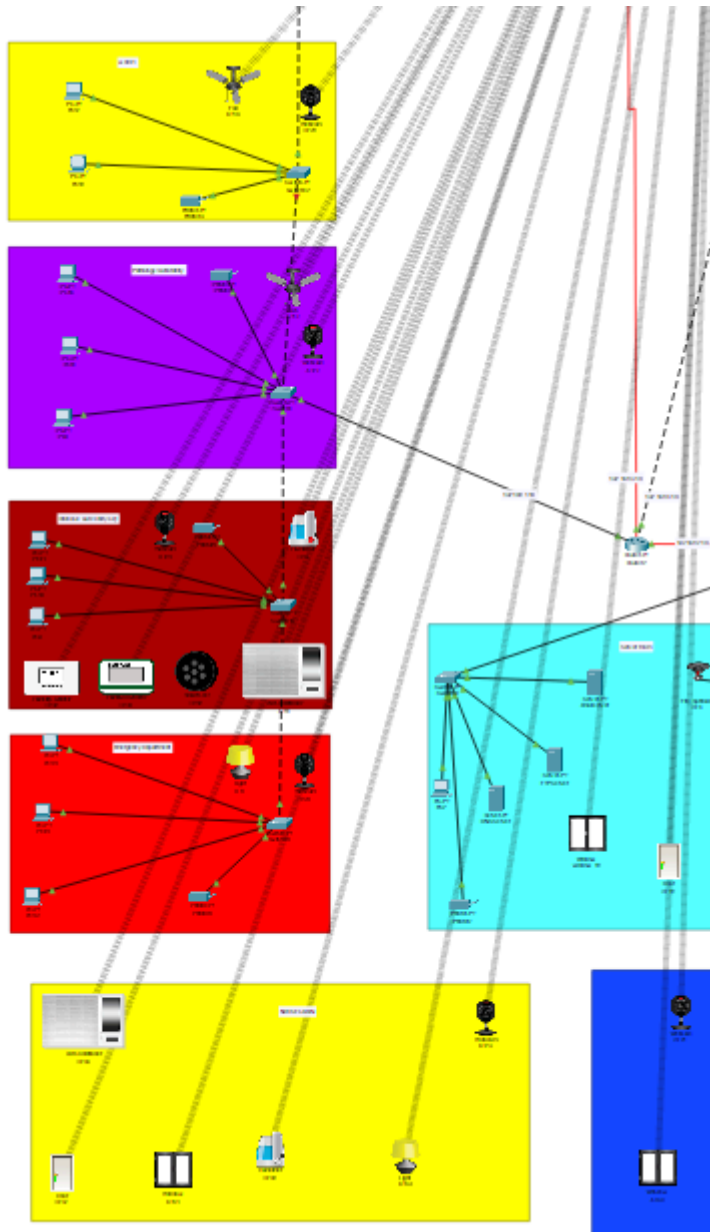
Link Local Address: FE80::20A:F3FF:FE71:86A2

Default Gateway: []

DNS Server: []

802.1X

Network-4



PC18

Physical Config **Desktop** Programming Attributes

IP Configuration X

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.21

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.10

DNS Server: 192.168.6.3

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::205:5EFF:FE04:AC72

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Other 6 networks are not connected to any room or pc. but they are connected to each other.

Printer configuration

Printer1

Physical **Config** Attributes

GLOBAL

Settings

INTERFACE

FastEthernet0

FastEthernet0

Port Status: ☒ On

Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address: 000A.41B9.AD22

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.10.8

Subnet Mask: 255.255.255.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

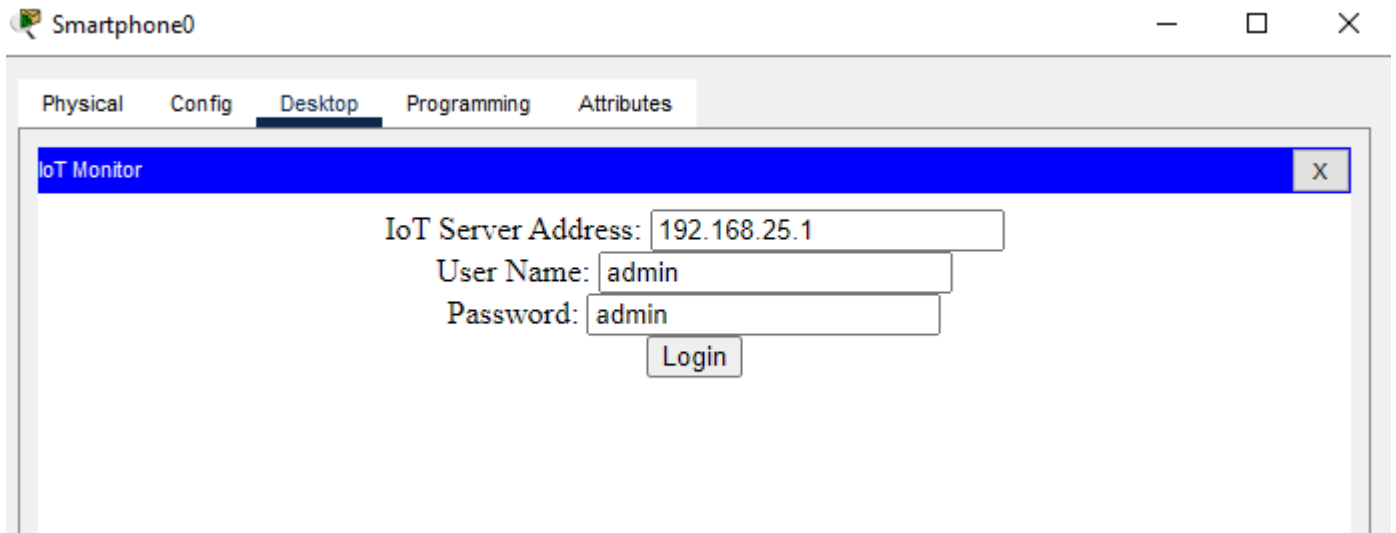
Link Local Address: FE80::20A:41FF:FEB9:AD22

Chapter 3

Performance Evaluation

3.1 Test Result

IOT Configuration Result



The screenshot shows a software window titled "Smartphone0" with standard Windows window controls (minimize, maximize, close). Inside the window, there are five tabs: "Physical", "Config", "Desktop", "Programming", and "Attributes". The "Desktop" tab is currently selected. Within this tab, there is a sub-window titled "IoT Monitor" with its own close button. The "IoT Monitor" sub-window contains the following configuration fields and a button:

- IoT Server Address:** 192.168.25.1
- User Name:** admin
- Password:** admin
- Login** button

