

**ASSUMPTION UNIVERSITY**  
**FACULTY OF ENGINEERING**  
**COMPUTER ENGINEERING**



**CE4224 TELECOMMUNICATION NETWORK LABORATORY  
SECTION 641  
SEMESTER 2/2022**

**PROJECT REPORT  
SMART FRAM USING IOT**

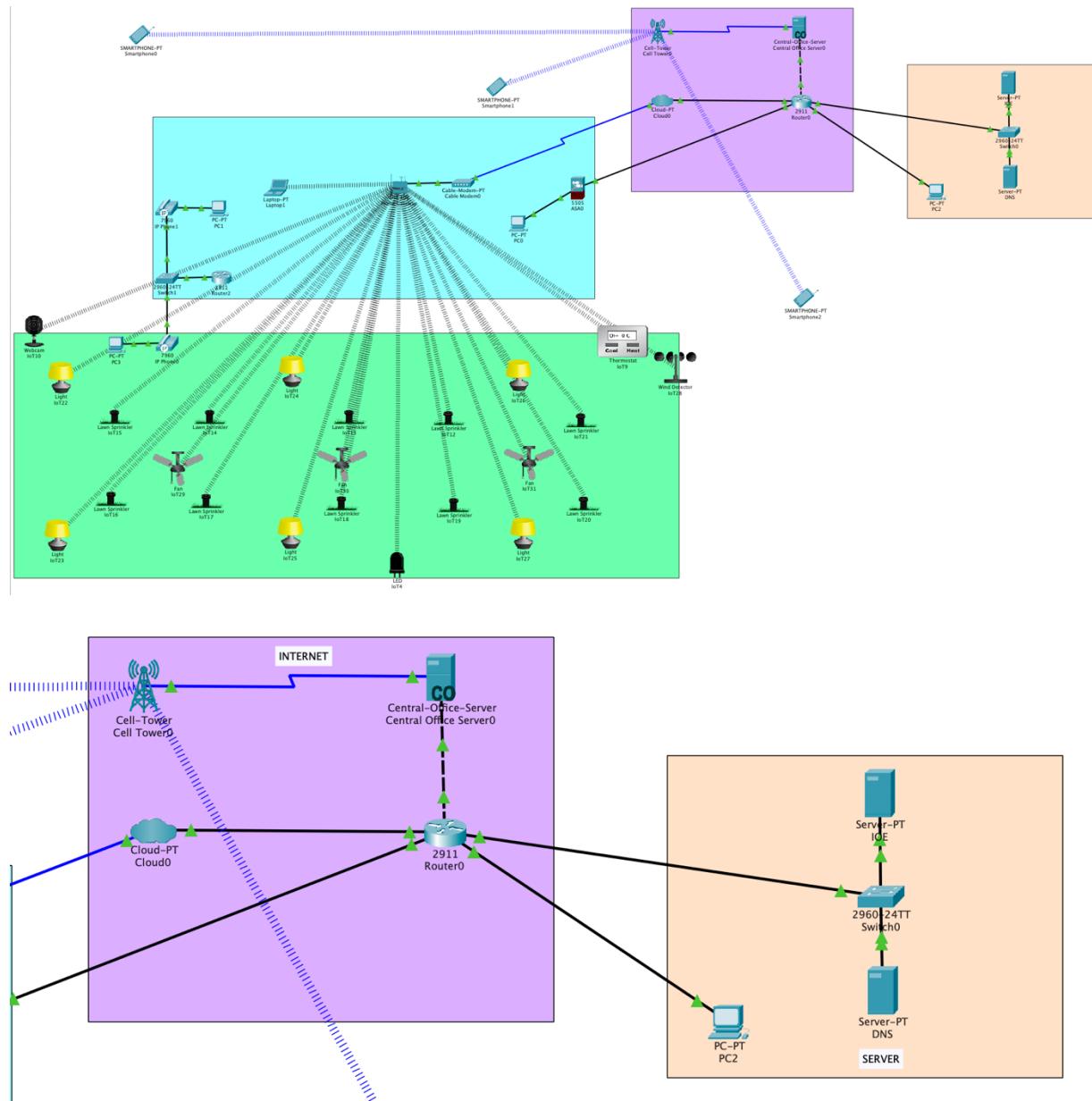
**SUBMITTED TO: A. Sneha Paudel  
SUBMITTED BY: Mr. Senee Suksawat ID: 6235107**

**DATE: 2023/02/28**

## Introduction

Smart frames are a convenient and customizable way to display digital photos without the need to print or change physical frames. With features such as different layouts, filters, and effects, as well as the ability to schedule photo displays, you can personalize the way your photos are shown. With Wi-Fi connectivity, smart frames can be remotely controlled from your phone or computer, allowing you to easily share photos with friends and family or display photos from social media. Additionally, smart frames are energy-efficient, which can save you money on your electricity bill over time.

## Topology



## Procedure

Device	Interface	IP Address	Subnet Mask	Default Gateway
Router	Giga0/0	10.0.0.1	255.255.255.0	
	Giga0/1	209.165.200.225	255.255.255.224	
	Giga0/2	209.165.201.225	255.255.255.224	
Router 2	Fa0/0	10.1.1.1	255.255.255.0	10.1.1.0
DNS Server		10.0.0.254	255.255.255.0	10.0.0.1
IOE Server		10.0.0.253	255.255.255.0	10.0.0.1
Laptop	Wireless0	DHCP		192.168.25.1
Smartphone	Wireless0	DHCP		172.16.1.1
IP Phone 1 (444)	Vlan1	10.1.1.12	255.255.255.0	10.1.1.1
IP Phone 2 (333)	Vlan2	10.1.1.13	255.255.255.0	10.1.1.1
PC 1	Fa0/0	DHCP		10.1.1.1
PC 3	Fa0/0	DHCP		10.1.1.1

