

UNIVERSITY OF ENGINEERING AND TECHNOLOGY, TAXILA
UET TAXILA

SOFTWARE ENGINEERING DEPARTMENT



CCN LAB PROJECT

SUBMITTED TO: **MAAM SIDRA SHAFI**

SEMESTER: **6TH (OMEGA)**

DATE: **JUNE 22, 2021**

SUBMITTED BY : **REGD. NO**

SEHAR FATIMA : **18-SE-06**

ALI AHMED : **18-SE-22**

FASIH MALIK : **18-SE-86**

CONTRIBUTION:

SEHAR FATIMA : **HOME**

ALI AHMED : **NETWORK**

FASIH MALIK : **OFFICE**

TABLE OF CONTENTS

Introduction:	4
Features:	4
Sensors:	4
Actuator:	4
IOT Elements:	4
Smart fire alarm → IOT Components:	4
Smart environment control → IOT Components:	5
Smart power management → IOT Components:	5
Smart violation control → IOT Components:	5
Smart home security → IOT Components:	5
Server Used:	5
Routing:	5
Routing Table:	5
Coding:	6
HomeRoom2MCU	6
HomeRoom1MCU	8
OfficeEntranceMCU	9
OfficeEnvironmentControlMCU	10
FireDetectionSBC	11
North ViolenceDetectionMCU	12
South ViolenceDetectionSBC	13
OverAll Project:	15
Home:	15
Room1	15
Room2	16
Office:	16
Road:	17
SafeCity:	18
Network:	19
Outputs of Project Safe-city in action:	21
Logging In Office server from LAptop in Office:	21
Fire is being stected and reported to server and emailed to secrity server	22

Security Server:.....	22
Domain Name server:	23
Office environment control system on production of smoke:	24
Motion Detection System:	24
Accessing Home From Office:	25
Accessing Safe-City Server from office:.....	26
Accessing home server from anywhere in safe-city:	27
Accessing your office from anywhere in the world (that is somewhere from internet):.....	28

PROJECT: SMART CITY

INTRODUCTION:

FEATURES:

1. Smart Home
 - a. Smart Environment Control
 - b. Smart home security
2. Smart Office
 - a. Smart Fire Alarm and Mailing
 - b. Smart Violation Control and Mailing
 - c. Smart power management
3. Smart Safe-City
 - a. Smart lights
 - b. Smart surveillance cameras

SENSORS:

1. Fire Detector
2. Smoke Sensor
3. Wind Sensor
4. Temperature Sensor

ACTUATOR:

1. Ceiling Sprinkler
2. Heating Element

IOT ELEMENTS:

1. AC
2. Furnace
3. Door
4. Webcam
5. Light
6. Battery
7. Solar
8. Fan
9. Coffee Maker
10. Car
11. Garage

SMART FIRE ALARM ➔ IOT COMPONENTS:

1. SBC
2. Fire Detector
3. Smoke Sensor
4. Heating Element

5. Siren

SMART ENVIRONMENT CONTROL ➔ IOT COMPONENTS:

- 1. Fire Detector
- 2. MCU
- 3. AC
- 4. Furnace
- 5. Window
- 6. Thermostat
- 7. Smoke Sensor
- 8. Wind Sensor
- 9. Temperature Sensor

SMART POWER MANAGEMENT ➔ IOT COMPONENTS:

- 1. MCU
- 2. Fan
- 3. Lamp Light
- 4. Solar
- 5. Battery

SMART VIOLATION CONTROL ➔ IOT COMPONENTS:

- 1. MCU
- 2. Sound Detector
- 3. Potentiometer
- 4. Home Sound

SMART HOME SECURITY ➔ IOT COMPONENTS:

- 1. MCU
- 2. Motion Sensor
- 3. Fan
- 4. Lamp Light
- 5. Webcam

SERVER USED:

- 1. Home server (www.home.com)
- 2. Email server(security.com)
- 3. Office server (www.office.com)
- 4. Safe-City server (www.safeserver.com)
- 5. DNS server

ROUTING:

- 1. EIGRP Routing and DHCP configured.

ROUTING TABLE:

Device Designation:	Interface	IP Address	Subnet Mask	Default Gateway
RouterEast	Gig0/0	192.168.100.1	255.255.255.128	N/A
	Gig0/1	192.168.10.1	255.255.255.128	N/A
	Serial0/1/1	201.10.242.2	255.255.255.252	N/A
RouterWest	Gig0/0	172.16.0.1	255.255.255.128	N/A
	Gig0/1	192.168.20.1	255.255.255.0	N/A
	Serial0/0/0	201.10.240.2	255.255.255.252	N/A
RouterSouth	Gig0/1	192.168.200.1	255.255.255.0	N/A
	Serial0/0/1	201.10.241.2	255.255.255.252	N/A
RouterCentral	Gig0/0	172.16.10.1	255.255.255.0	N/A
	Gig0/1	8.8.8.1	255.255.255.0	N/A
	Serial0/0/0	201.10.240.1	255.255.255.252	N/A
	Serial0/0/1	201.10.241.1	255.255.255.252	N/A
	Serial0/1/1	201.10.242.1	255.255.255.252	N/A

CODING:

HOMEROOM2MCU

```

var wind = 0;
var smoke = 0;
var temp = 0;
var heat = 0;
var garage = 0;
var cooler = 0;
function setup() {
    pinMode(1, INPUT);
    pinMode(0, OUTPUT);
    pinMode(5, OUTPUT);
    pinMode(4, OUTPUT);
    pinMode(3, OUTPUT);
    pinMode(A1, INPUT);
    pinMode(A2, OUTPUT);
    pinMode(A3, OUTPUT);
    pinMode(A0, INPUT);
    IoEClient.setup({

```

```
        type: "Home Environment",
        states: [
            {
                name: "wind",
                type: "number",
                decimalDigits: 1
            },
            {
                name: "smoke",
                type: "number",
                decimalDigits: 1
            },
            {
                name: "temp",
                type: "number",
                decimalDigits: 1
            },
            {
                name: "heat",
                type: "number",
                decimalDigits: 1
            }
        ]
    }) ;

}

function loop (){

//    value = analogRead(1);
    temp = analogRead(A0);
    console.log("temp:           " + temp);
    smoke = analogRead(A1);
    console.log("smoke:           " + smoke);
    heat = analogRead(A3);
    digitalWrite(A3, HIGH);
    delay(1000);
    digitalWrite(A3, LOW);
    delay(500);
    digitalWrite(3, HIGH);
```

```

delay(1000);
digitalWrite(3, LOW);
delay(500);
wind = analogRead(1);
console.log("wind: " + wind);
analogWrite(5, smoke);
IoEClient.reportStates([wind, smoke, temp, heat]);
if(smoke === 0 ){
    customWrite(4, LOW);
} else{
    customWrite(4, HIGH);
}
if(wind == 1023 && smoke === 0){
    customWrite(0, 0);
}
else{
    customWrite(0, 1);
}
if(temp > 500)
{
    customWrite(2, 1);
}
else
{
    customWrite(2, 2);
}
}

```

HOMEROOM1MCU

```

var count = 0;
var motion = 0;
function setup() {

    pinMode(0, INPUT);
    pinMode(1, OUTPUT);
    pinMode(2, OUTPUT);
    pinMode(3, OUTPUT);
    pinMode(4, OUTPUT);
    pinMode(5, OUTPUT);
    IoEClient.setup({
        type: "Home Room 1",
        states: [
            {
                name: "motion",

```

```

        type: "number",
        decimalDigits: 1
    }
]
}) ;

}

function loop (){

    motion = digitalRead(0);
    IoEClient.reportStates([motion]);
    if(motion == HIGH)
    {
        customWrite(1, 2);
        customWrite(2, 1);
        customWrite(3, 1);
        customWrite(4, 2);
        customWrite(5, 2);
        count = 0;
    }else
    {
        delay(1000);
        count++;
        if(count >25)
        {
            customWrite(1, 0);
        }
        count++;
        if(count >50)
        {
            customWrite(4, 1);
        }
        customWrite(2, 0);
        customWrite(3, 0);
    }
}
}

```

OFFICEENTRANCEMCU

```

var count = 0;
var motion = 0;
function setup() {

    pinMode(0, INPUT);
    pinMode(1, OUTPUT);
    pinMode(2, OUTPUT);
    pinMode(3, OUTPUT);
    IoEClient.setup({
        type: "Office Entrance",
        states: [
            {
                name: "motion",
                type: "number",
                decimalDigits: 1
            }
        ]
    })
}

```

```

    });
}

function loop()
{
    motion = digitalRead(0);
    IoEClient.reportStates([motion]);
    if(motion == HIGH)
    {
        customWrite(1, 2);
        customWrite(2, 1);
        customWrite(3, 1);

        count = 0;

    }else

    {
        delay(1000);
        count++;
        if(count >20)
        {
            customWrite(1, 0);
        }
        count++;
        customWrite(2, 0);
        customWrite(3, 0);
    }

}

```

OFFICEENVIRONMENTCONTROLMCU

```

var wind = 0;
var smoke = 0;
var temp = 0;
function setup() {
    pinMode(1, INPUT);
    pinMode(0, OUTPUT);
    pinMode(5, OUTPUT);
    pinMode(A1, INPUT);
    pinMode(A0, INPUT);
    IoEClient.setup({
        type: "Office Environment",
        states: [
            {
                name: "wind",
                type: "number",
                decimalDigits: 1
            },
            {
                name: "smoke",
                type: "number",
                decimalDigits: 1
            }
        ]
    });
}

```

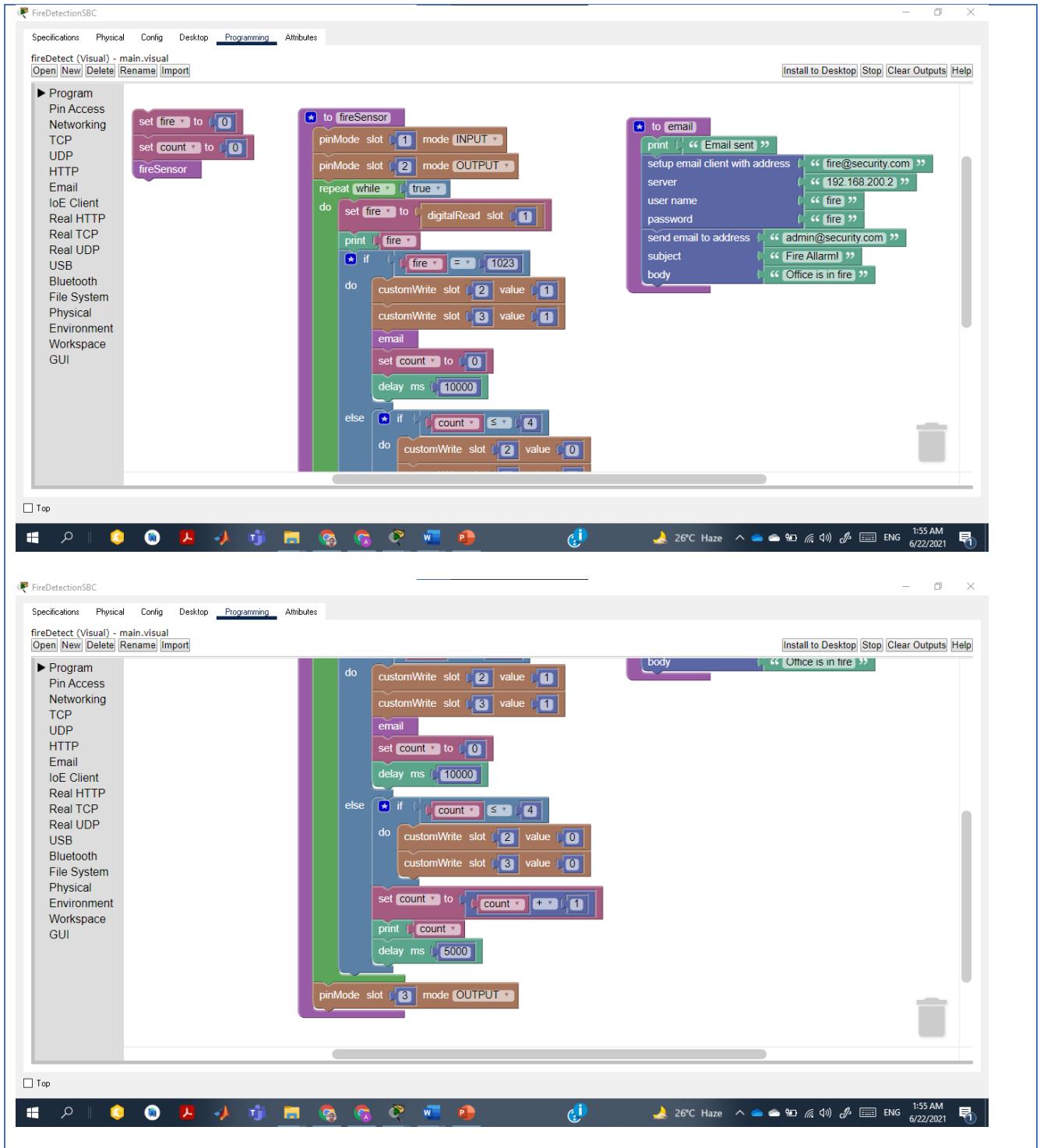
```
        },
        {
            name: "temp",
            type: "number",
            decimalDigits: 1
        }
    ]
);

}

function loop (){

//    value = analogRead(1);
    temp = analogRead(A0);
    console.log("temp:           " + temp);
    smoke = analogRead(A1);
    console.log("smoke:          " + smoke);
    wind = digitalRead(1);
    delay(500);
    console.log("wind:           " + wind);
    analogWrite(5, smoke);
    IoEClient.reportStates([wind, smoke, temp]);
    if(wind == 1023 && smoke === 0){
        customWrite(0, 0);
    }
    else{
        customWrite(0, 1);
    }
    if(temp > 500)
    {
        customWrite(2, 1);
    }
    else
    {
        customWrite(2, 2);
    }
}
```