Smartphone0

Physical

Config

Desktop

Programming

Attributes

IoT Monitor

IoT Server - Devices

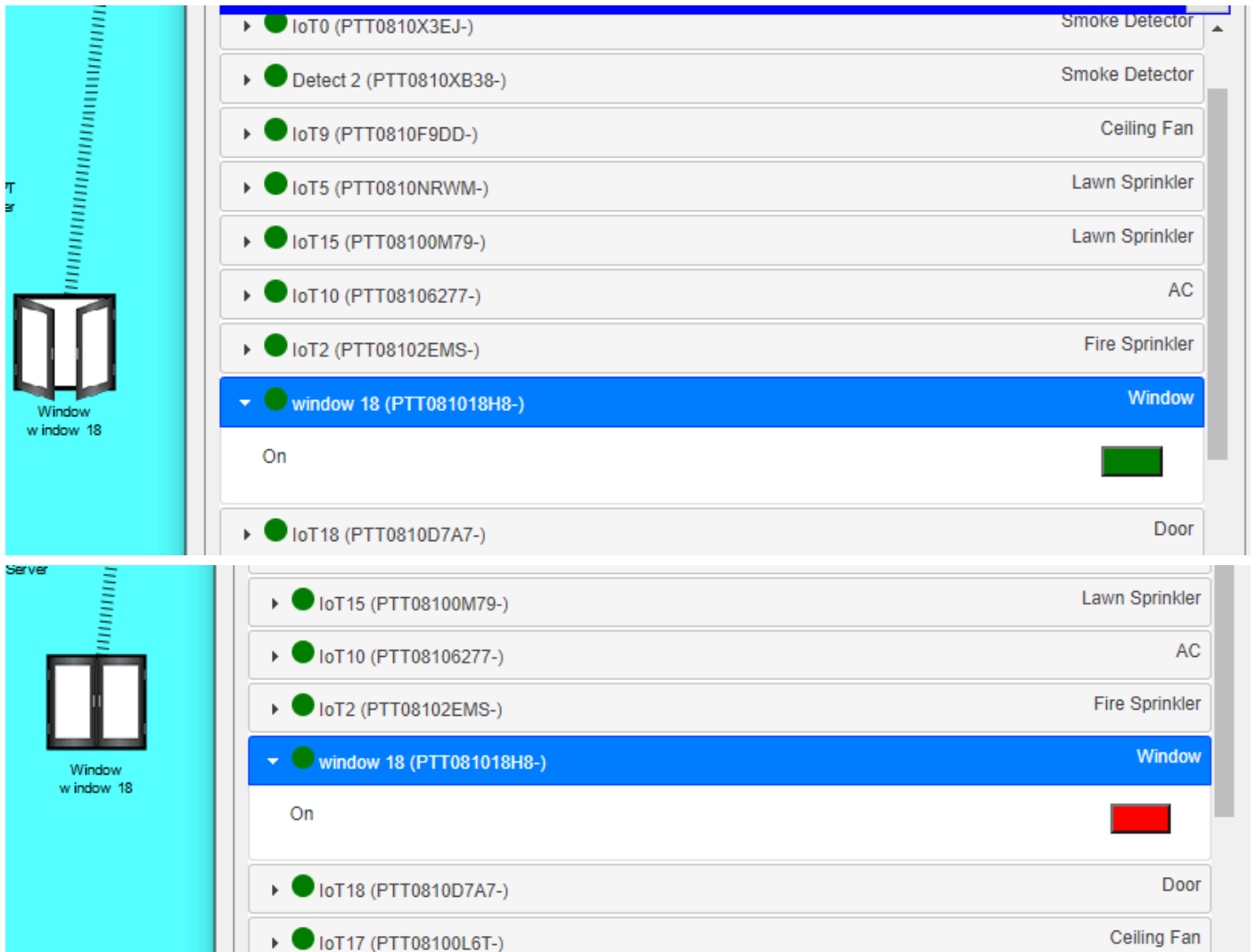
Home | Conditions | Editor | Log Out

▶ IoT14 (PTT0810M394-)	Siren
▶ IoT0 (PTT0810X3EJ-)	Smoke Detector
▶ Detect 2 (PTT0810XB38-)	Smoke Detector
▶ IoT9 (PTT0810F9DD-)	Ceiling Fan
▶ IoT5 (PTT0810NRWM-)	Lawn Sprinkler
▶ IoT15 (PTT08100M79-)	Lawn Sprinkler
▶ IoT10 (PTT08106277-)	AC
▶ IoT2 (PTT08102EMS-)	Fire Sprinkler
▶ window 18 (PTT081018H8-)	Window
▶ IoT18 (PTT0810D7A7-)	Door
▶ IoT17 (PTT08100L6T-)	Ceiling Fan
▶ IoT16 (PTT08106VM0-)	Ceiling Fan
▶ IoT19 (PTT0810LG12-)	Ceiling Fan
▶ IoT7 (PTT0810CI04-)	Bluetooth Speaker
▶ IoT8 (PTT0810WS29-)	Humidifier