## Configure the Router

```
Would you like to enter the initial configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip address 10.0.0.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#int g0/2
Router(config-if)#ip address 209.165.201.255 255.255.255.224
Bad mask /27 for address 209.165.201.255
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up

Router(config-if)#int g0/1
Router(config-if)#ip address 209.165.200.255 255.255.255.224
Bad mask /27 for address 209.165.200.255
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Router(config-if)#exit
Router(config)#ip dhcp excluded-address 209.165.201.225 209.165.201.229
Router(config)#ip dhcp dns-server 10.0.0.254
Router(config)#interface GEL1
Router(dhcp-config)#network 209.165.201.224 255.255.255.224
Router(dhcp-config)#default-router 209.165.201.225
Router(dhcp-config)#dns-server 10.0.0.254
Router(dhcp-config)#exit
Router(config)#ip dhcp pool WAN
Router(dhcp-config)#exit
Router(config)#ip dhcp excluded-address 209.165.200.225 209.165.200.229
Router(config)#ip dhcp pool WAN
Router(dhcp-config)#network 209.165.200.224 255.255.255.224
Router(dhcp-config)#default-router 209.165.200.225
Router(dhcp-config)#dns-server 10.0.0.254
Router(dhcp-config)#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)oint g0/2
Router(config-if)#ip address 209.165.201.255 255.255.255.224
Bad mask /27 for address 209.165.201.255
Router(config-if)#ip address 209.165.201.225 255.255.255.224
Router(config-if)#no shutdown
Routeip address 209.165.201.255 ip address 209.165.201.225 255.255.255.224ip address 209.165.200.225 255.255.255.224
Router(config-if)#no shutdown
Router(config-if)#ex
Router(config)ndo w
Building configuration...
[OK]
Router(config)#
Router con0 is now available
```

## Configure the DNS Server and IOE Server

### DNS Server:

**GLOBAL**

Display Name: DNS

Gateway/DNS IPv4:

- DHCP
- Static

Default Gateway: 10.0.0.1

DNS Server: 10.0.0.254

Gateway/DNS IPv6:

- Automatic
- Static

Default Gateway:

DNS Server:

**SERVICES**

DNS Service:  On  Off

Resource Records

Name	Type	Address
www.riot.com	A Record	10.0.0.253

DNS Cache

### IOE Server:

**SERVICES**

DNS Service:  On  Off

Resource Records

Name	Type	Address
www.riot.com	A Record	10.0.0.253

DNS Cache

**SERVICES**

Registration Server

Service:  On  Off

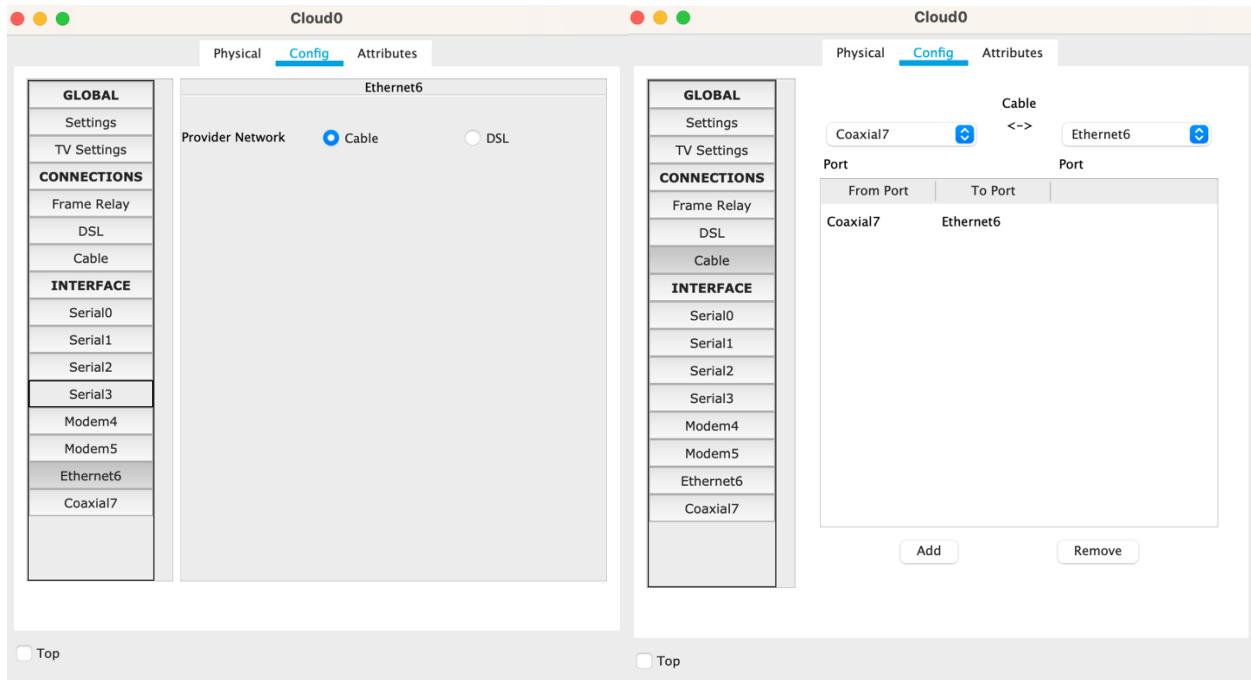
Username	Password
Senee	zxc

Delete

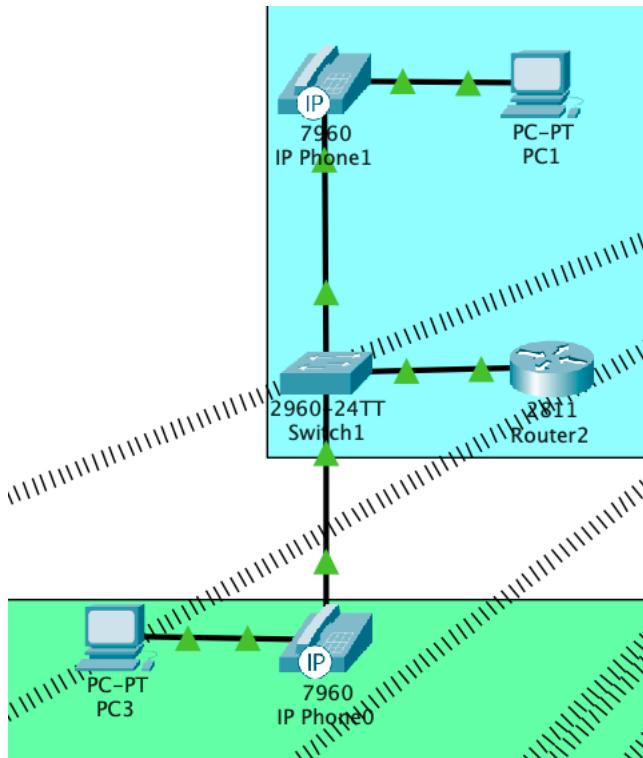
## Configure WAN

Change the interface Ethernet that connect with the router to cable:

Then, connect the cable with the Ethernet:



## Configure IP Phone



## Configure IP Phone in Router 2

```
Router(config)#interface fa0/0
Router(config-if)#ip address 10.1.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#ip dhcp pool senee
Router(dhcp-config)#network 10.1.1.0 255.255.255.0
Router(dhcp-config)#default-router 10.1.1.1
Router(dhcp-config)#option 150 ip 10.1.1.1
Router(dhcp-config)#exit
Router(config)#ip dhcp excluded-address 10.1.1.2 10.1.1.10
Router(config)#telephony-service
Router(config-telephony)#max-ephone 2
Router(config-telephony)#max-dn 2
Router(config-telephony)#ip source-address 10.1.1.1 port 2000
Router(config-telephony)#ephone-dn 1
Router(config-ephone-dn)#number 333
Router(config-ephone-dn)#exit
Router(config)#ephone-dn 2
Router(config-ephone-dn)#number 444
Router(config-ephone-dn)#exit
Router(config)#%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 10.1.1.1.

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#tele%DHCPD-4-PING_CONFLICT: DHCP address conflict: server pinged 10.1.1.15.

Router(config-telephony)#max-ephone 2
Router(config-telephony)#max-dn 2
Router(config-telephony)#ip source-address 10.1.1.1 port 2000
Router(config-telephony)#auto assign 1 to 3
Router(config-telephony)#exit
Router(config)#ephone
%IPPHONE-6-REGISTER: ephone-2 IP:10.1.1.15 Socket:2 DeviceType:Phone has registered.

%IPPHONE-6-REGISTER: ephone-1 IP:10.1.1.11 Socket:2 DeviceType:Phone has registered
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

## Configure Switch

```
Switch>en
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#interface range fa0/1-3
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport voice vlan 1
Switch(config-if-range)#exit
Switch(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up

Switch(config)#interface range fa0/1-5
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport voice vlan1
^
% Invalid input detected at '^' marker.

Switch(config-if-range)#switchport voice vlan 1
Switch(config-if-range)#exit
Switch(config)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to down

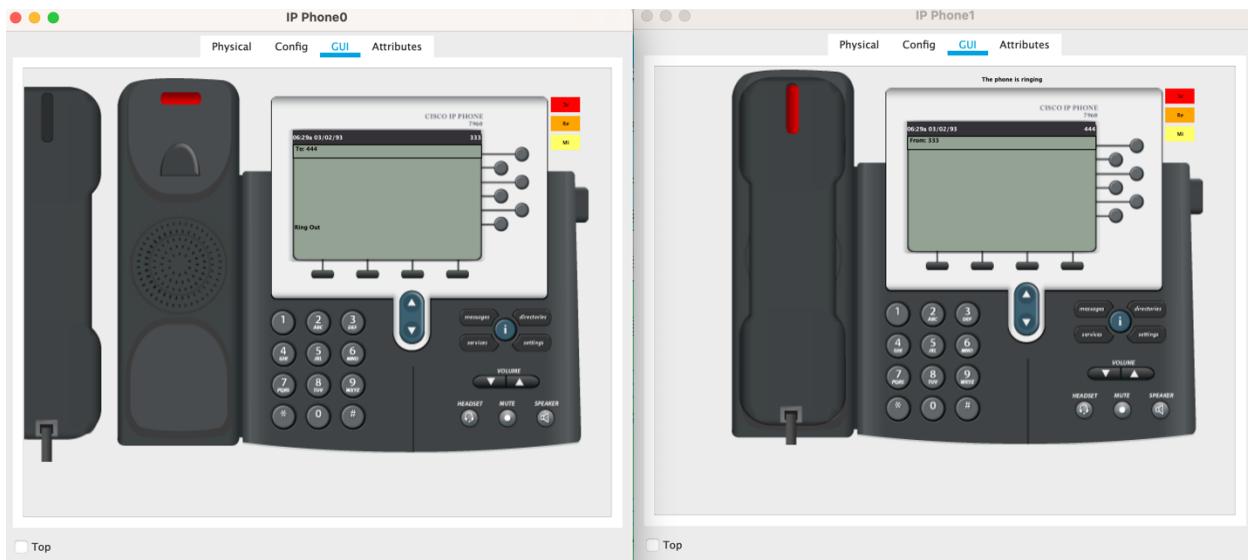
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to down