FIREDETECTIONSB



NORTH VIOLENCEDETECTIONMCU

```
//sound detect
var volt = 0;
var sound = 0;
function setup() {
```

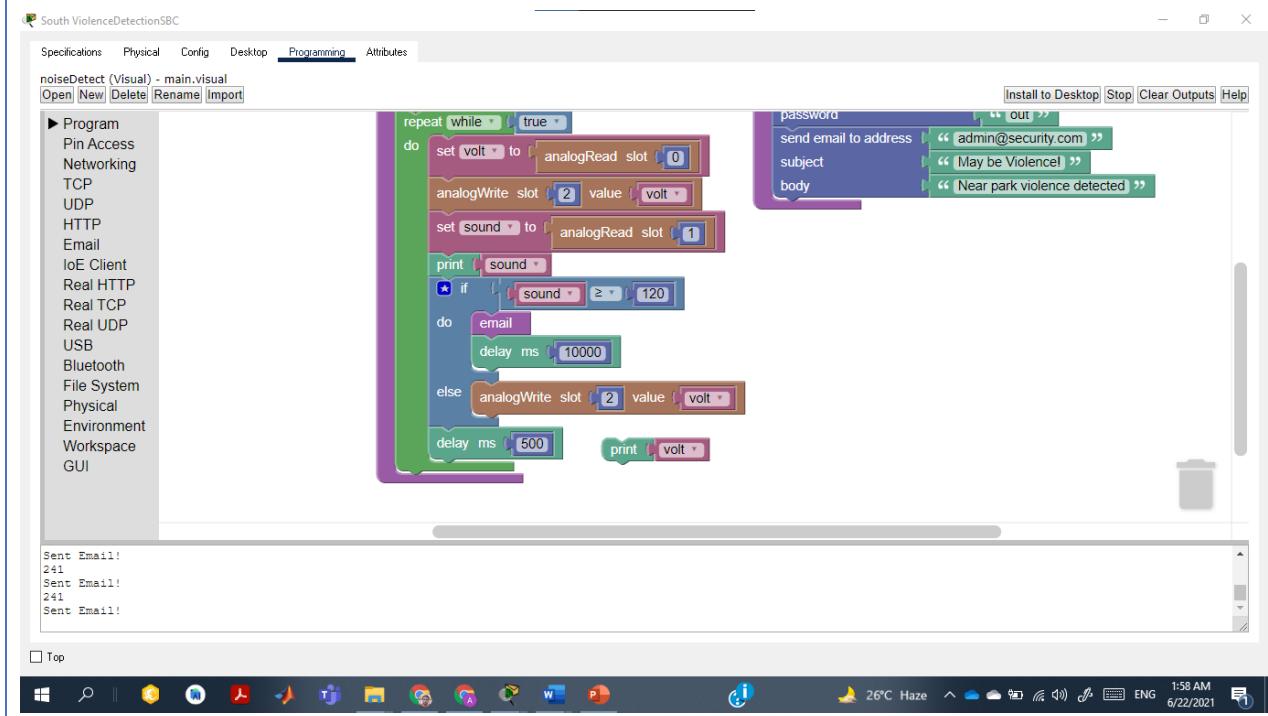
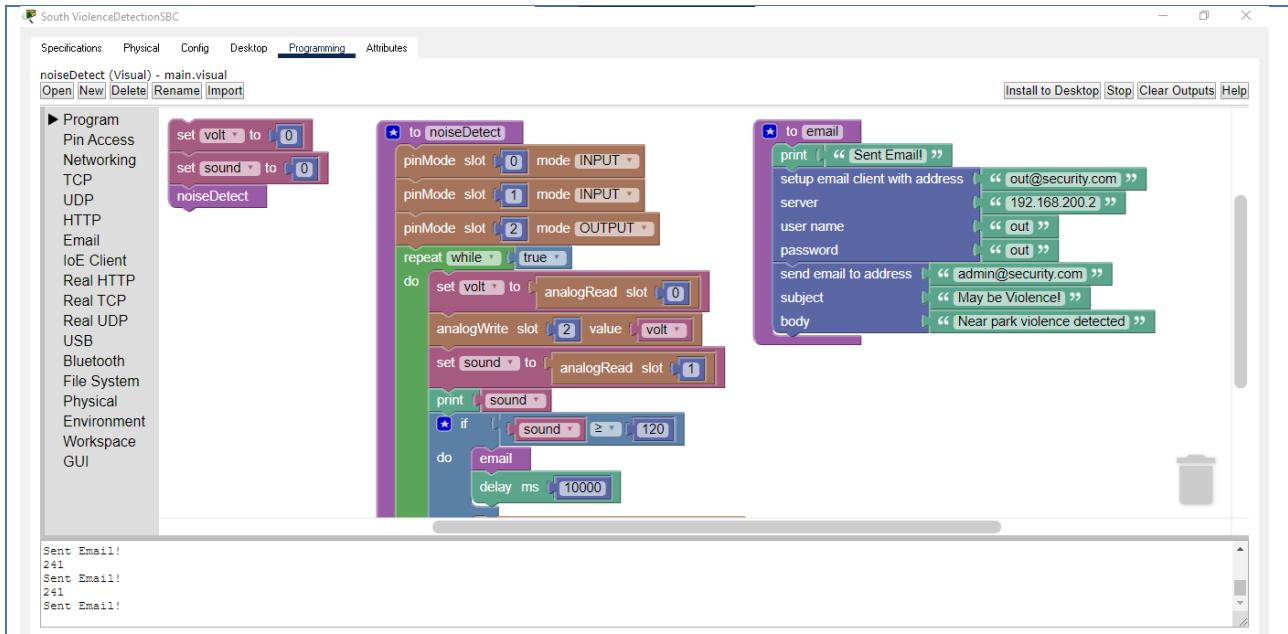
```
pinMode(0, INPUT);
pinMode(1, INPUT);
pinMode(2, OUTPUT);
IoEClient.setup({
    type: "Home Environment",
    states: [
        {
            name: "volt",
            type: "number",
            decimalDigits: 1
        },
        {
            name: "sound",
            type: "number",
            decimalDigits: 1
        }
    ]
});

function loop(){

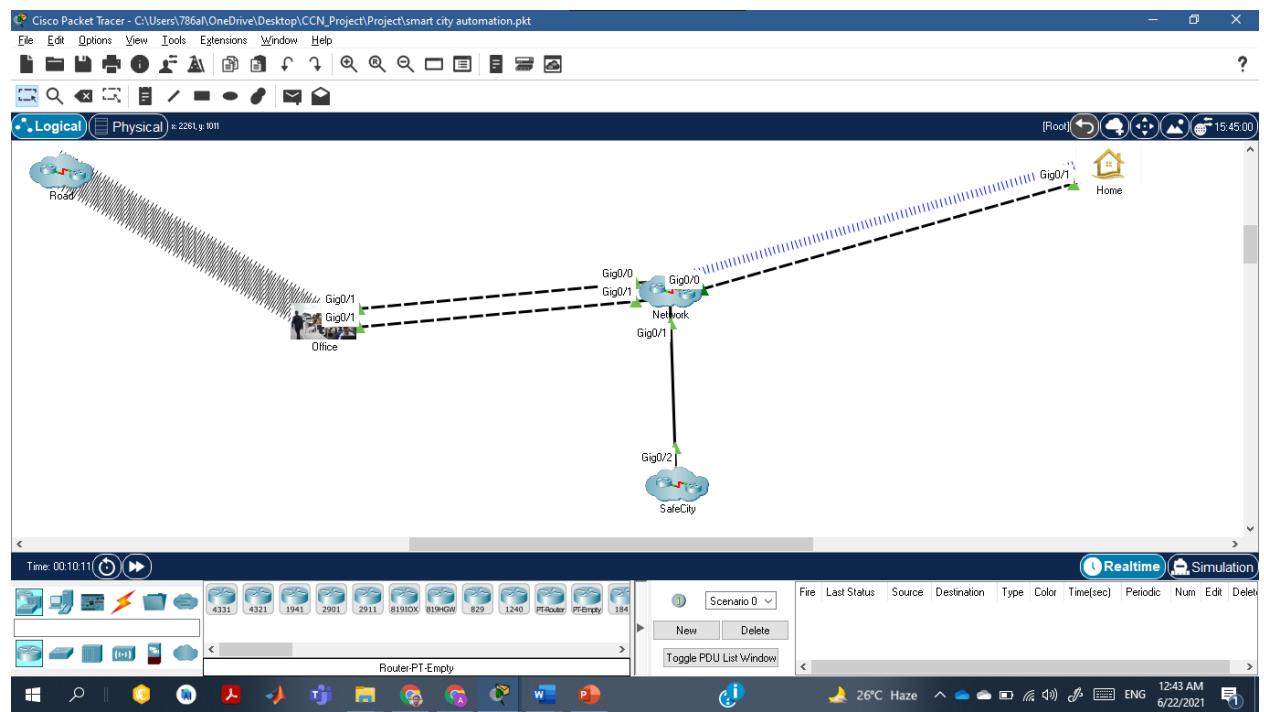
    volt = analogRead(0);
    digitalWrite(2,volt);
    sound = analogRead(1);
    IoEClient.reportStates([volt, sound]);
    //console.log("volt" + volt);
    console.log("sound           " + sound);
    delay(1000);

}
```

SOUTH VIOLENCEDETECTIONSBC

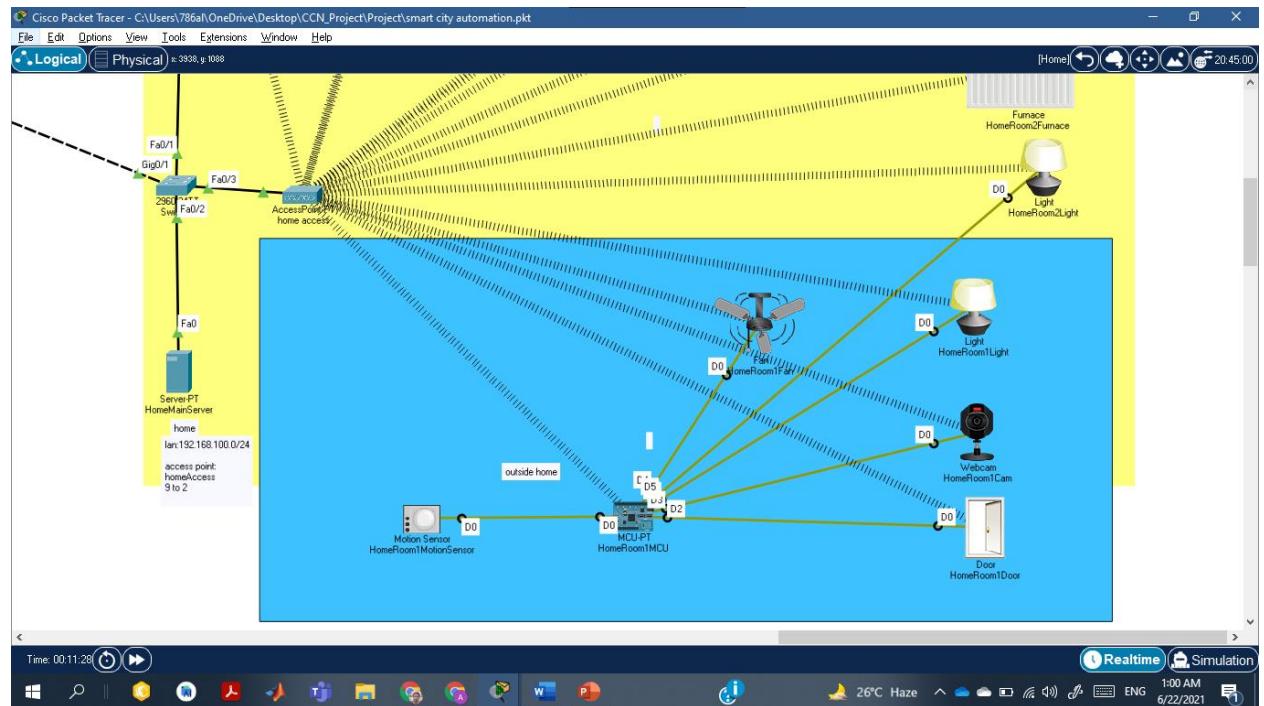


OVERALL PROJECT:

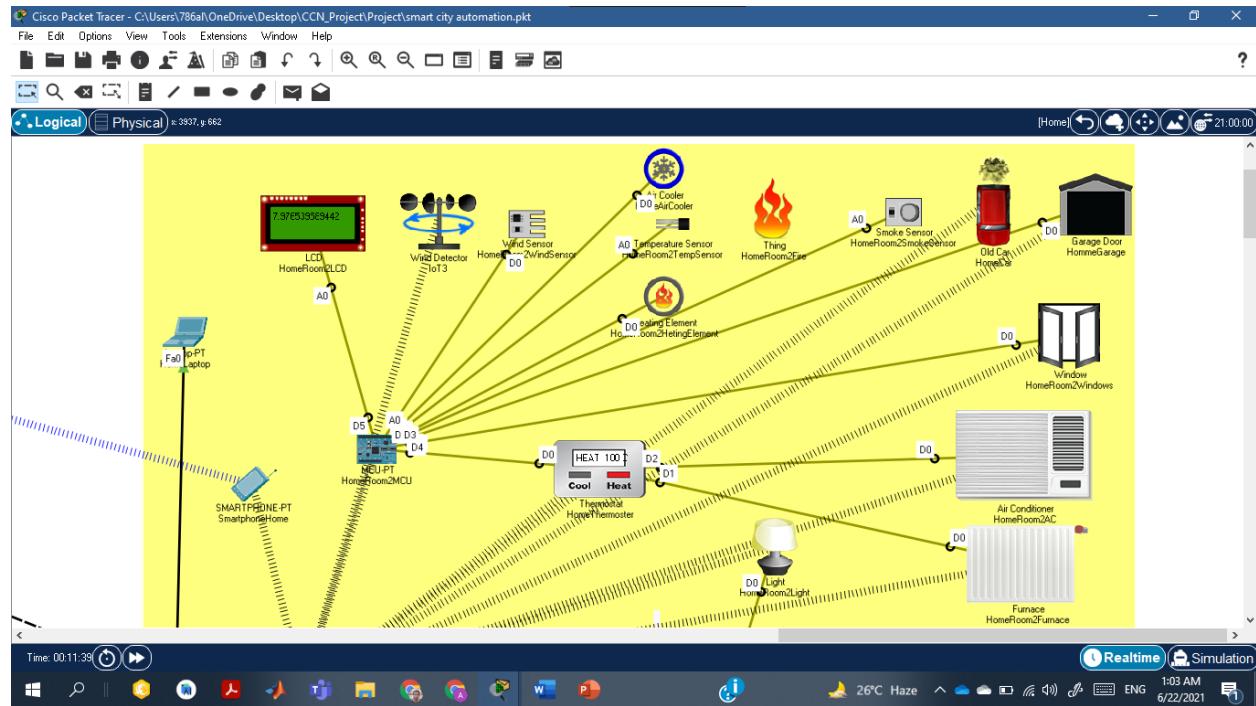


HOME:

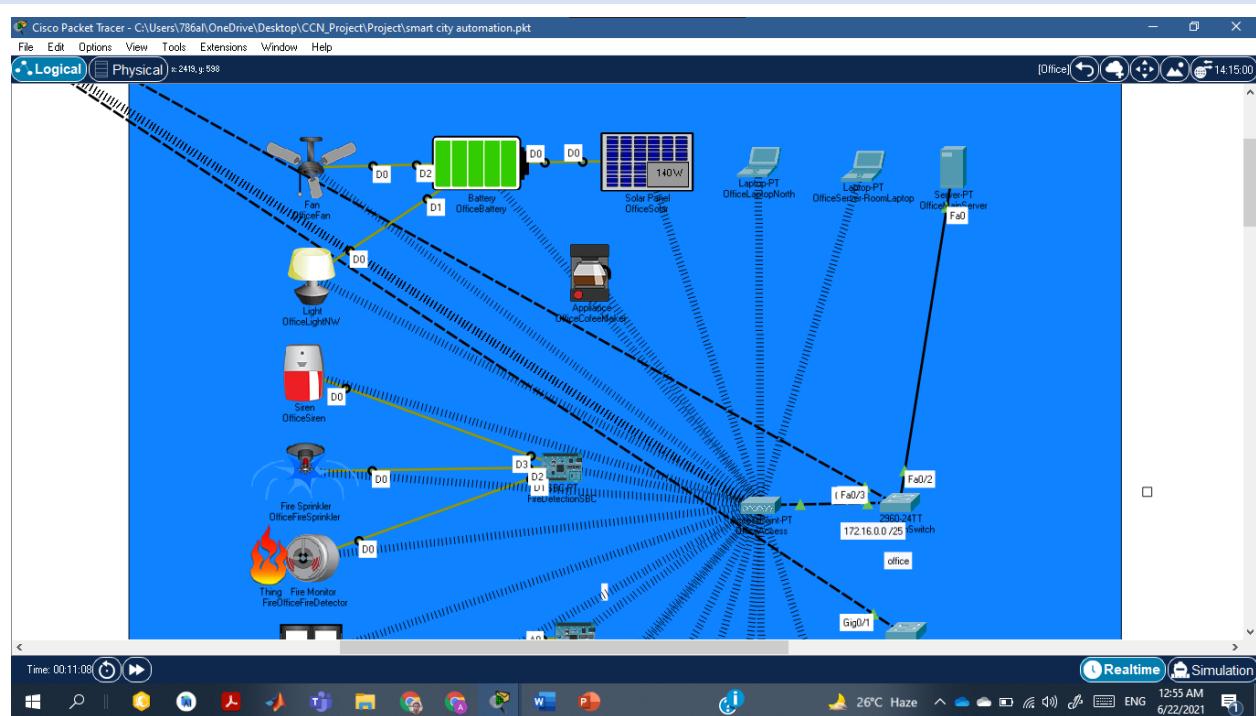
ROOM1

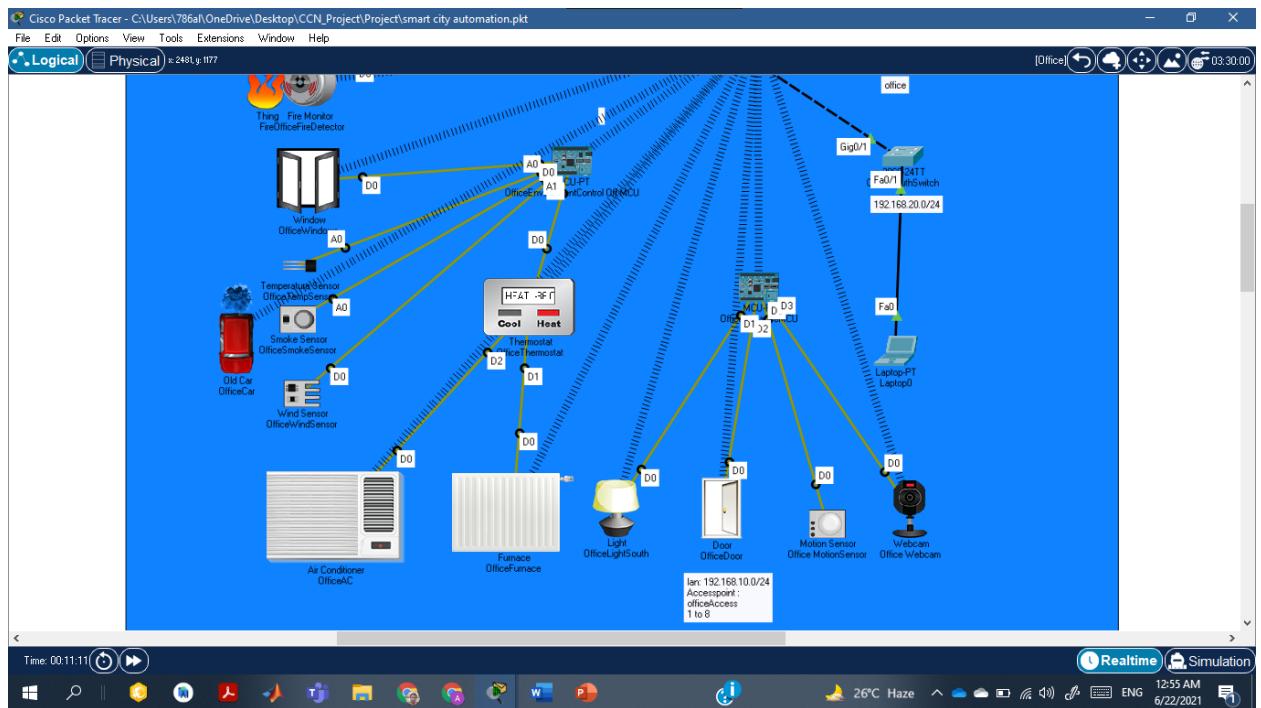


ROOM2

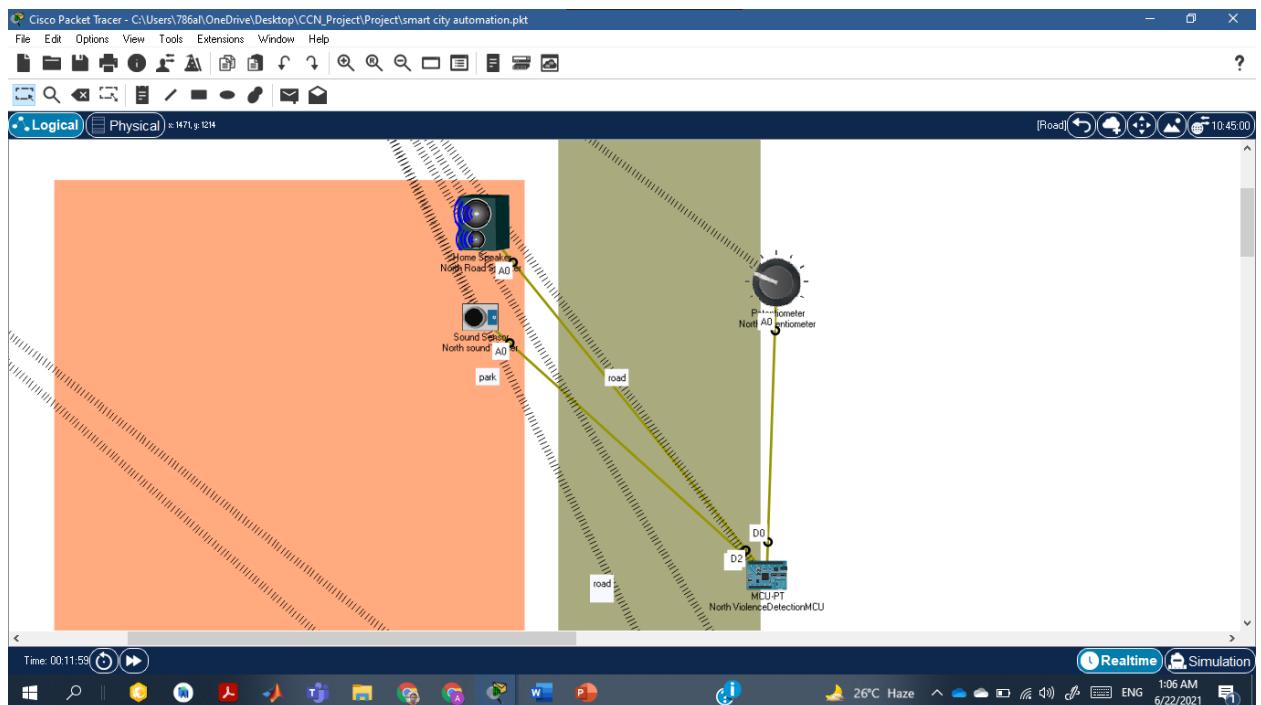


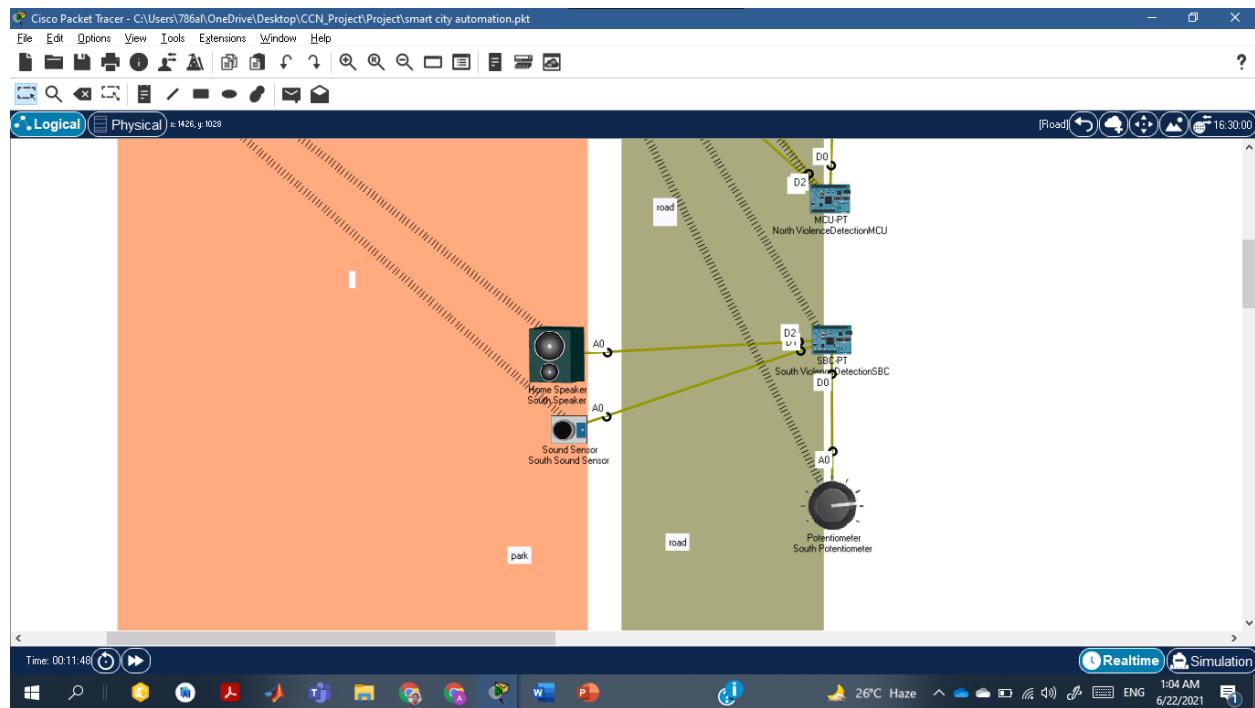
OFFICE:



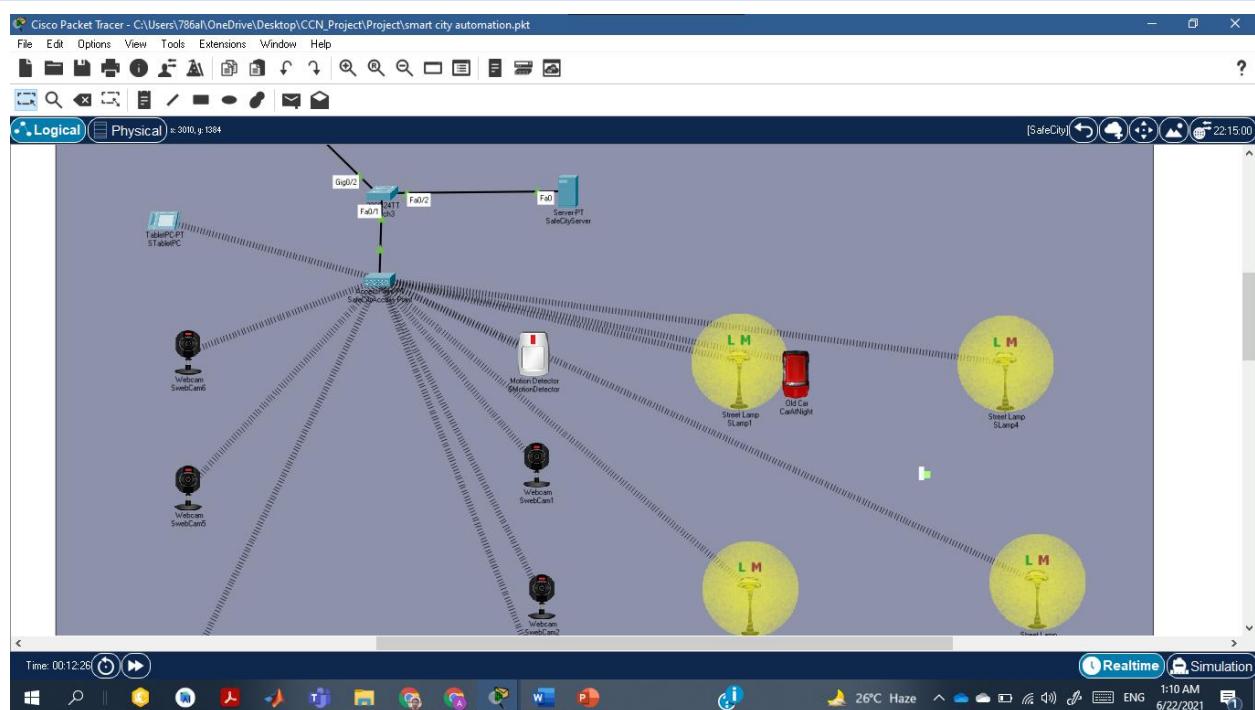


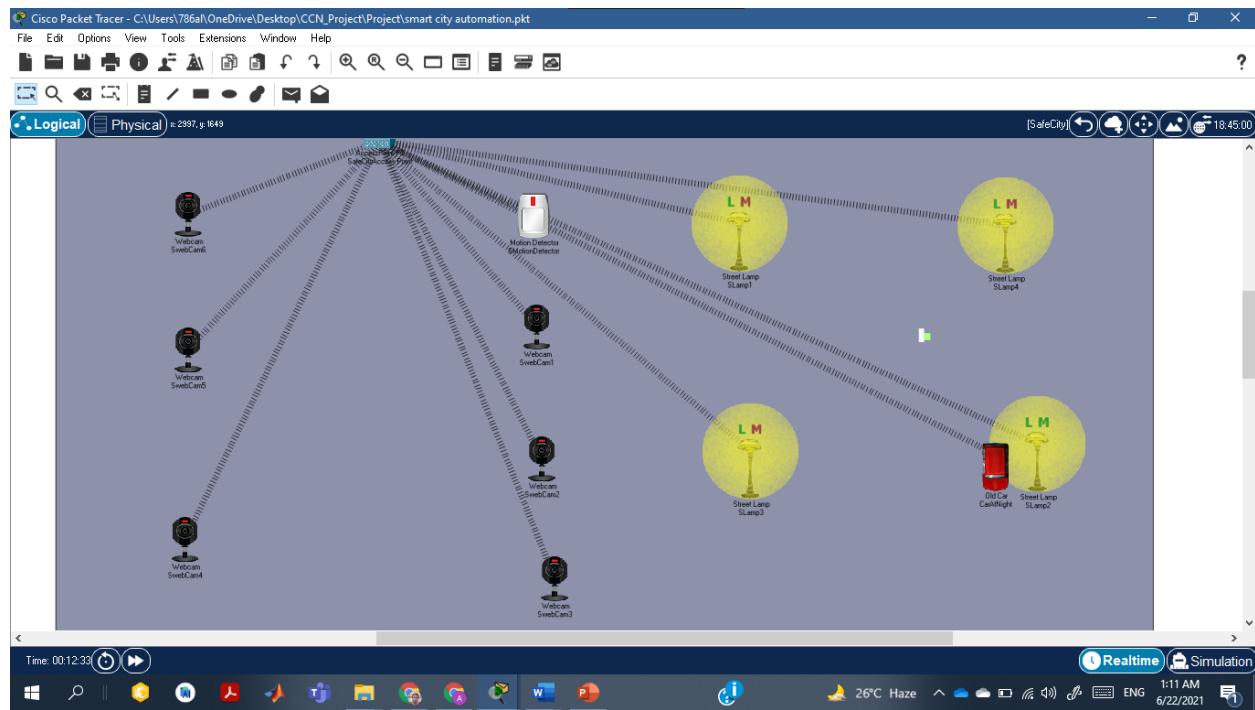
ROAD:



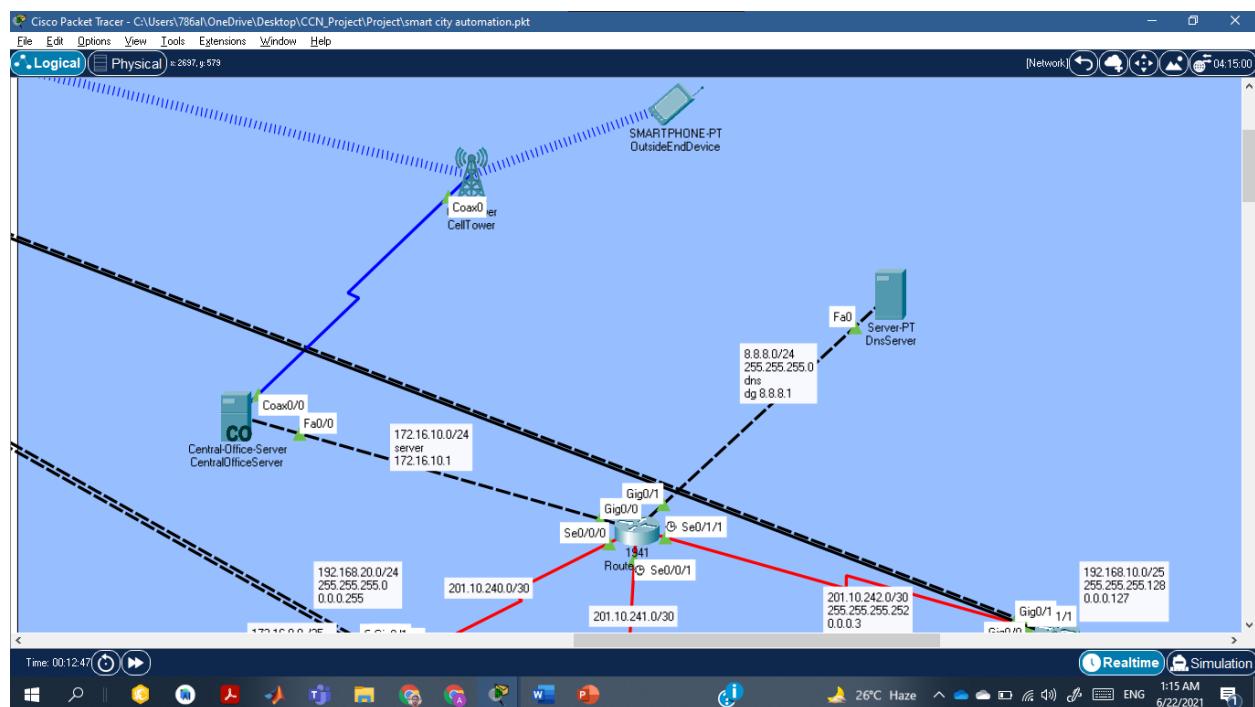


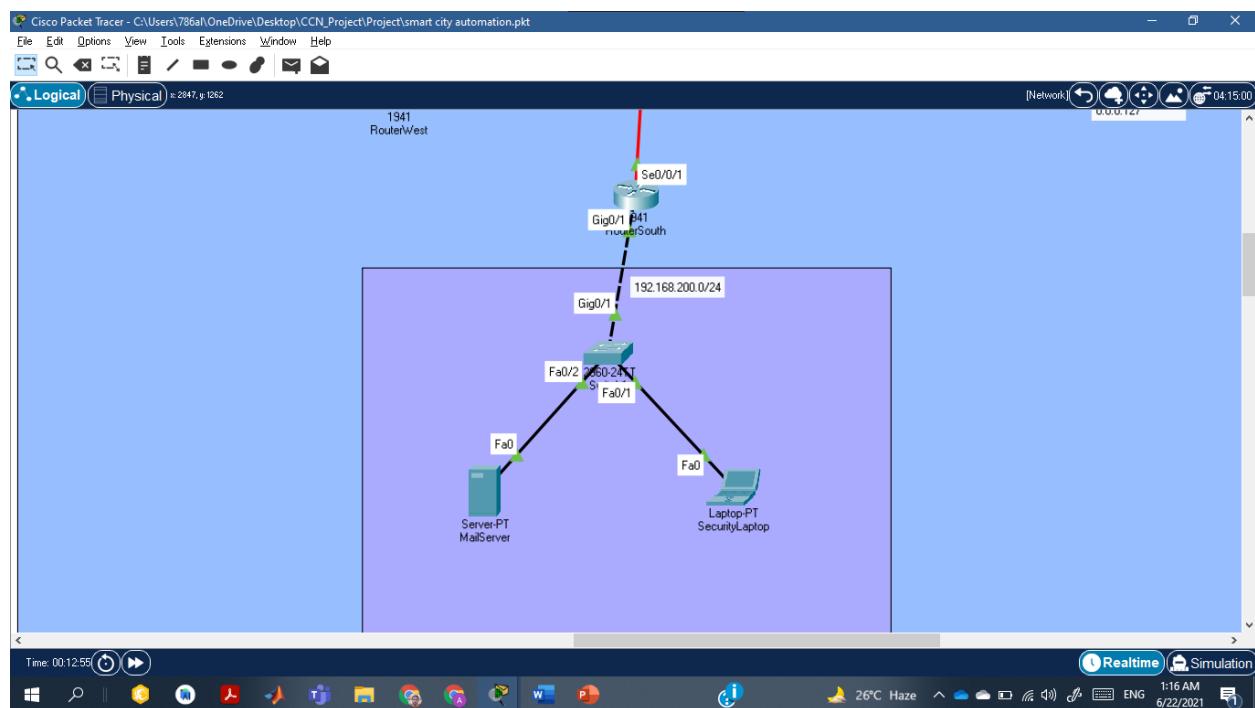
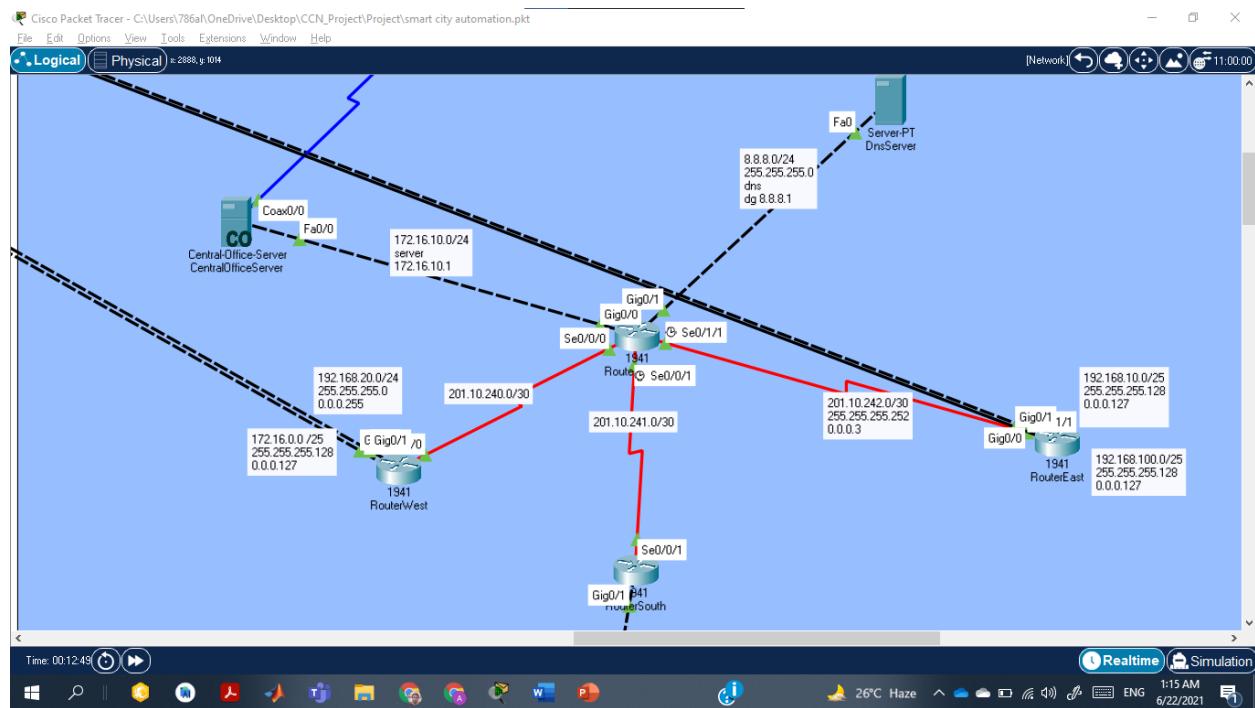
SAFECITY:





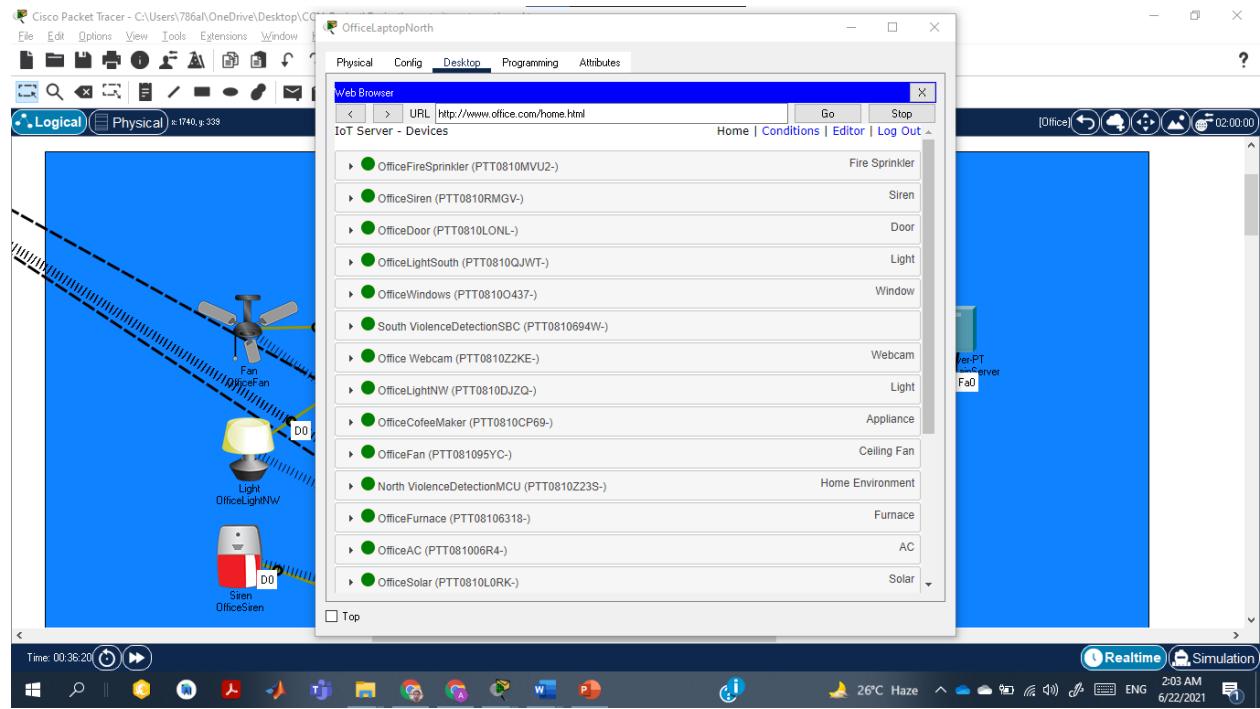
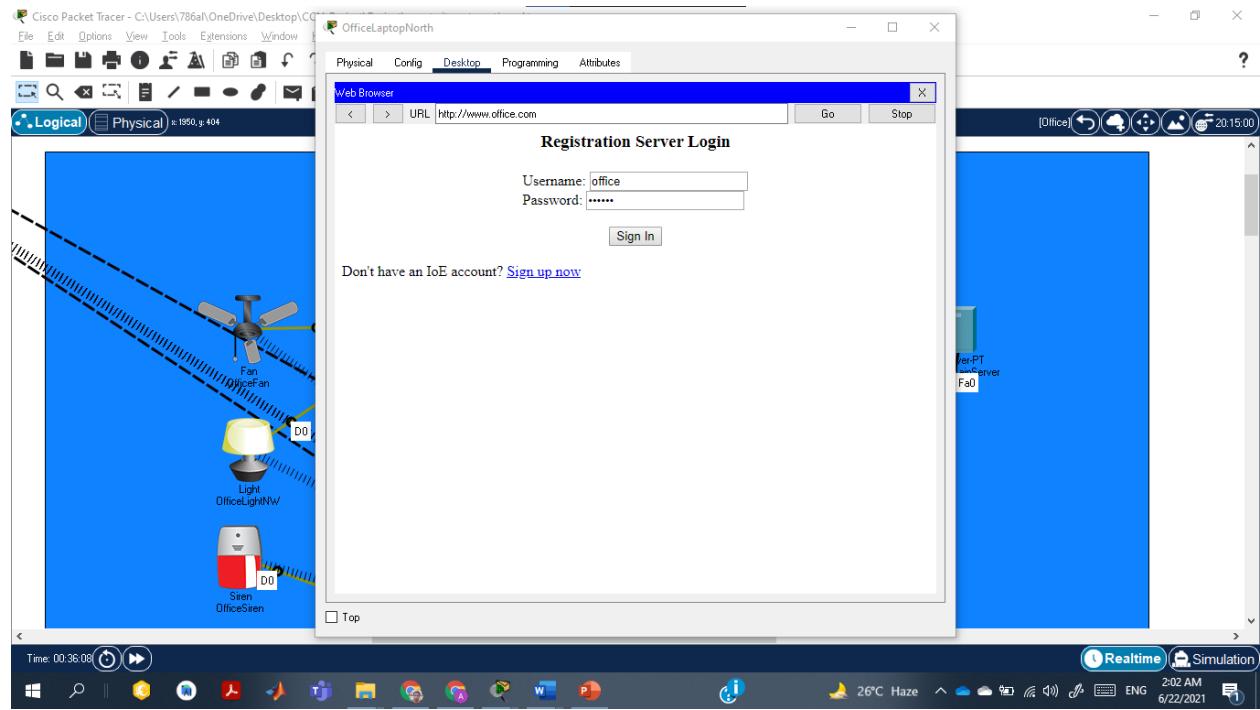
NETWORK:



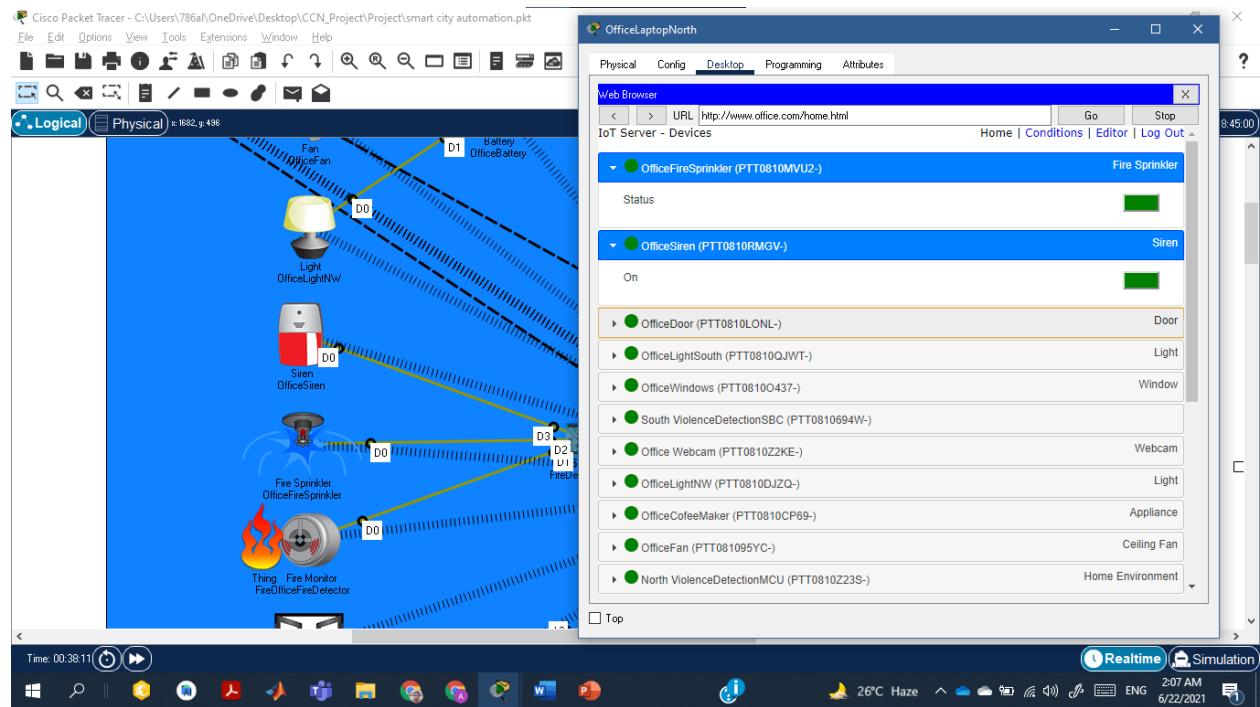
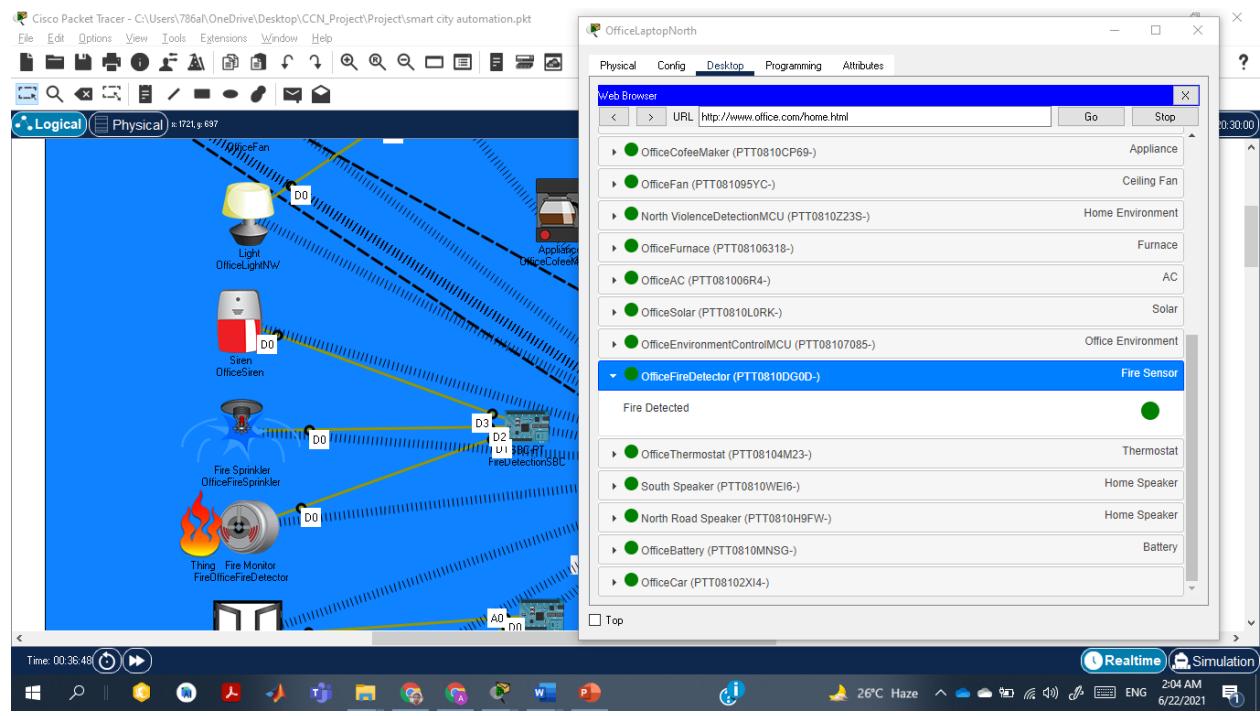