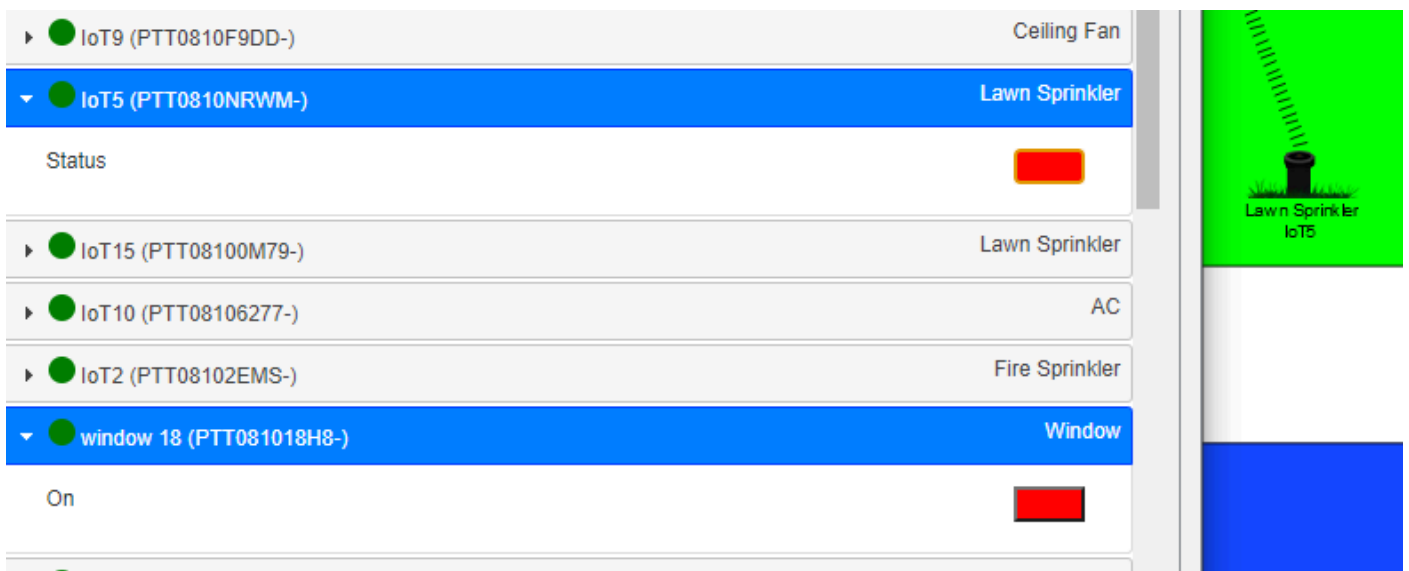
Door IoT18

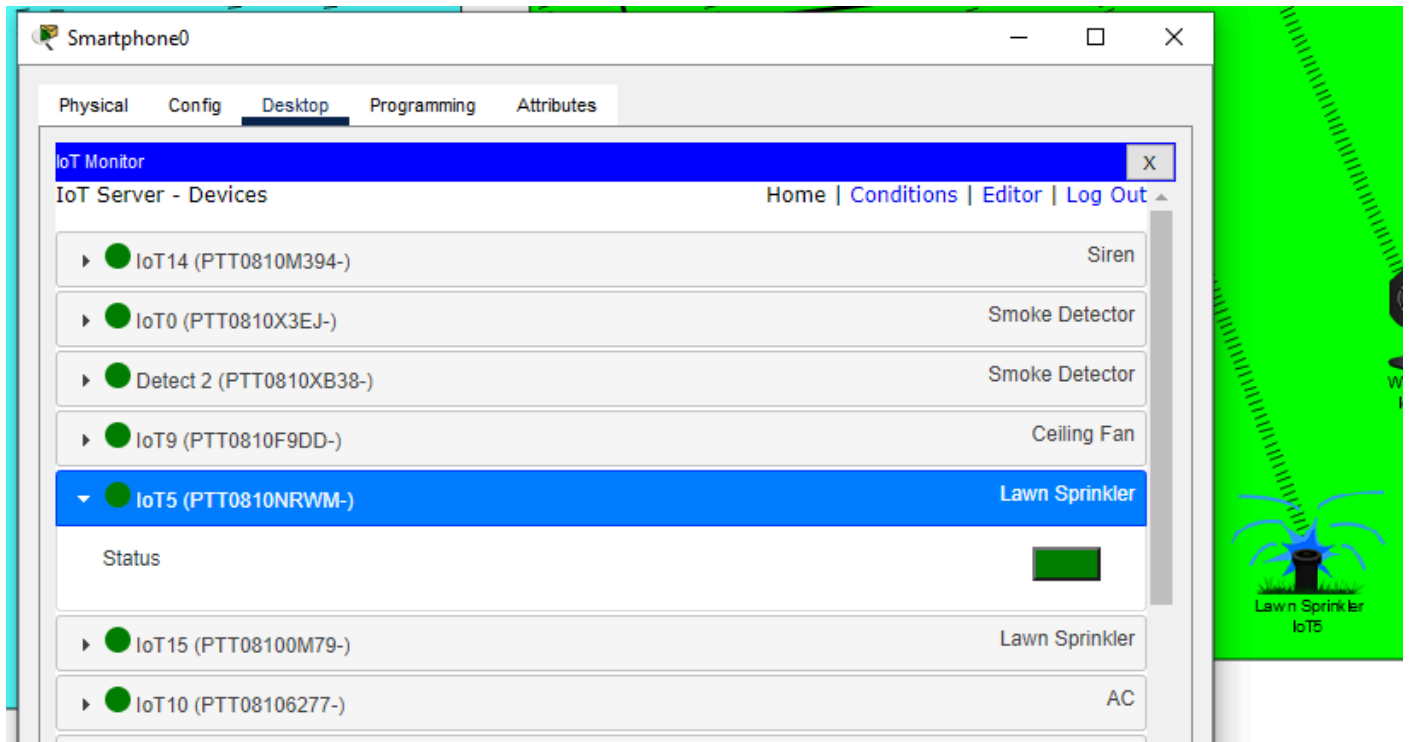
Webcam IoT21

▶ IoT17 (PTT08100L6T-) Ceiling Fan
 ▶ IoT16 (PTT08106VM0-) Ceiling Fan
 ▶ IoT19 (PTT0810LG12-) Ceiling Fan
 ▶ IoT7 (PTT0810CI04-) Bluetooth Speaker
 ▶ IoT8 (PTT0810WS29-) Humidifier
 ▶ IoT21 (PTT08101P0F-) Webcam
 ▼ IoT23 (PTT0810Q64K-) Webcam
 On
 Image
 ▶ IoT25 (PTT0810UM4C-) Webcam

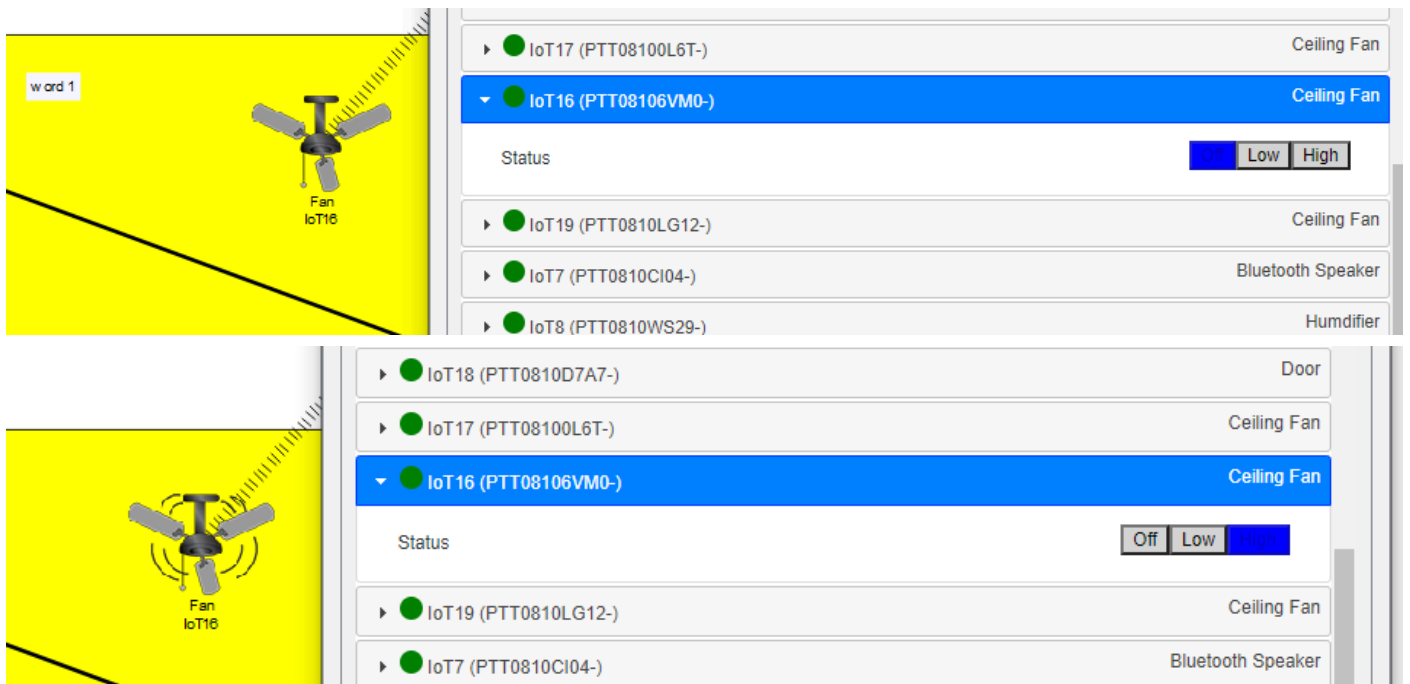


Lawn Sprinkler








Fan




Humidifier





Status	
▶ IoT19 (PTT0810LG12-)	Ceiling Fan
▶ IoT7 (PTT0810CI04-)	Bluetooth Speaker
▼ IoT8 (PTT0810WS29-)	Humidifier
Status	
	
▶ IoT21 (PTT08101P0F-)	Webcam





▶ IoT19 (PTT0810LG12-)	Ceiling Fan
▶ IoT7 (PTT0810CI04-)	Bluetooth Speaker
▼ IoT8 (PTT0810WS29-)	Humidifier
Status	
	