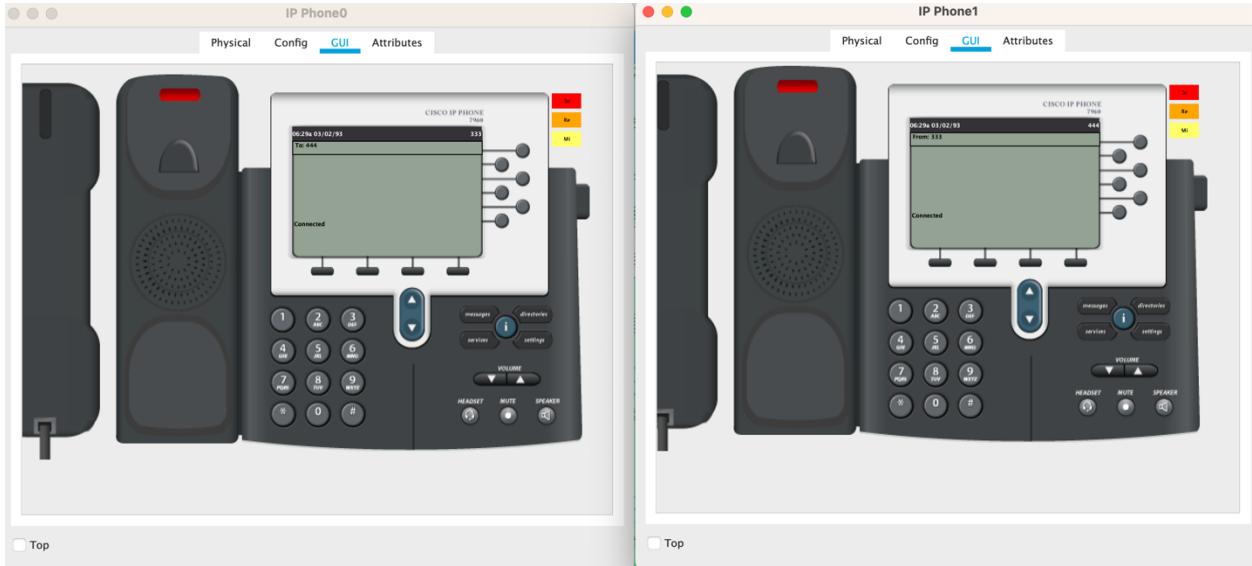
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
```

Test the IP Phone by calling one to another:

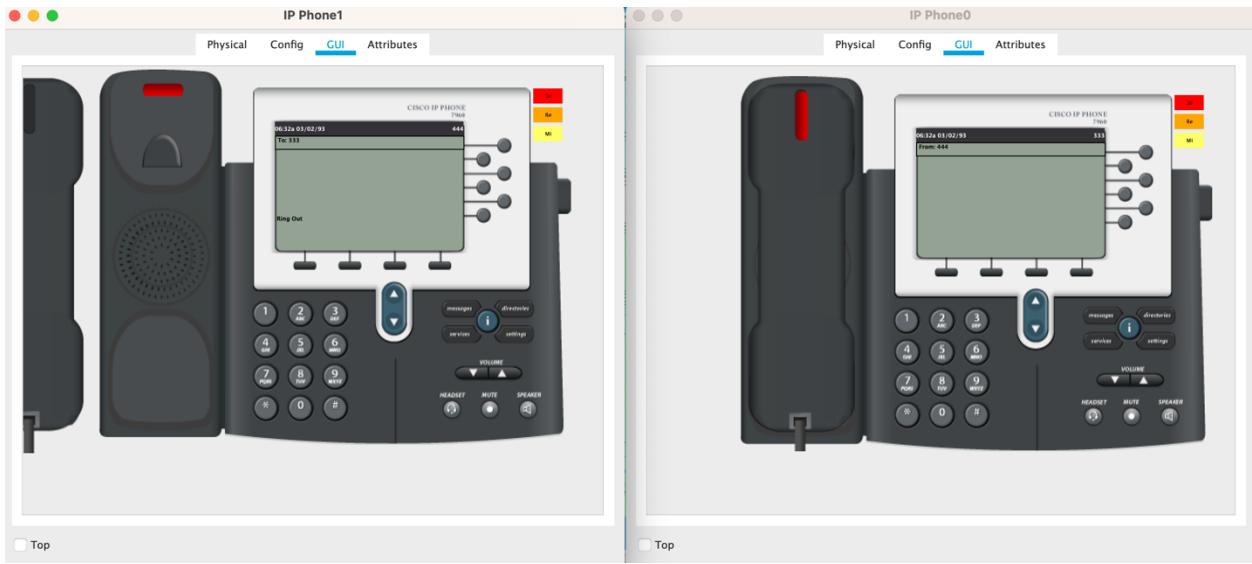
Number 333 called Number 444:



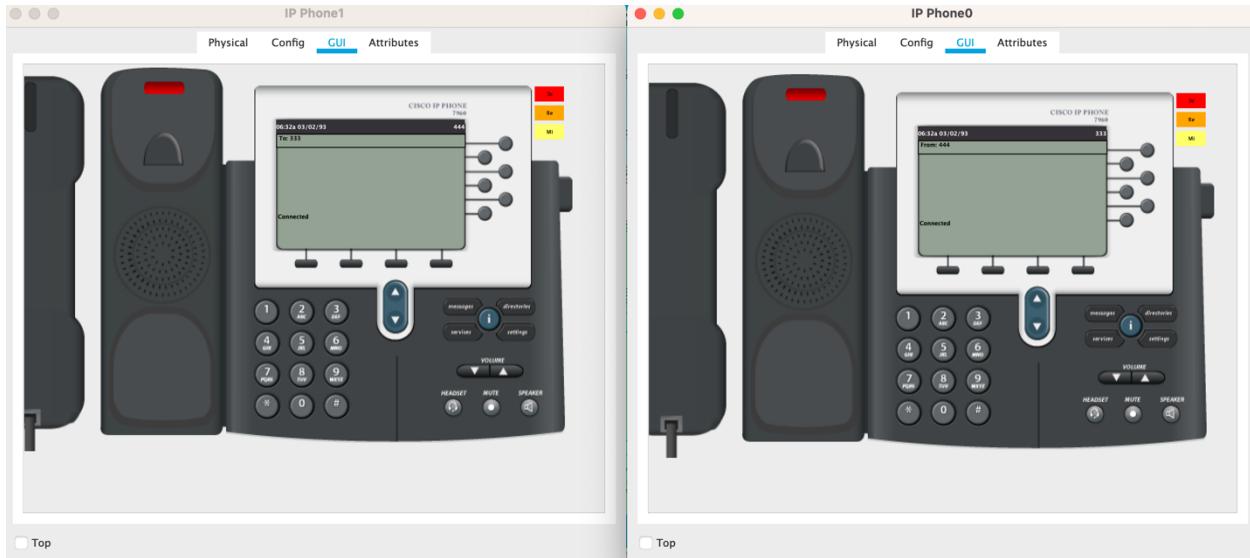
Number 444 pick the phone up and it show connected that's mean the connection is work



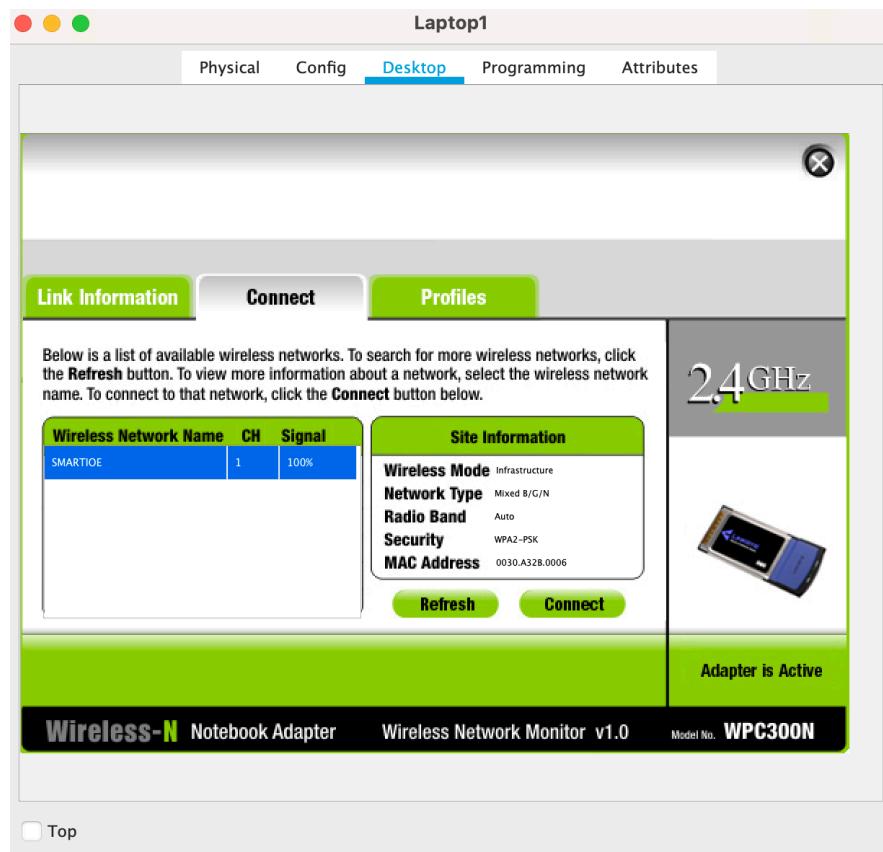
Number 444 called Number 333:



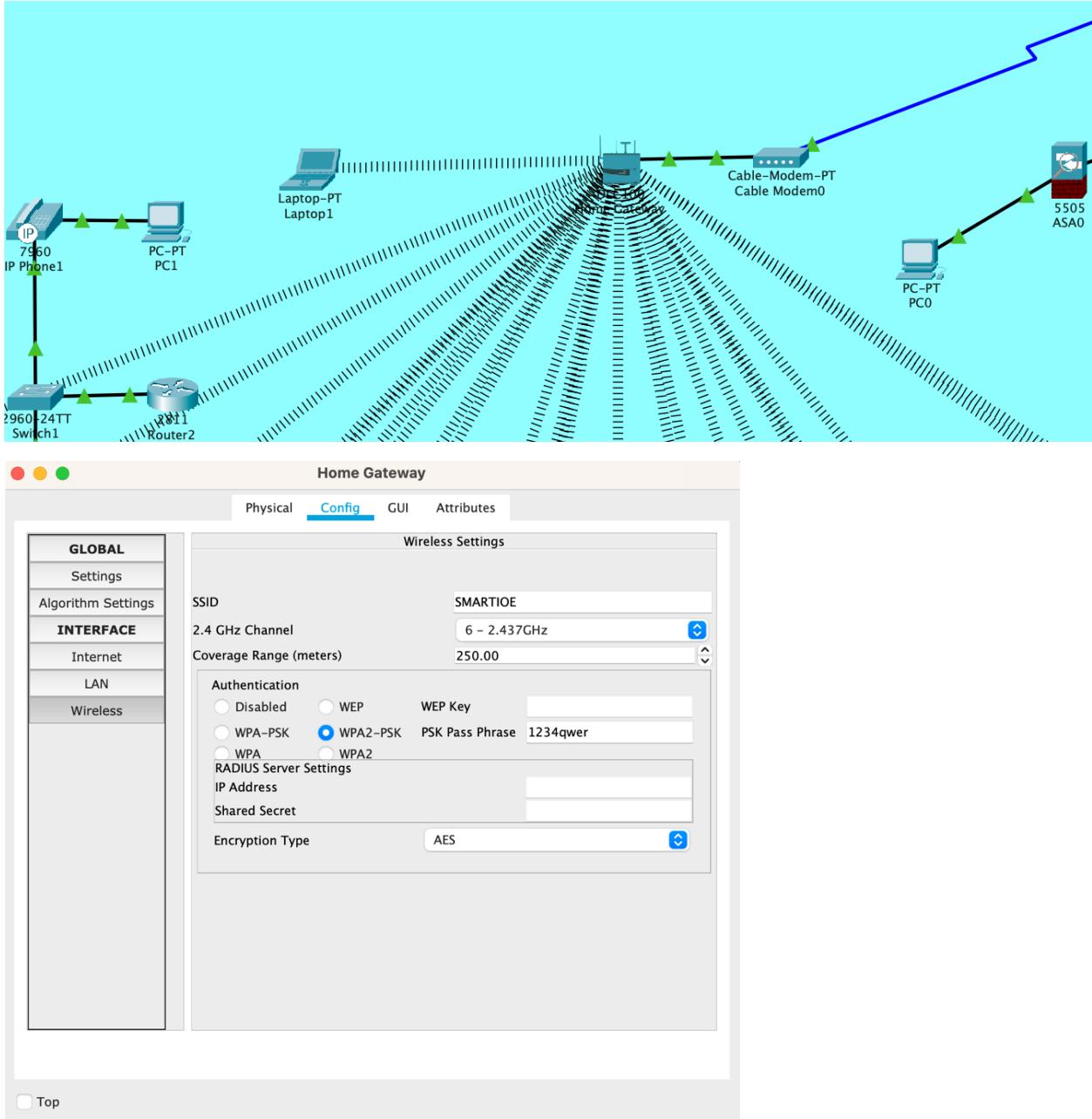
The result shows connected



Connect Wireless Network to our Laptop