OUTPUTS OF PROJECT SAFE-CITY IN ACTION:

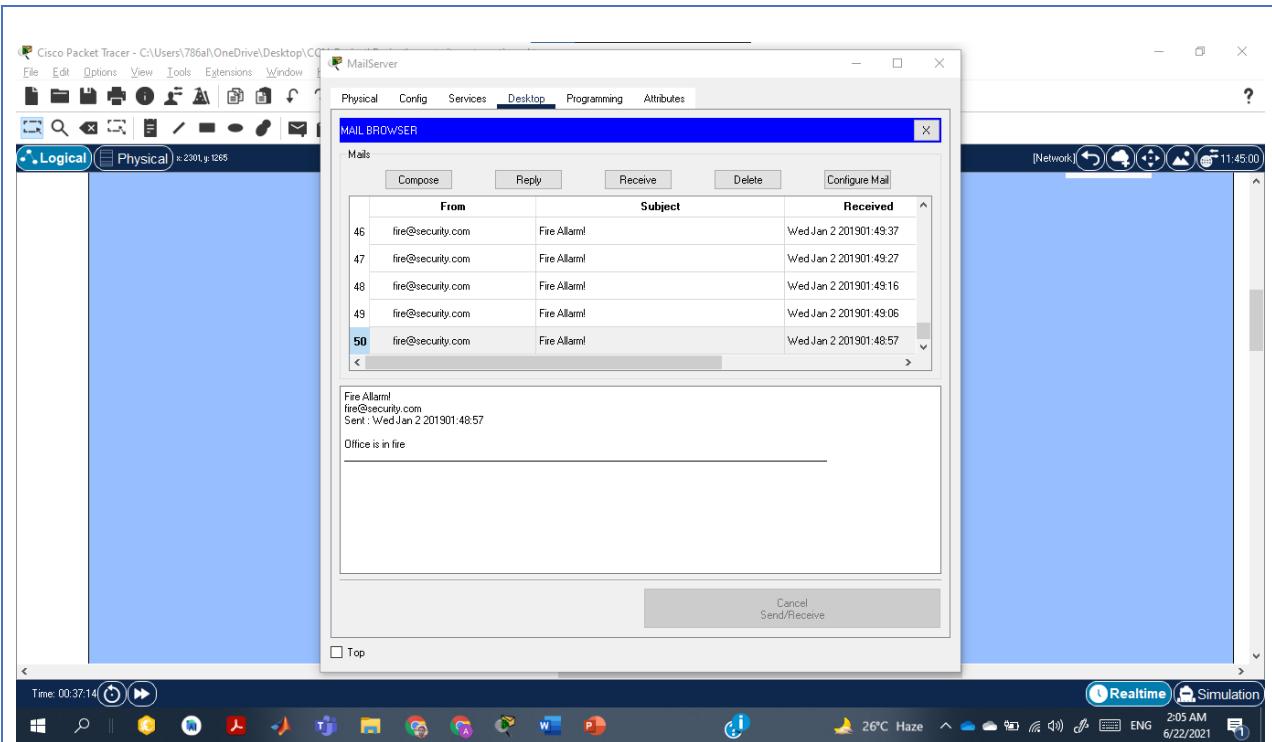
LOGGING IN OFFICE SERVER FROM LAPTOP IN OFFICE:



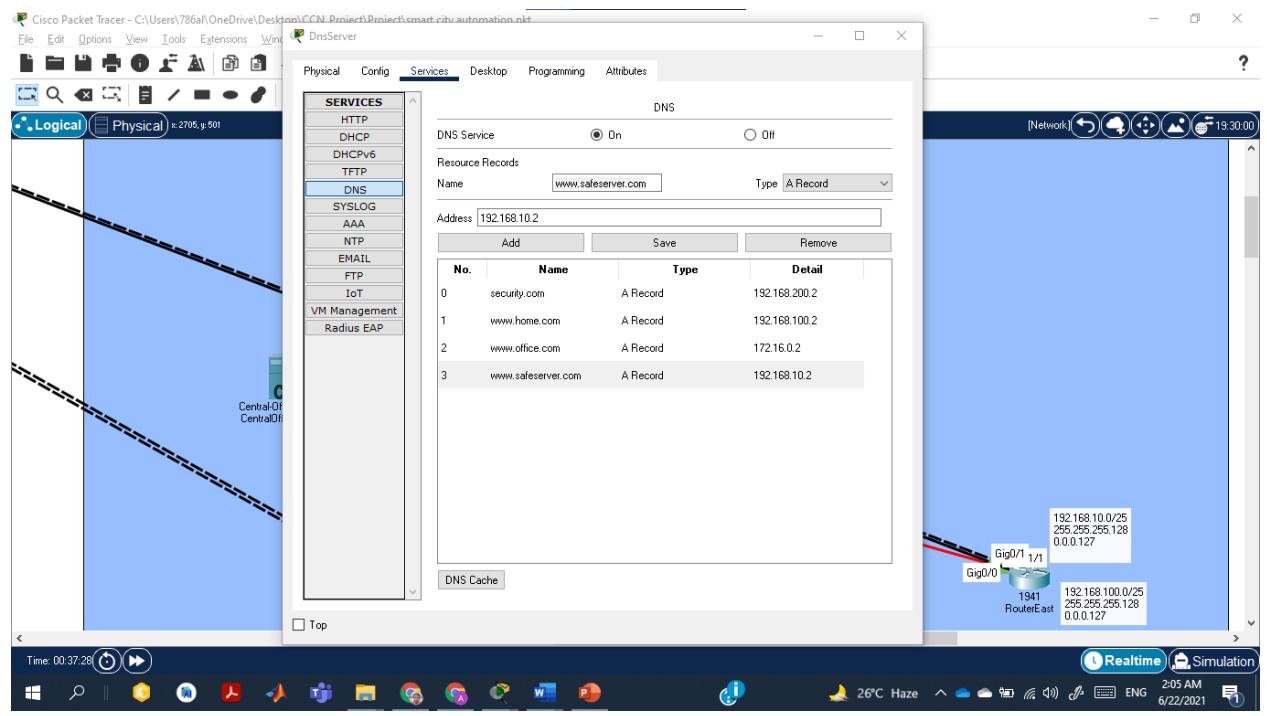
FIRE IS BEING SIGHTED AND REPORTED TO SERVER AND EMAILED TO SECURITY SERVER



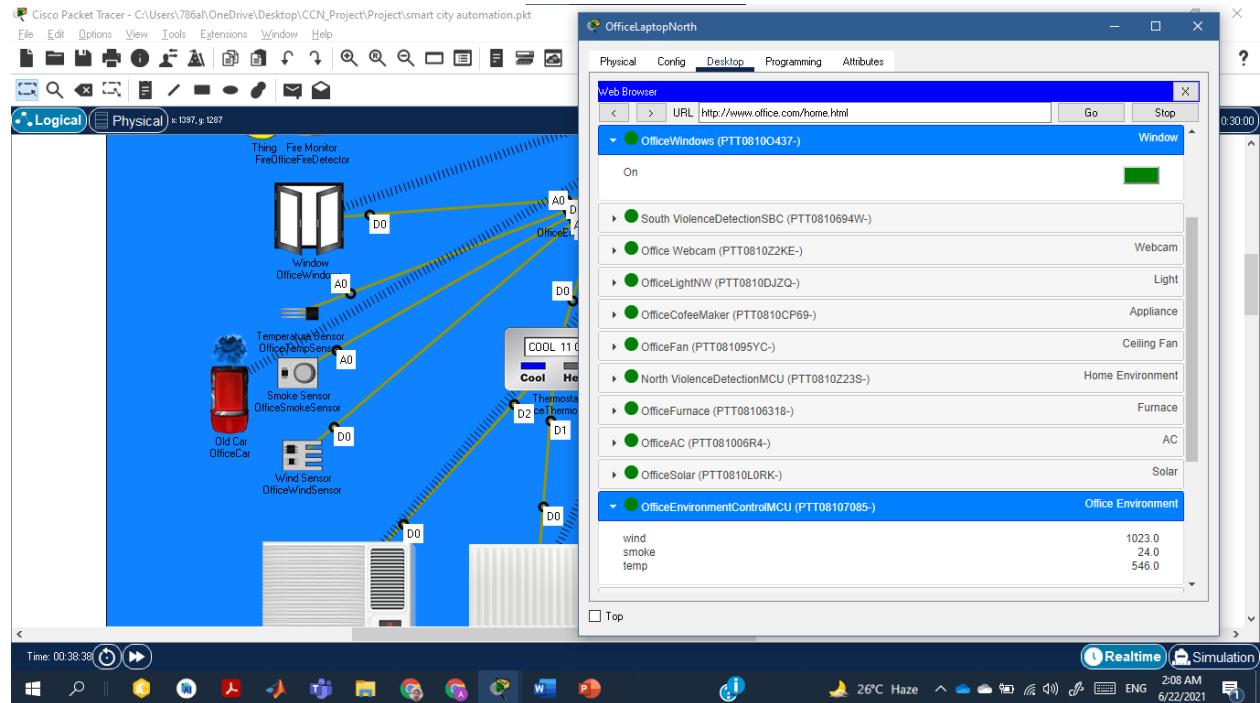
SECURITY SERVER:



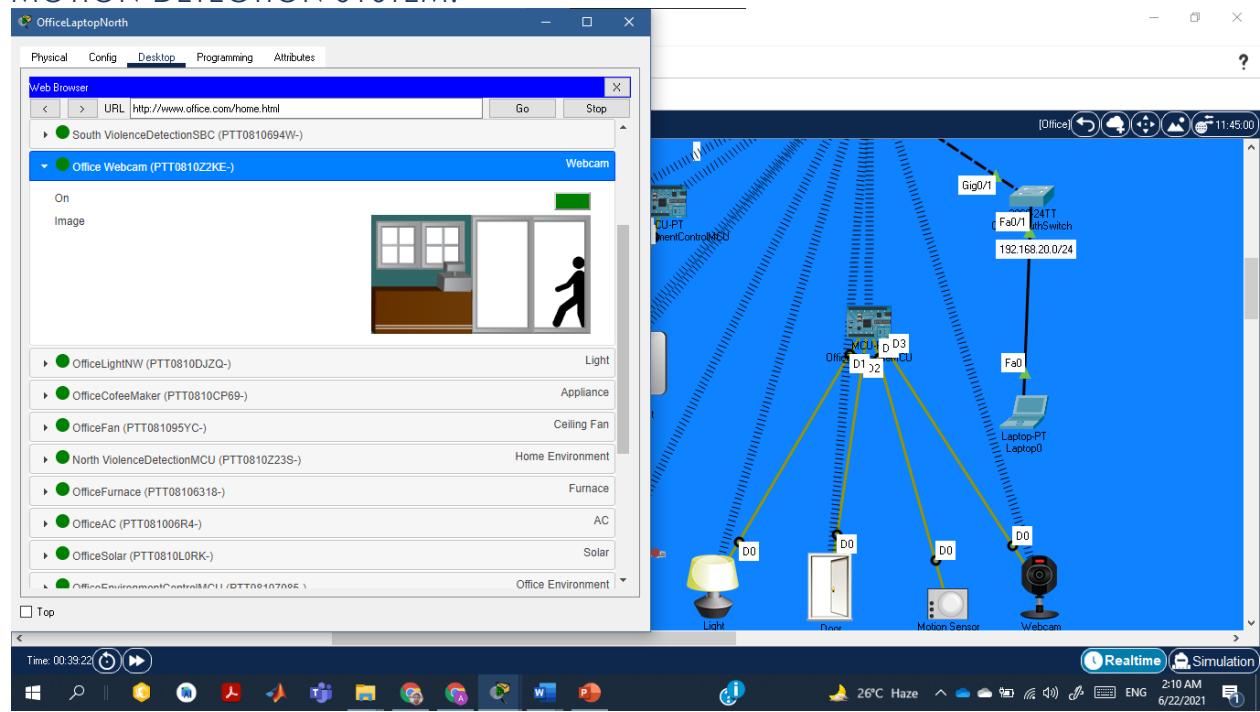
DOMAIN NAME SERVER:

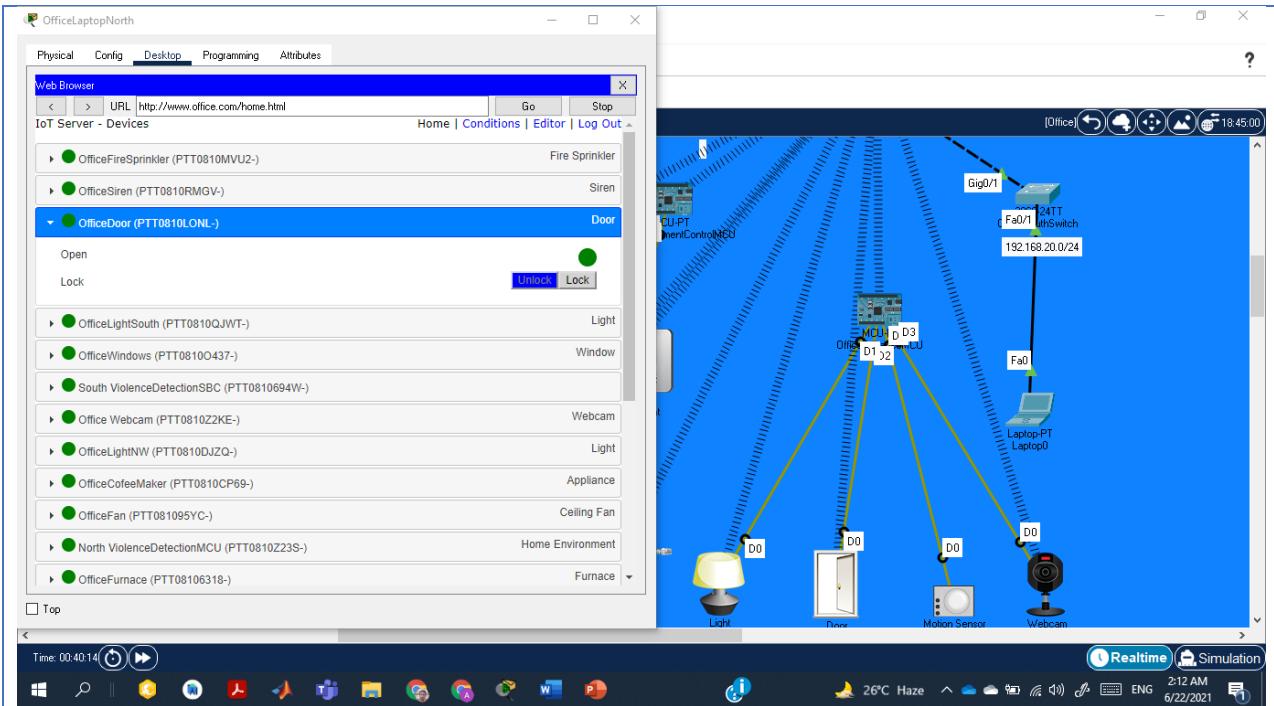


OFFICE ENVIRONMENT CONTROL SYSTEM ON PRODUCTION OF SMOKE:



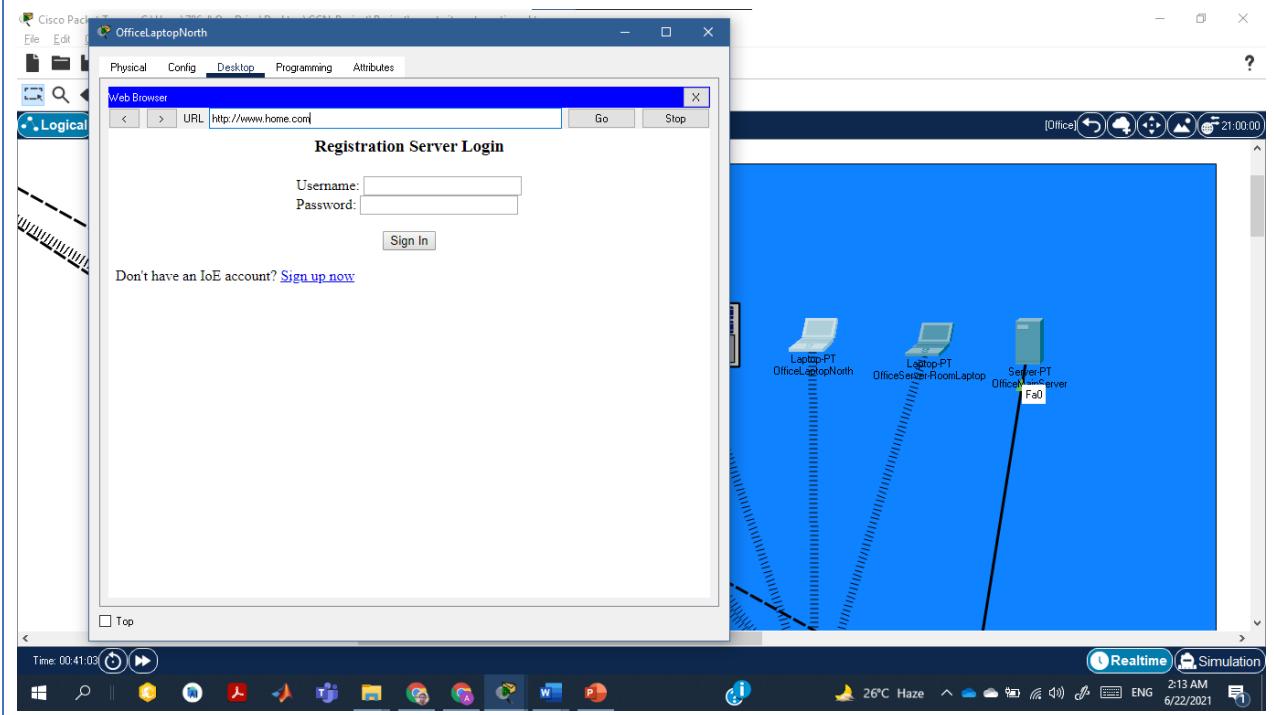
MOTION DETECTION SYSTEM:

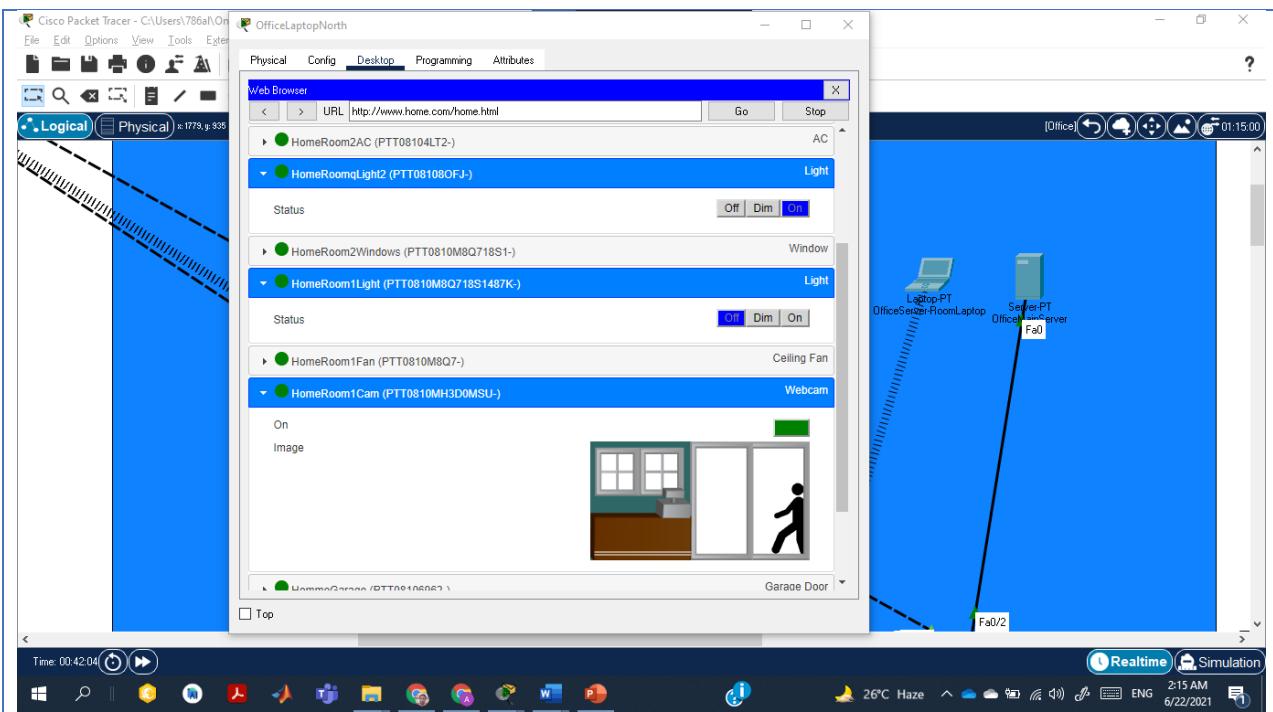




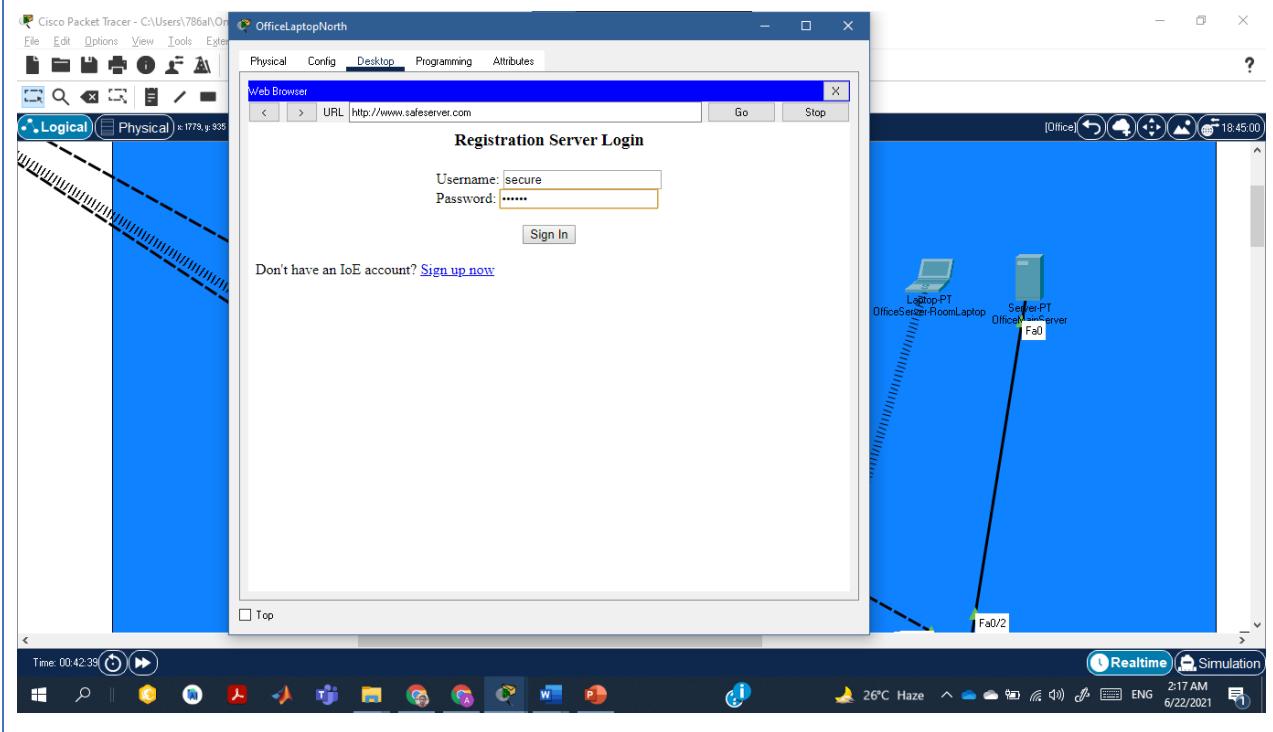
Now in safe City One can remotely manage their Homes.