▶ IoT21 (PTT08101P0F-)	Webcam

AC

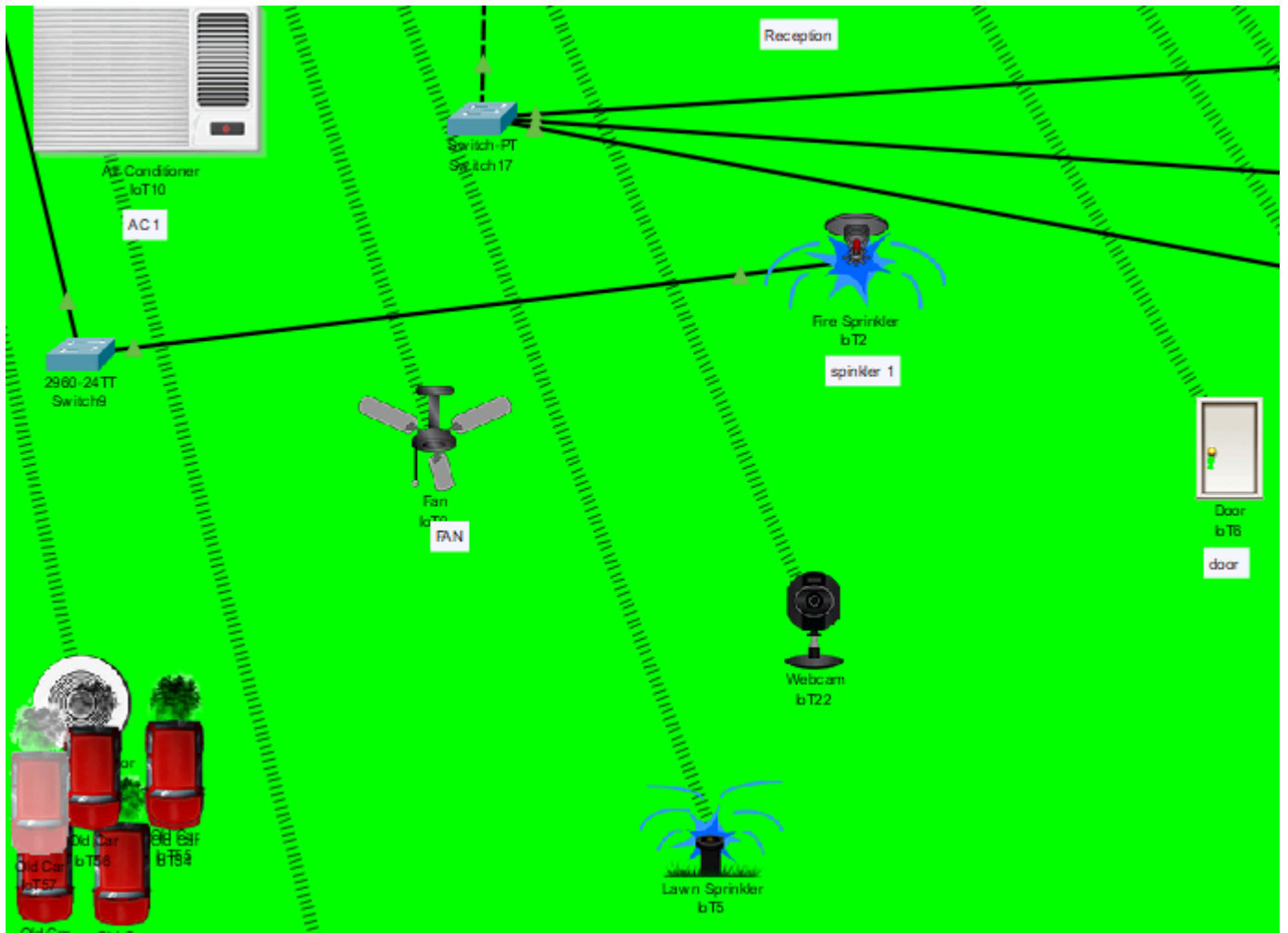
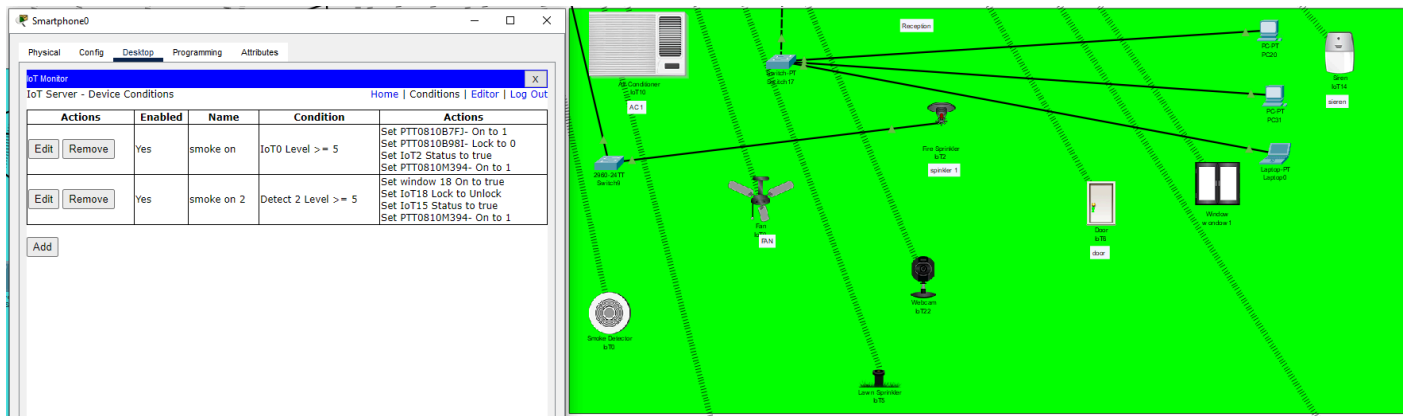


▶ IoT5 (PTT0810NRWM-)	Lawn Sprinkler
▶ IoT15 (PTT08100M79-)	Lawn Sprinkler
▼ IoT10 (PTT08106277-)	AC
On	
	
▶ IoT2 (PTT08102EMS-)	Fire Sprinkler
▶ window 18 (PTT081018H8-)	Window



▶ IoT5 (PTT0810NRWM-)	Lawn Sprinkler
▶ IoT15 (PTT08100M79-)	Lawn Sprinkler
▼ IoT10 (PTT08106277-)	AC
On	
	
▶ IoT2 (PTT08102EMS-)	Fire Sprinkler

Smoke Detector



Server configuration

SMTP server:

email server

Physical Config Services **Desktop** Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IPv4 Address

Subnet Mask

Default Gateway

DNS Server

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

email server

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

siam
rafi
abm
hospital
Kamruzzaman

DNS Server

DNS Server

Physical Config **Services** Desktop Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.6.3

Subnet Mask 255.255.255.0

Default Gateway 192.168.6.20

DNS Server 192.168.6.3

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::290:21FF:FE83:E349

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

DNS Server

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 Address Type A Record

Add Save Remove

No.	Name	Type	Detail
0	www.hospitalnetwoek.com	A Record	192.168.6.3
1	www.hospital_network.com	A Record	192.168.6.3
2	www.siam.com	A Record	192.168.6.3

FTP

FTP Server

Physical Config **Services** Desktop Programming Attributes

IP Configuration

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.6.5

Subnet Mask 255.255.255.0

Default Gateway 192.168.6.20

DNS Server 192.168.6.3

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address /

Link Local Address FE80::201:63FF:FED1:B205

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication MD5

FTP Server

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	abm	12345	RWDNL	Add
2	hospital	12345	RWDNL	
3	rafi	12345	RWDNL	Save
4	siam	12345	RWDNL	
5	Kamruzzaman	12345	RWDNL	Remove

Physical Config **Desktop** Programming Attributes

Compose Mail X

Send To:

Subject:

hiii bro, whats up.....