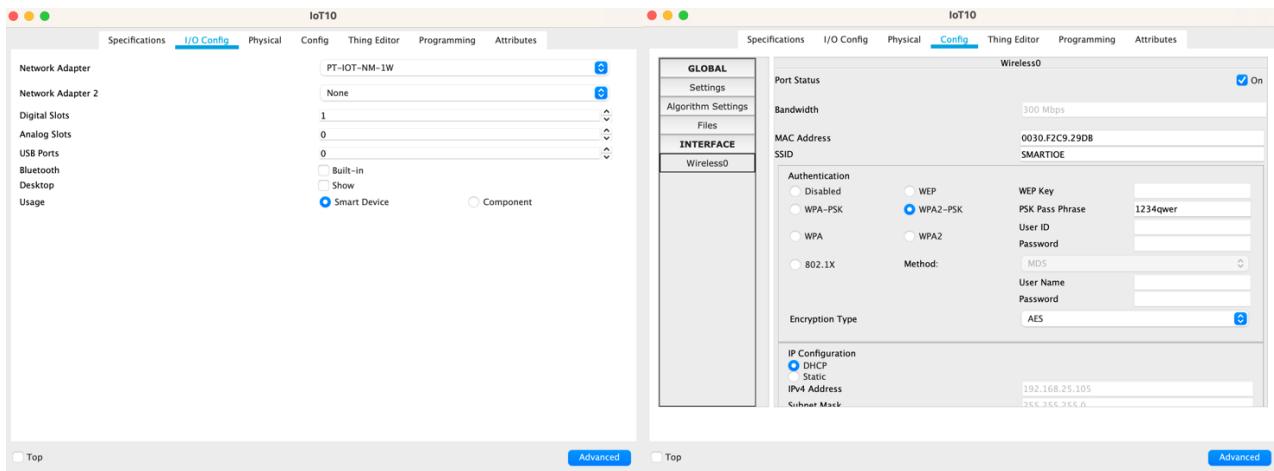
## Configure the SSID and Password in Home Gateway



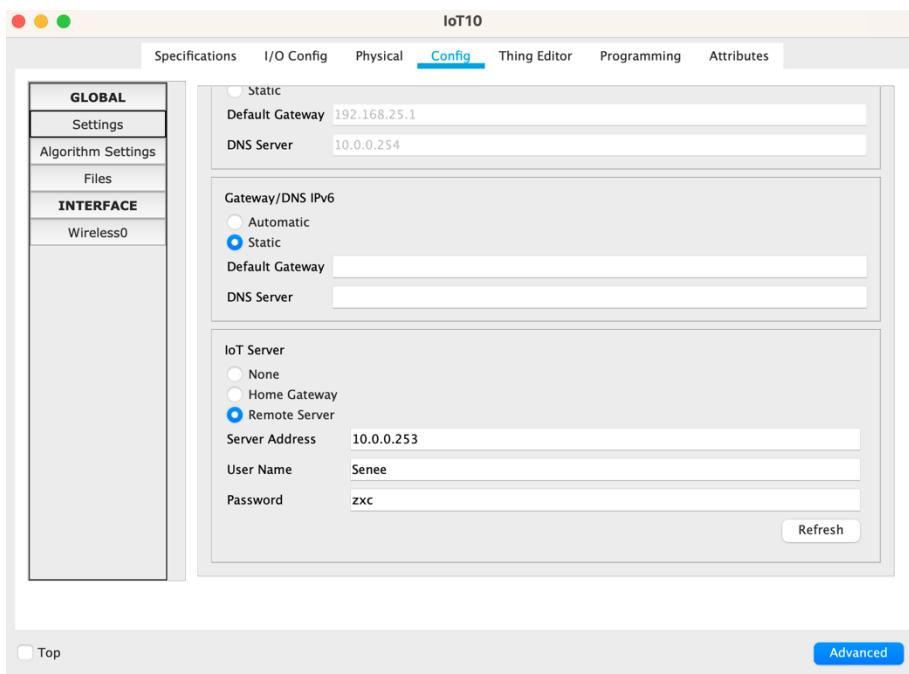
## Configure the IoT Device

First, change the network adapter to PT-IOT-NM-1W and thick Smart Device:

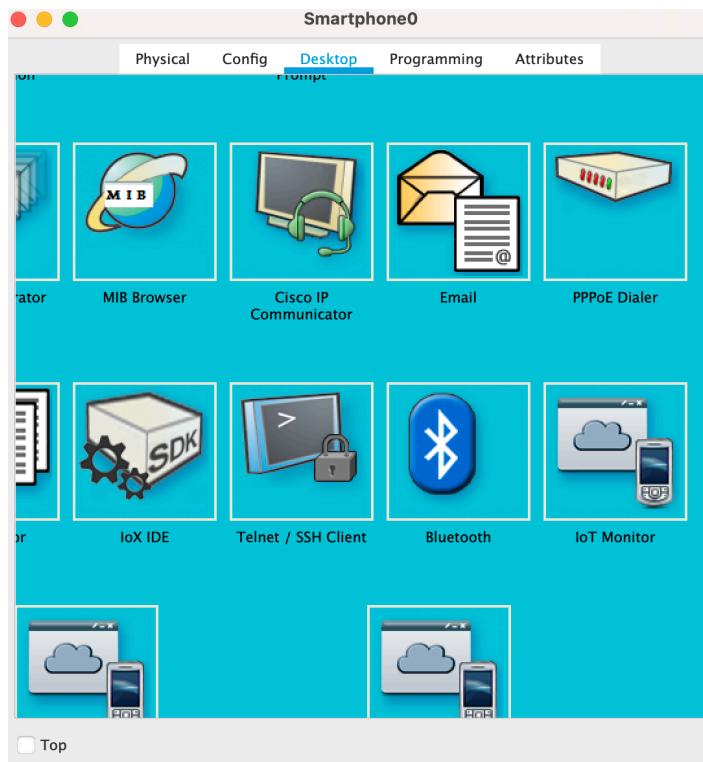
Next step, go to config and select Wireless set the SSID and change Authentication to WPA2-PSK and put your password of SSID:



Next, click on Setting and go to IoT Server, thick the Remote Server and fill your Server Address, User Name and Password:



## Configure the IOT Monitor in Laptop and Smartphone



Smartphone:

The image contains two side-by-side screenshots of the 'Smartphone0' application running the 'IoT Monitor' software.

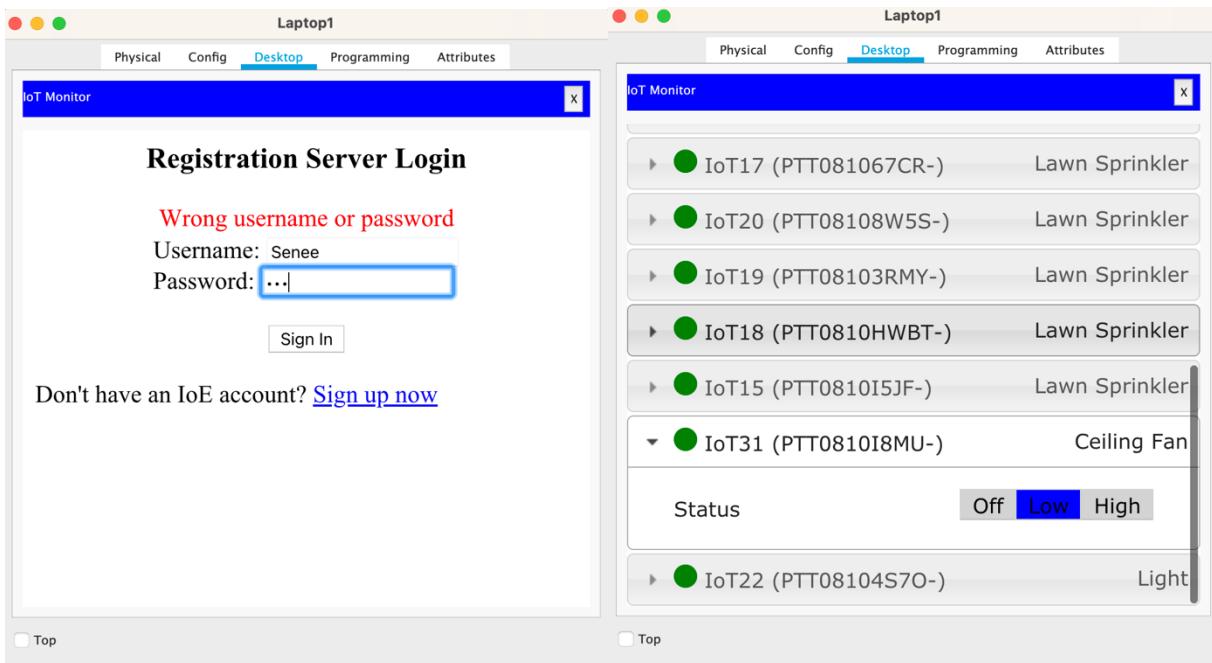
**Left Screenshot (Login Screen):**

- The title bar says 'IoT Monitor'.
- The form fields are:
  - IOT Server Address: 10.0.0.253
  - User Name: Senee
  - Password: zxc
- A 'Login' button is present.

**Right Screenshot (Device Management Screen):**

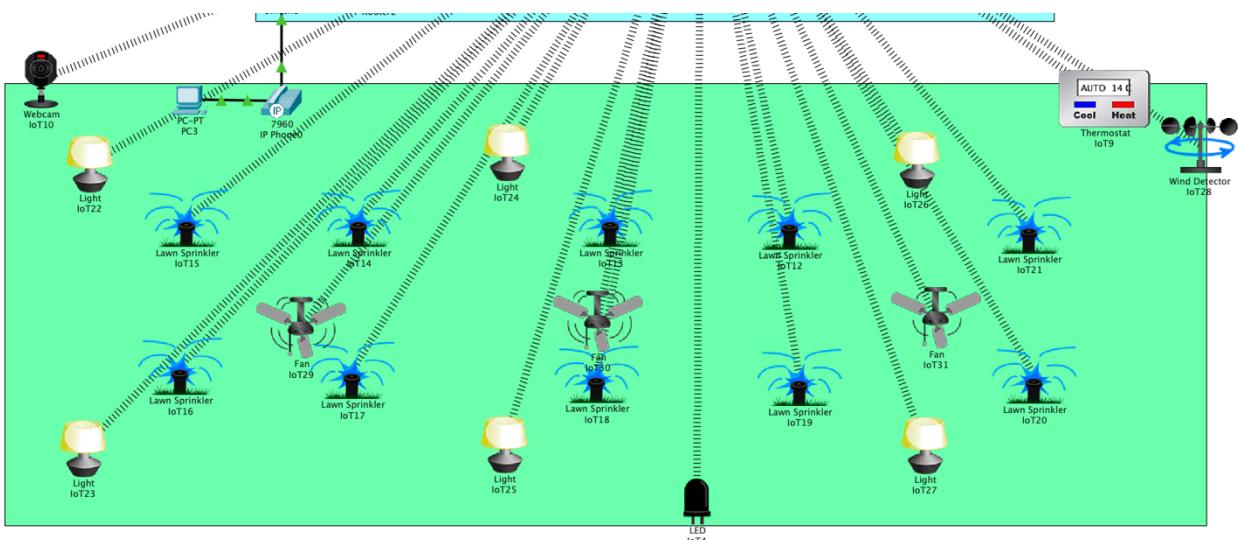
- The title bar says 'IoT Monitor'.
- The top navigation bar includes Home, Conditions, Editor, and Log Out.
- The main area displays a list of IoT devices:
  - IoT9 (PTT08109FZO-) - Thermostat
    - Status: Auto
    - Temperature: -0.0 °C
    - Auto Cool Temperature: 20.0 °C
    - Auto Heat Temperature: 19.0 °C
  - IoT4 (PTT08106H31-) - Light
  - IoT23 (PTT0810FCRP-) - Light
  - IoT27 (PTT0810523F-) - Light

Laptop:



The device can set by our Smartphone and Laptop:

Result:



## Check the connection by pinging