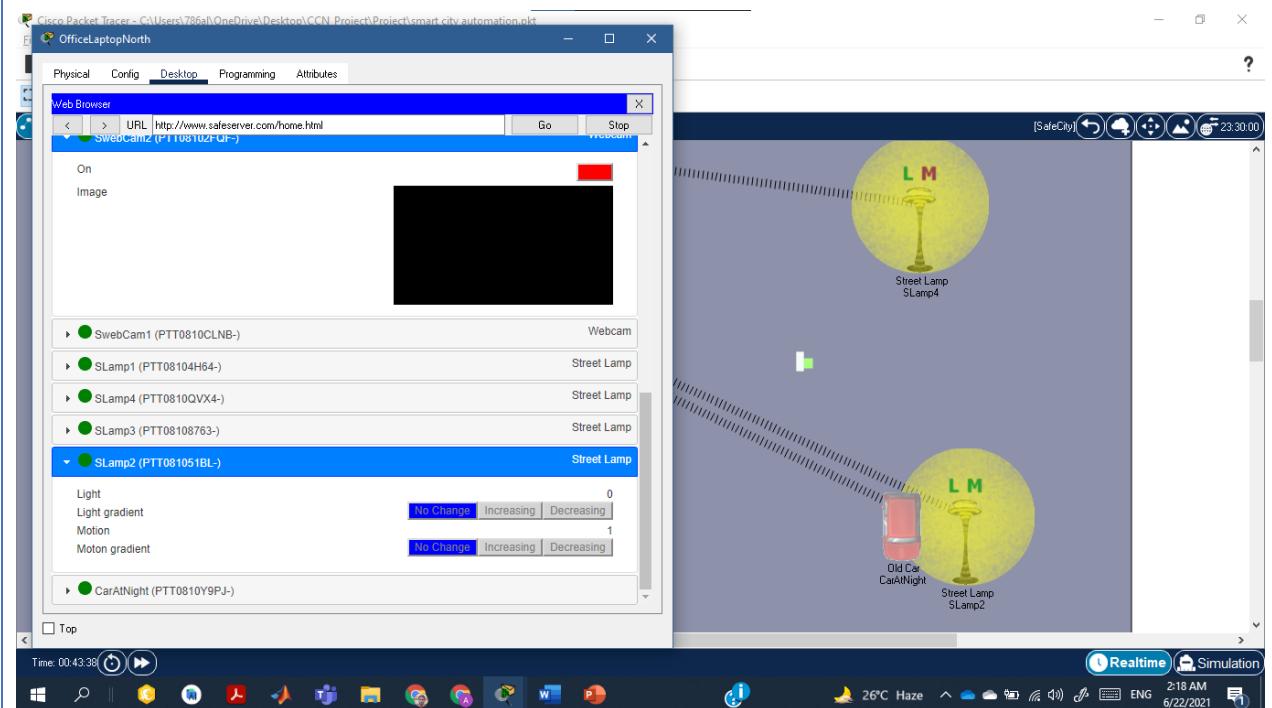
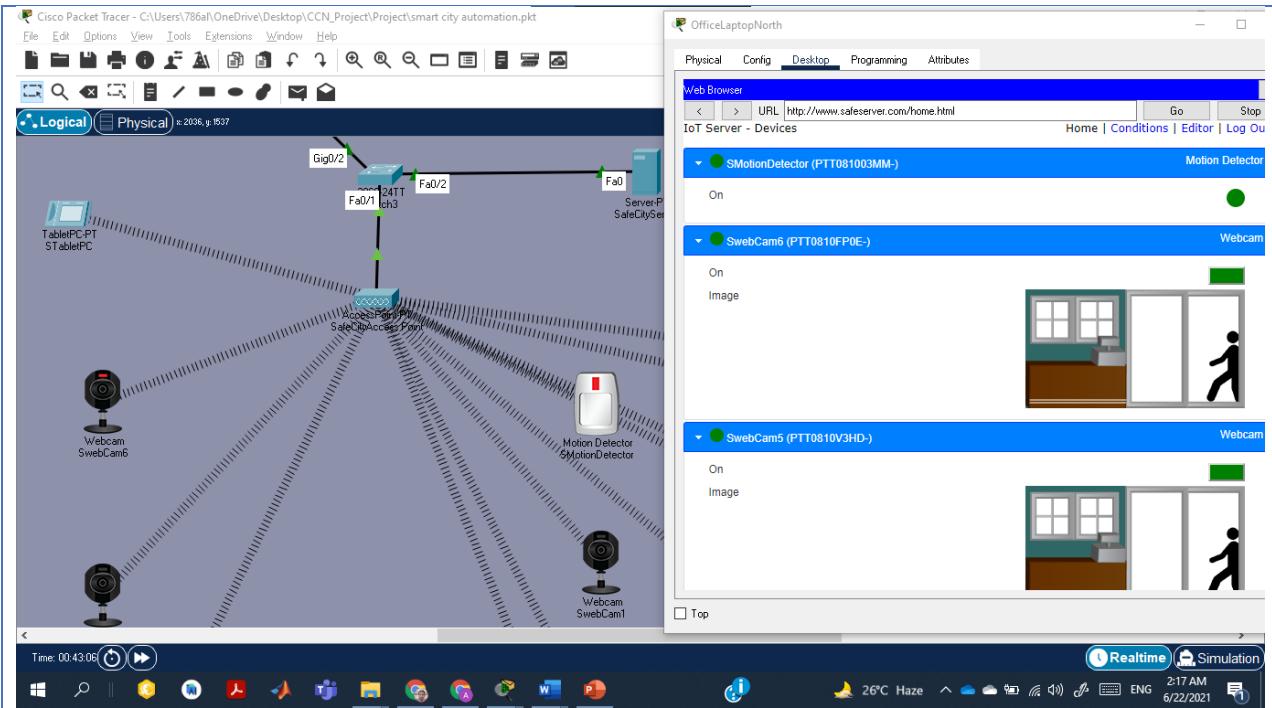
ACCESSING HOME FROM OFFICE:



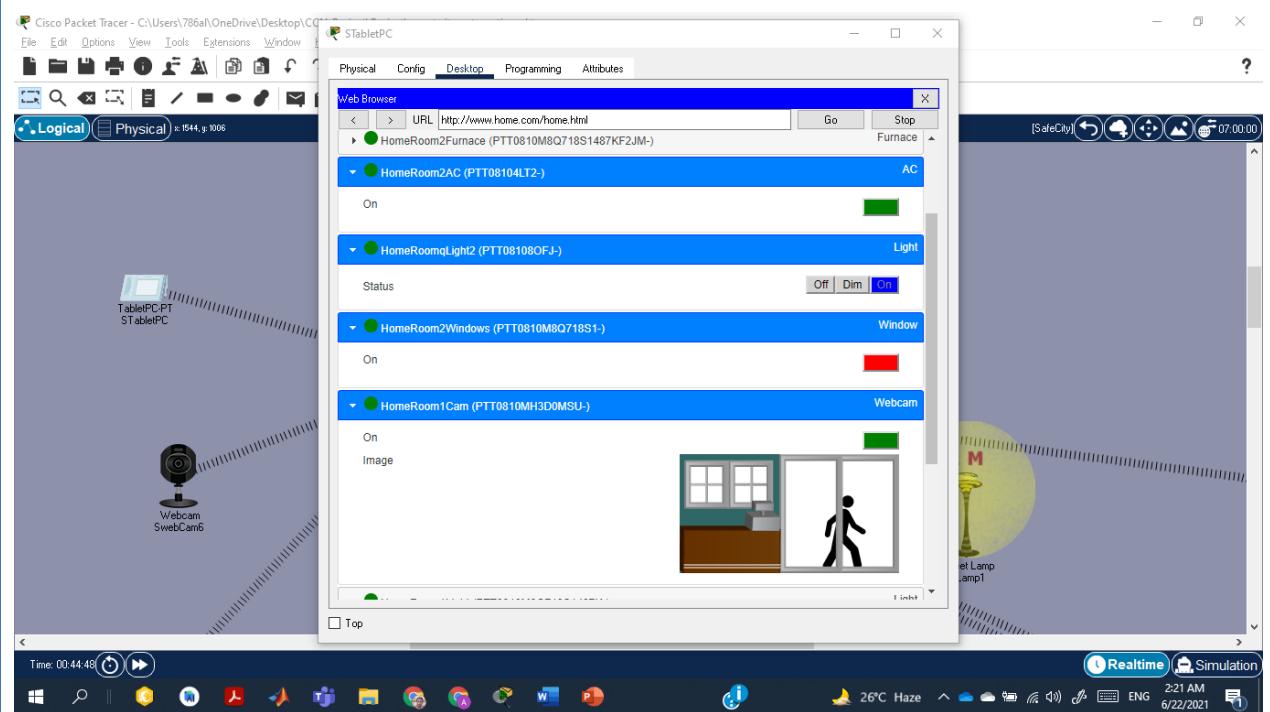
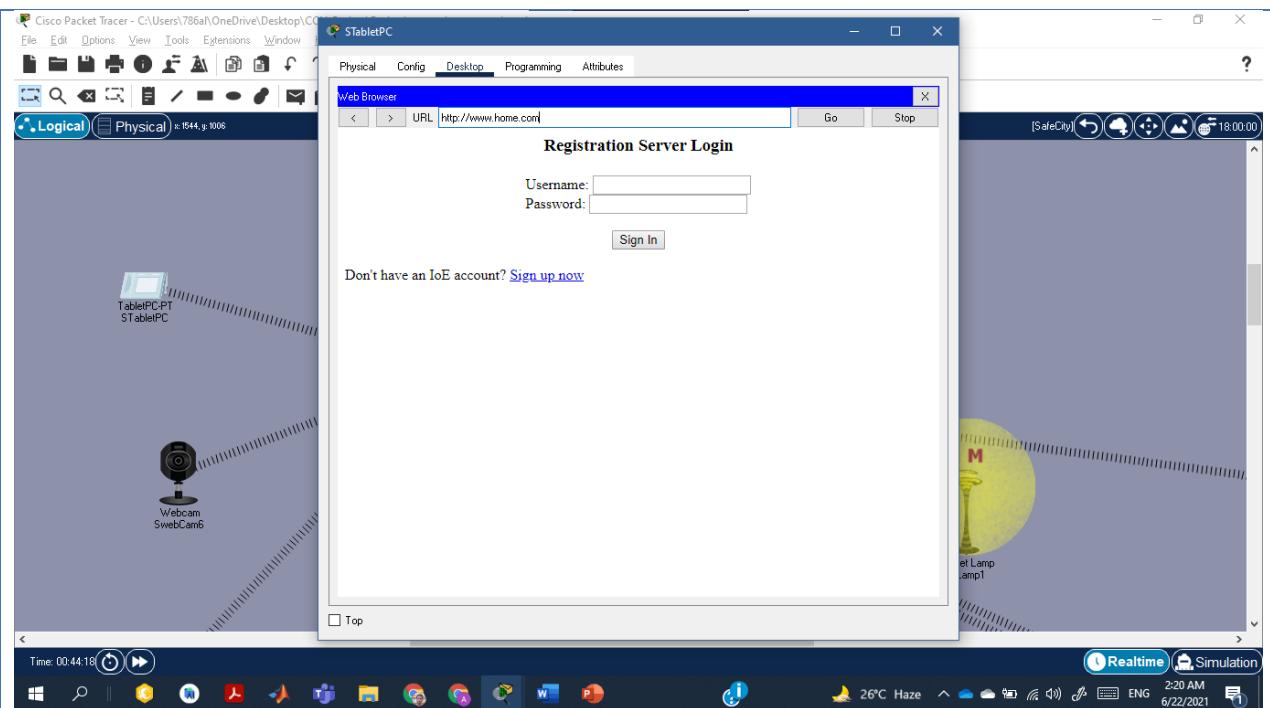


ACCESSING SAFE-CITY SERVER FROM OFFICE:





ACCESSING HOME SERVER FROM ANYWHERE IN SAFE-CITY:



ACCESSING YOUR OFFICE FROM ANYWHERE IN THE WORLD (THAT IS SOME WHERE FROM INTERNET):