Physical Config **Desktop** Programming Attributes

MAIL BROWSER X

Mails

Compose Reply Receive Delete Configure Mail

	From	Subject	Received
1	hospital@gmail.com		Mon Dec 23 2024 12:39:56
2	siam@gmail.com	RE: Request for Study Leave	Thu Dec 19 2024 10:23:41

< >

RE: Request for Study Leave
siam@gmail.com
Sent : Thu Dec 19 2024 10:23:41

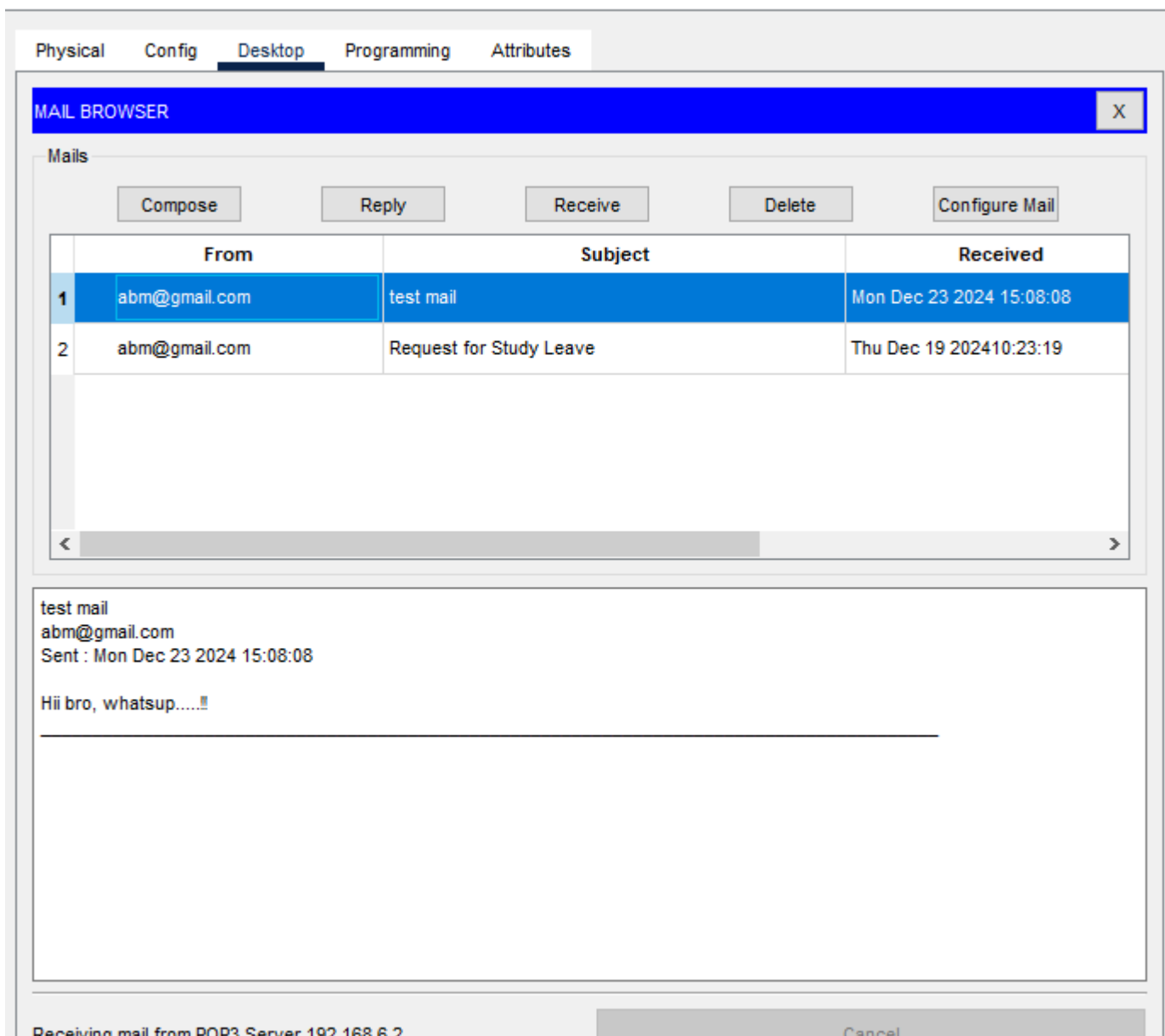
ok

Subject : Request for Study Leave
From : abm@gmail.com
Sent : Thu Dec 19 2024 10:23:19

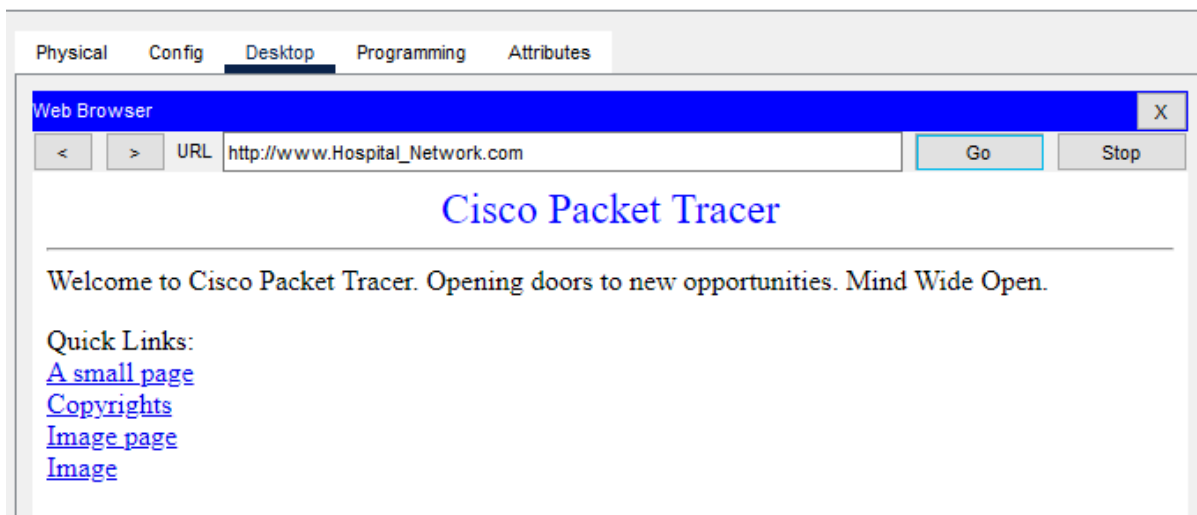
Dear [Recipient's Name],
I hope this email finds you well. I am writing to formally request study leave from [start date] to [end date]. During this time, I plan to

Sending mail to siam@gmail.com , with subject : test mail .. Mail
Server: 192.168.6.2
Send Success.