```
C:\>ping 10.0.0.253                                         C:\>ping 10.1.1.11
Ping 10.0.0.253 with 32 bytes of data:
Reply from 10.0.0.253: bytes=32 time=1ms TTL=127
Reply from 10.0.0.253: bytes=32 time<1ms TTL=127
Reply from 10.0.0.253: bytes=32 time<1ms TTL=127
Reply from 10.0.0.253: bytes=32 time<1ms TTL=127
Ping statistics for 10.0.0.253:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
Packet Tracer PC Command Line 1.0
C:\>ping 10.1.1.13
Ping 10.1.1.13 with 32 bytes of data:
Request timed out.
Reply from 10.1.1.13: bytes=32 time<1ms TTL=255
Reply from 10.1.1.13: bytes=32 time<1ms TTL=255
Reply from 10.1.1.13: bytes=32 time<1ms TTL=255
Ping statistics for 10.1.1.13:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.1.1.14
Ping 10.1.1.14 with 32 bytes of data:
Reply from 10.1.1.14: bytes=32 time=26ms TTL=128
Reply from 10.1.1.14: bytes=32 time=6ms TTL=128
Reply from 10.1.1.14: bytes=32 time<1ms TTL=128
Reply from 10.1.1.14: bytes=32 time=4ms TTL=128
Ping statistics for 10.1.1.14:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 26ms, Average = 9ms

C:\>ping 10.1.1.12                                         C:\>ping 10.1.1.12
Ping 10.1.1.12 with 32 bytes of data:
Request timed out.
Reply from 10.1.1.12: bytes=32 time<1ms TTL=255
Ping statistics for 10.1.1.12:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.1.1.12
Ping 10.1.1.12 with 32 bytes of data:
Reply from 10.1.1.12: bytes=32 time=1ms TTL=255
Reply from 10.1.1.12: bytes=32 time<1ms TTL=255
Reply from 10.1.1.12: bytes=32 time<1ms TTL=255
Reply from 10.1.1.12: bytes=32 time<1ms TTL=255
Ping statistics for 10.1.1.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>
```

## Conclusion

In this project, I have learned a lot of things. I build a simple smart farm using IOT and using a various device. Firstly, new thing that I have learned from this project is setting the IOT device and it's really interesting and challenge for me and I'm also adapt our old topic in this project such as IP-Phone, Wireless, Server and Firewall but for the firewall I stuck with some problem that I cannot not fix and when I know it's too late for me too change so I cannot configure the firewall by using the command but I know how to use it directly. Lastly, this project made me see the important part and also if we are expert on this, we can get a job also.