Cancel
Send/Receive

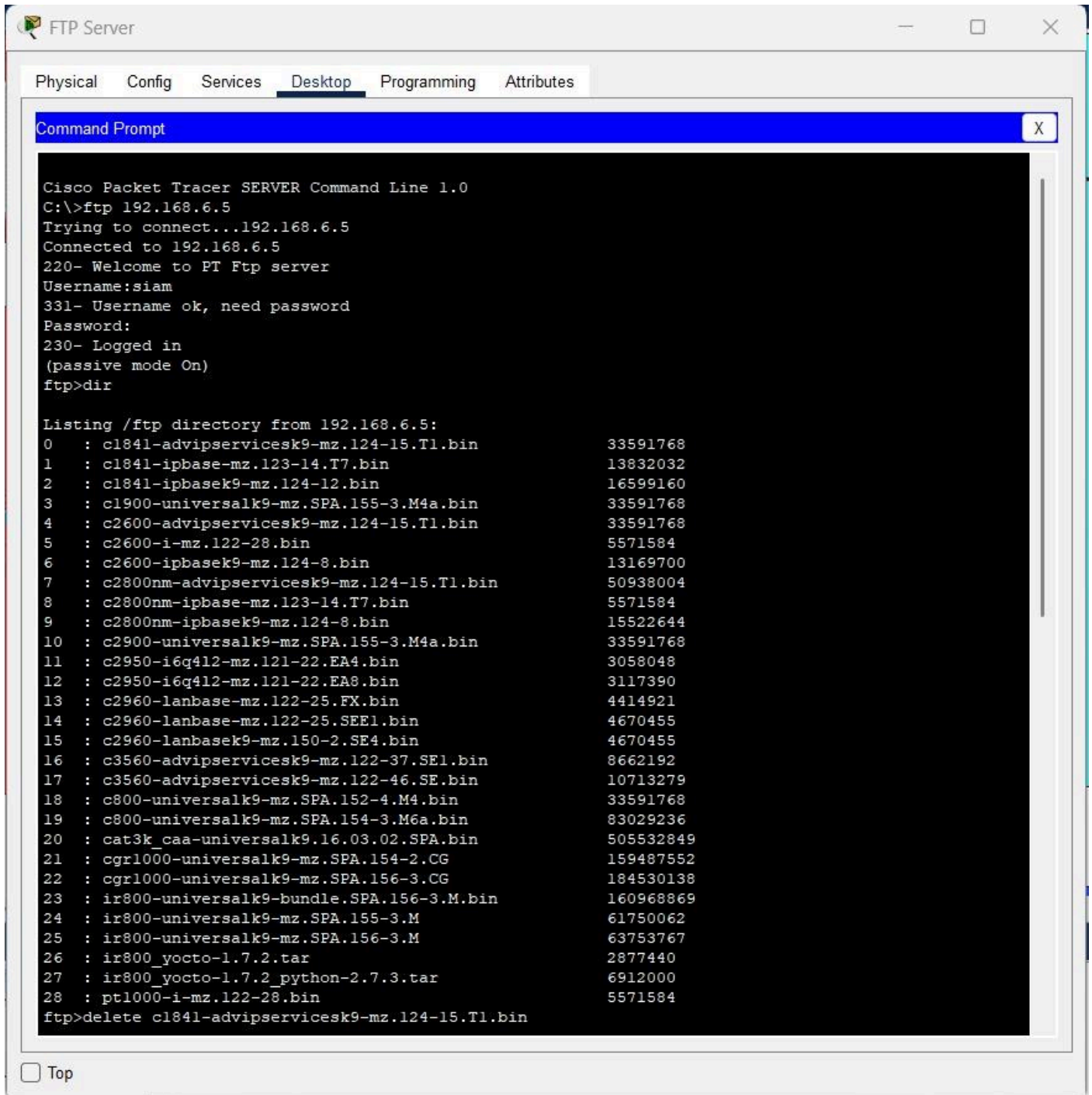


DNS



FTP

list-



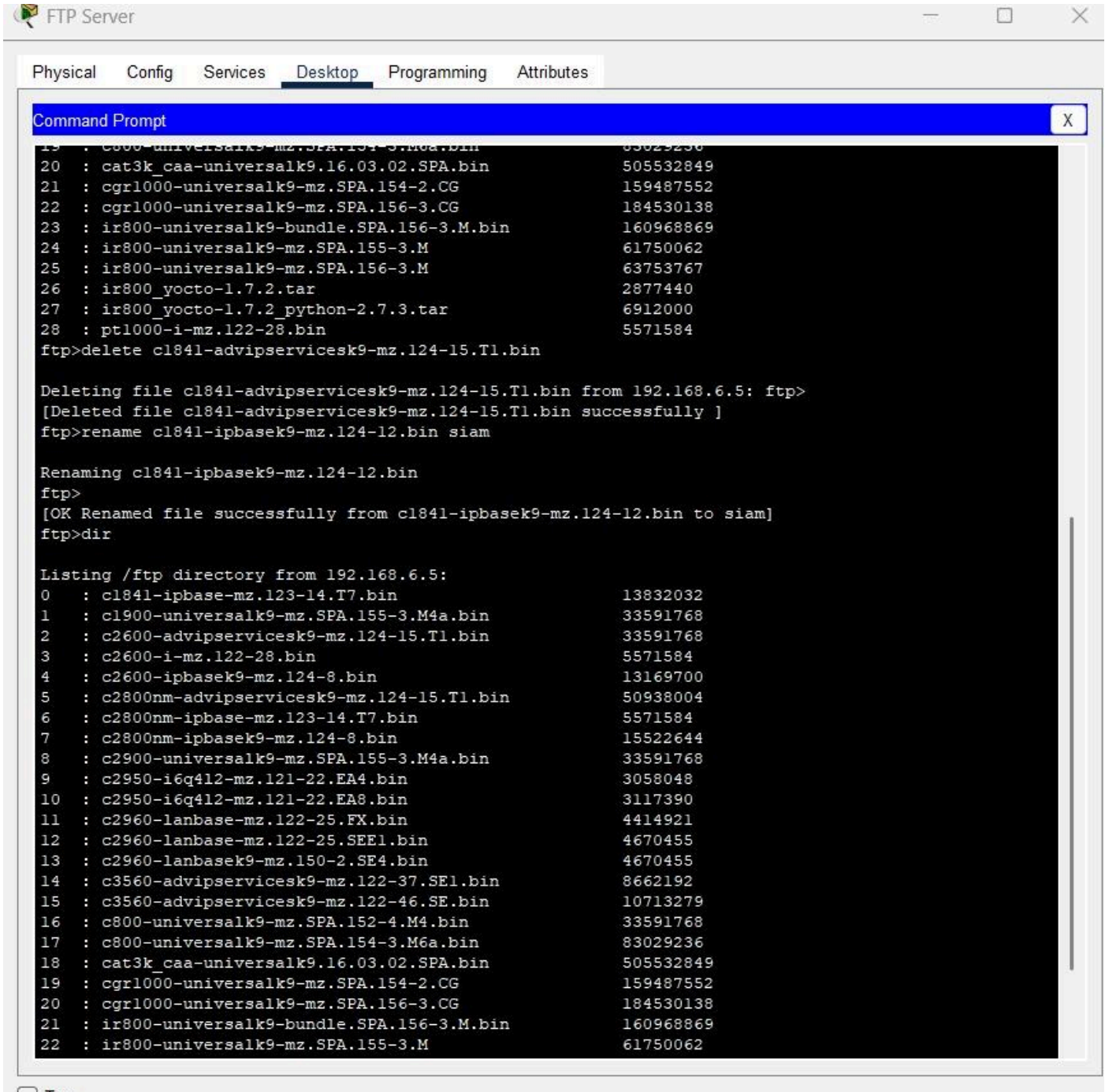
The screenshot shows a window titled "FTP Server" with tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The "Desktop" tab is active, displaying a "Command Prompt" window. The Command Prompt shows the following text:

```
Cisco Packet Tracer SERVER Command Line 1.0
C:\>ftp 192.168.6.5
Trying to connect...192.168.6.5
Connected to 192.168.6.5
220- Welcome to PT Ftp server
Username:siam
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>dir

Listing /ftp directory from 192.168.6.5:
0  : c1841-advipservicesk9-mz.124-15.T1.bin          33591768
1  : c1841-ipbase-mz.123-14.T7.bin                  13832032
2  : c1841-ipbasek9-mz.124-12.bin                    16599160
3  : c1900-universalk9-mz.SPA.155-3.M4a.bin          33591768
4  : c2600-advipservicesk9-mz.124-15.T1.bin          33591768
5  : c2600-i-mz.122-28.bin                           5571584
6  : c2600-ipbasek9-mz.124-8.bin                     13169700
7  : c2800nm-advipservicesk9-mz.124-15.T1.bin        50938004
8  : c2800nm-ipbase-mz.123-14.T7.bin                 5571584
9  : c2800nm-ipbasek9-mz.124-8.bin                   15522644
10 : c2900-universalk9-mz.SPA.155-3.M4a.bin          33591768
11 : c2950-i6q412-mz.121-22.EA4.bin                 3058048
12 : c2950-i6q412-mz.121-22.EA8.bin                 3117390
13 : c2960-lanbase-mz.122-25.FX.bin                  4414921
14 : c2960-lanbase-mz.122-25.SEE1.bin                4670455
15 : c2960-lanbasek9-mz.150-2.SE4.bin                4670455
16 : c3560-advipservicesk9-mz.122-37.SEE1.bin        8662192
17 : c3560-advipservicesk9-mz.122-46.SEE1.bin        10713279
18 : c800-universalk9-mz.SPA.152-4.M4a.bin           33591768
19 : c800-universalk9-mz.SPA.154-3.M6a.bin           83029236
20 : cat3k_caa-universalk9.16.03.02.SPA.bin           505532849
21 : cgr1000-universalk9-mz.SPA.154-2.CG             159487552
22 : cgr1000-universalk9-mz.SPA.156-3.CG             184530138
23 : ir800-universalk9-bundle.SPA.156-3.M.bin        160968869
24 : ir800-universalk9-mz.SPA.155-3.M                61750062
25 : ir800-universalk9-mz.SPA.156-3.M                63753767
26 : ir800_yocto-1.7.2.tar                          2877440
27 : ir800_yocto-1.7.2_python-2.7.3.tar             6912000
28 : pt1000-i-mz.122-28.bin                          5571584
ftp>delete c1841-advipservicesk9-mz.124-15.T1.bin
```

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

Delete-



The screenshot shows an FTP Server application window with a 'Desktop' tab selected. A Command Prompt window is open, displaying the following commands and their outputs:

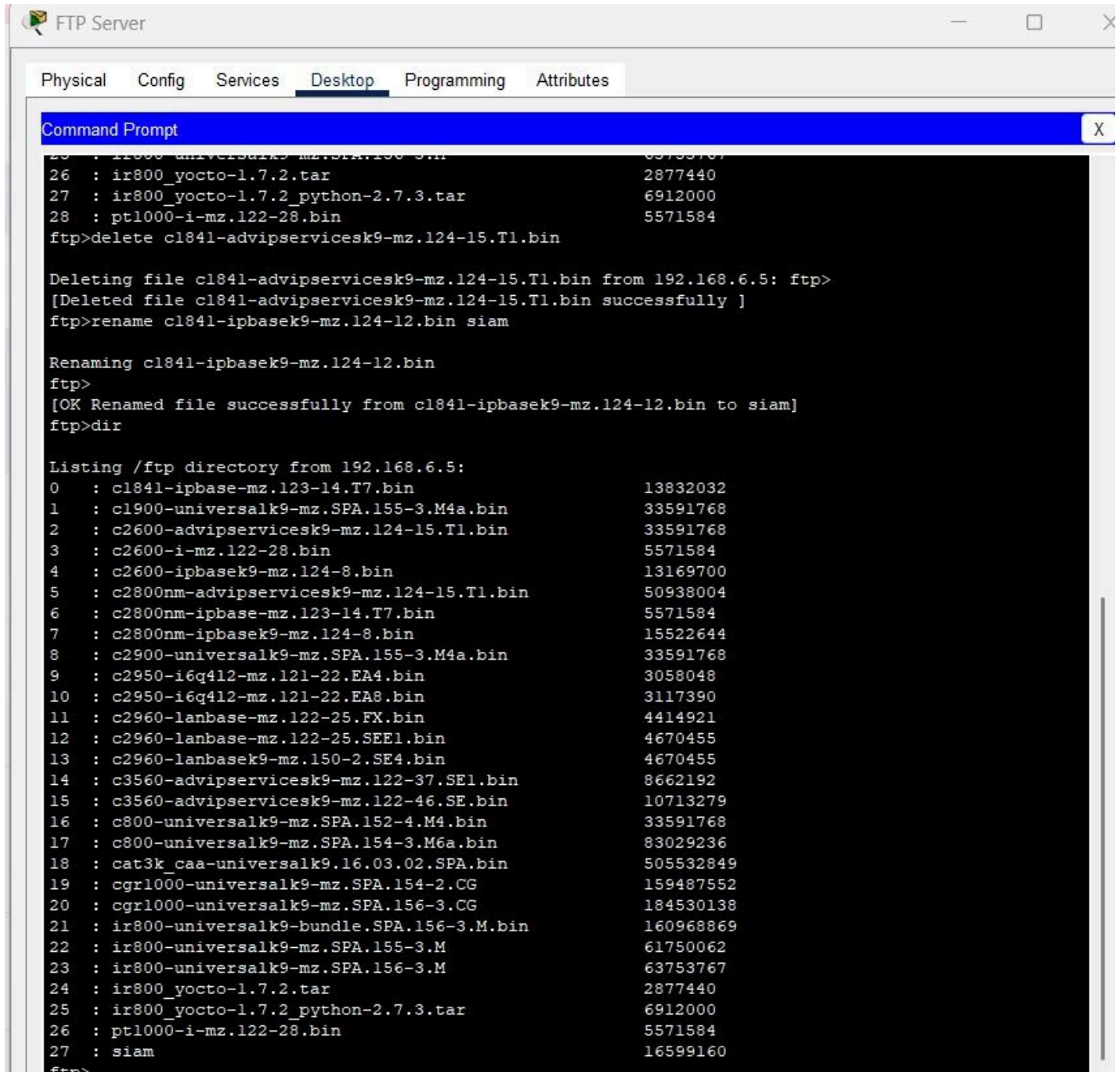
```
19 : c800-universalk9-mz.SPA.154-3.M6a.bin 83029236
20 : cat3k_caa-universalk9.16.03.02.SPA.bin 505532849
21 : cgr1000-universalk9-mz.SPA.154-2.CG 159487552
22 : cgr1000-universalk9-mz.SPA.156-3.CG 184530138
23 : ir800-universalk9-bundle.SPA.156-3.M.bin 160968869
24 : ir800-universalk9-mz.SPA.155-3.M 61750062
25 : ir800-universalk9-mz.SPA.156-3.M 63753767
26 : ir800_yocto-1.7.2.tar 2877440
27 : ir800_yocto-1.7.2_python-2.7.3.tar 6912000
28 : pt1000-i-mz.122-28.bin 5571584
ftp>delete cl841-advipservicesk9-mz.124-15.T1.bin

Deleting file cl841-advipservicesk9-mz.124-15.T1.bin from 192.168.6.5: ftp>
[Deleted file cl841-advipservicesk9-mz.124-15.T1.bin successfully ]
ftp>rename cl841-ipbasek9-mz.124-12.bin siam

Renaming cl841-ipbasek9-mz.124-12.bin
ftp>
[OK Renamed file successfully from cl841-ipbasek9-mz.124-12.bin to siam]
ftp>dir

Listing /ftp directory from 192.168.6.5:
0 : cl841-ipbase-mz.123-14.T7.bin 13832032
1 : cl900-universalk9-mz.SPA.155-3.M4a.bin 33591768
2 : c2600-advipservicesk9-mz.124-15.T1.bin 33591768
3 : c2600-i-mz.122-28.bin 5571584
4 : c2600-ipbasek9-mz.124-8.bin 13169700
5 : c2800nm-advipservicesk9-mz.124-15.T1.bin 50938004
6 : c2800nm-ipbase-mz.123-14.T7.bin 5571584
7 : c2800nm-ipbasek9-mz.124-8.bin 15522644
8 : c2900-universalk9-mz.SPA.155-3.M4a.bin 33591768
9 : c2950-i6q412-mz.121-22.EA4.bin 3058048
10 : c2950-i6q412-mz.121-22.EA8.bin 3117390
11 : c2960-lanbase-mz.122-25.FX.bin 4414921
12 : c2960-lanbase-mz.122-25.SEE1.bin 4670455
13 : c2960-lanbasek9-mz.150-2.SE4.bin 4670455
14 : c3560-advipservicesk9-mz.122-37.SE1.bin 8662192
15 : c3560-advipservicesk9-mz.122-46.SE.bin 10713279
16 : c800-universalk9-mz.SPA.152-4.M4.bin 33591768
17 : c800-universalk9-mz.SPA.154-3.M6a.bin 83029236
18 : cat3k_caa-universalk9.16.03.02.SPA.bin 505532849
19 : cgr1000-universalk9-mz.SPA.154-2.CG 159487552
20 : cgr1000-universalk9-mz.SPA.156-3.CG 184530138
21 : ir800-universalk9-bundle.SPA.156-3.M.bin 160968869
22 : ir800-universalk9-mz.SPA.155-3.M 61750062
```

Rename-



```
FTP Server
Physical Config Services Desktop Programming Attributes

Command Prompt
25 : c1900-universalk9-mz.SPA.155-3.M4a.bin 33591768
26 : ir800_yocto-1.7.2.tar 2877440
27 : ir800_yocto-1.7.2_python-2.7.3.tar 6912000
28 : pt1000-i-mz.122-28.bin 5571584
ftp>delete c1841-advipservicesk9-mz.124-15.T1.bin

Deleting file c1841-advipservicesk9-mz.124-15.T1.bin from 192.168.6.5: ftp>
[Deleted file c1841-advipservicesk9-mz.124-15.T1.bin successfully ]
ftp>rename c1841-ipbasek9-mz.124-12.bin siam

Renaming c1841-ipbasek9-mz.124-12.bin
ftp>
[OK Renamed file successfully from c1841-ipbasek9-mz.124-12.bin to siam]
ftp>dir

Listing /ftp directory from 192.168.6.5:
0 : c1841-ipbase-mz.123-14.T7.bin 13832032
1 : c1900-universalk9-mz.SPA.155-3.M4a.bin 33591768
2 : c2600-advipservicesk9-mz.124-15.T1.bin 33591768
3 : c2600-i-mz.122-28.bin 5571584
4 : c2600-ipbasek9-mz.124-8.bin 13169700
5 : c2800nm-advipservicesk9-mz.124-15.T1.bin 50938004
6 : c2800nm-ipbase-mz.123-14.T7.bin 5571584
7 : c2800nm-ipbasek9-mz.124-8.bin 15522644
8 : c2900-universalk9-mz.SPA.155-3.M4a.bin 33591768
9 : c2950-i6q412-mz.121-22.EA4.bin 3058048
10 : c2950-i6q412-mz.121-22.EA8.bin 3117390
11 : c2960-lanbase-mz.122-25.FX.bin 4414921
12 : c2960-lanbase-mz.122-25.SEE1.bin 4670455
13 : c2960-lanbasek9-mz.150-2.SE4.bin 4670455
14 : c3560-advipservicesk9-mz.122-37.SE1.bin 8662192
15 : c3560-advipservicesk9-mz.122-46.SE.bin 10713279
16 : c800-universalk9-mz.SPA.152-4.M4.bin 33591768
17 : c800-universalk9-mz.SPA.154-3.M6a.bin 83029236
18 : cat3k_caa-universalk9.16.03.02.SPA.bin 505532849
19 : cg1000-universalk9-mz.SPA.154-2.CG 159487552
20 : cg1000-universalk9-mz.SPA.156-3.CG 184530138
21 : ir800-universalk9-bundle.SPA.156-3.M.bin 160968869
22 : ir800-universalk9-mz.SPA.155-3.M 61750062
23 : ir800-universalk9-mz.SPA.156-3.M 63753767
24 : ir800_yocto-1.7.2.tar 2877440
25 : ir800_yocto-1.7.2_python-2.7.3.tar 6912000
26 : pt1000-i-mz.122-28.bin 5571584
27 : siam 16599160
ftp>
```

3.2 Results Overall Discussion

The network design for the hospital successfully integrates IoT and smart devices for efficient management. Each department has the necessary devices tailored to its functionality, while the Admin Room acts as the centralized control hub. The inclusion of smart features improves energy efficiency and security while simplifying operations.

Testing validated the network's stability, security, and user-friendliness. This design ensures streamlined workflows, better patient care, and a secure environment, making it a reliable solution for modern hospital management.

Chapter 4

Conclusion

4.1 Introduction

The hospital management system network integrates IoT and smart devices to create an efficient, automated, and secure environment. The design ensures centralized control from the Admin Management Room, enabling seamless monitoring and operation of devices across departments, improving workflows, and enhancing patient care.

4.2 Limitations

While the system is functional, certain limitations were noted. Dependency on a stable network connection for smooth operation, Potential security risks if devices are not adequately protected against cyberattacks and High initial setup cost for implementing IoT and smart devices.

4.3 Scope of Future Work

The network can be expanded and enhanced in the future by:

- Integrating AI for predictive maintenance and advanced automation.
- Adding more IoT-enabled medical equipment for real-time health monitoring.
- Implementing blockchain for secure patient data management and efficient record-sharing across departments.
- Utilizing advanced encryption methods to enhance network security.

By addressing the current limitations and leveraging future advancements, this network design can evolve into a cutting-edge solution for modern hospital management.