DATTA MEGHE COLLEGE OF ENGINEERING, AIROLI NAVI MUMBAI

A PROJECT REPORT ON

“SMART OFFICE”

FOR

B.E

ENGINEERING, AIROLI, NAVI MUMBAI

A PROJECT REPORT ON

"SMART OFFICE"

SUBMITTED BY

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DATTA MEGHE COLLEGE AIROLI, NAVI MUMBAI (2019-2020)

CERTIFICATE

This is to certify that the project entitled **"SMART OFFICE"** is a bonafide work of **RITESH MAYYA (2016HFIT010), MIRZA NAUMAN (2015HFIT058), PRATIKSHA NAIK (2016HFIT011)**submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **"BE-IT"** in **"Internet of Everything**

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(GUIDE SIGNATURE) (HOD SIGNATURE)

Declaration

I declare that this written submission represents my ideas in my own words and where others ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Ritesh Mayya - 26
Mirza Nauman - 28
Pratiksha Naik - 29)

Date:

Abstract

Technology plays a critical role in all daily activities of the present day. One of these needs is to create a smart office that controls operation and turns off electronic devices via a smartphone. This implementation can be implemented effectively using package tracking software that includes IoT functions to control and simulate a smart office. IoT technology can be applied to many real life issues, such as: homework, treatment, campus, office, etc. In this paper, the focus is on a safe office system that includes devices such as: Web camera, fire alarm, RFID card reader, and doors. The aim of this research is to come up with a simulation of smart devices that can be controlled by the end-user smart device remotely and then show the concept called smart office. Use of Cisco Packet Tracking Features Simulated smart office and IoT devices are monitored. Simulation results show that smart objects can be connected to the office portal and objects can be successfully monitored which leads to the idea of real life implementation.

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Introduction

IOT means "Internet of Things" that defines things and their connections to the Internet. The Internet of Things enables control of local and remote objects by consuming the integration of network technology. IoT connects devices around us as well as over the Internet and automates communications. “Internet of things” is one of emerging technology that allows users to access smart office devices from remote locations. In the assignment, the packet tracer software 7.0 or above version is used to designing and configuring the network for IoT Smart Office.

A smart office is a workplace where technology enables people to work better, faster and, of course, smarter. Beacons, sensors and mobile apps help employees perform menial tasks better and faster, so they have enough time to focus on growing businesses and innovating.

Implementation

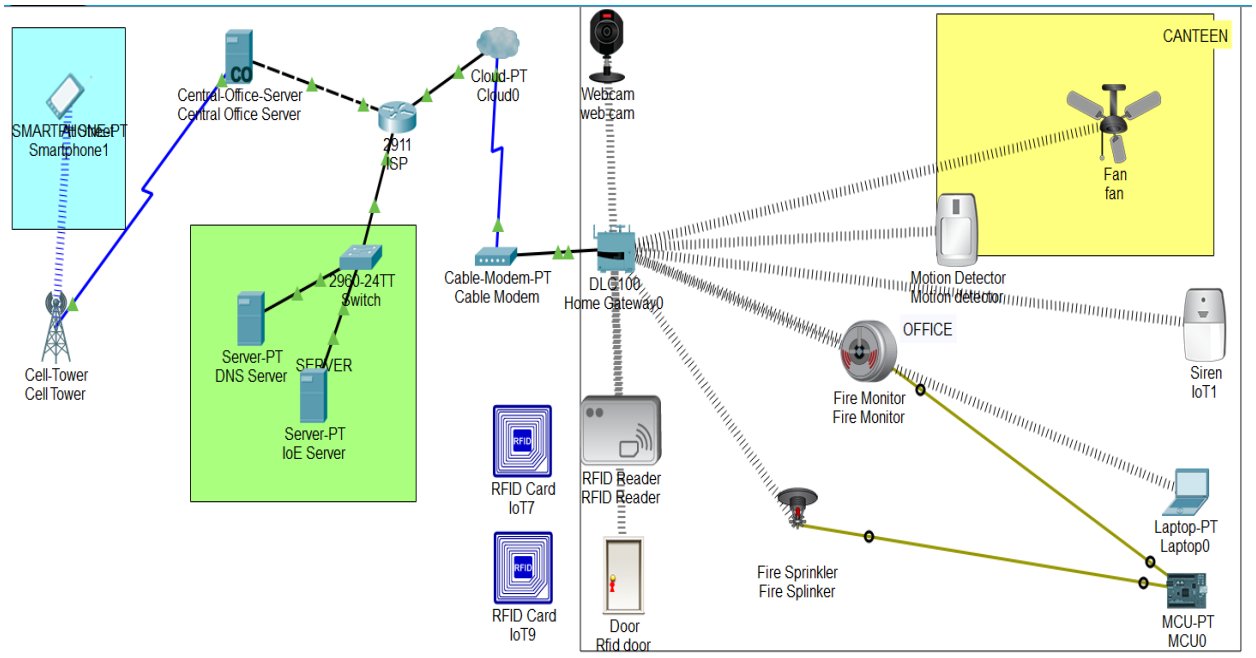
Iot Devices Used in Smart office

- Fire detection system
- RFID Authenticated doors
- Web Camera Surveillance
- Motion activated fans

These devices are linked to a Wireless Router, which is linked via an Ethernet cable to a Cable Modem. The modem is connected to the Internet via an ISP known as Optras. All the devices registered on the Remote Server can be controlled locally by a Tablet which is also connected to the wireless network. There is a Remote Server connected to the Company's Cloud Cluster service (run by Sky Servers), as well as an external server that the Smart office uses for backups.
Ensure that you add all necessary screenshots with the documentation as well as the packet tracer file to be presented to the manager for project approval.

Network Design

We have connected all the sensor used in office through a gateway called Home Gateway. This HomeGateway is connected to cable-modem to connect externally over internet. The sensor node is then connected to the cloud on which data is stored and is processed. The cloud consists of Servers and router to fetch data from various cloud locations to the server. The processed 3 data is then directed to the subscribed client at the end application. The cloud is attached to cable modem using coaxial cable and to the router using copper straight wire present in packet tracer. At End Client Network, the data from the server is achieved through access point i.e. cell tower. The client device can be smartphone or laptop. Central office (CO) server is used to connect to the cell tower wirelessly as show in below figure.



Connection and Configuration:

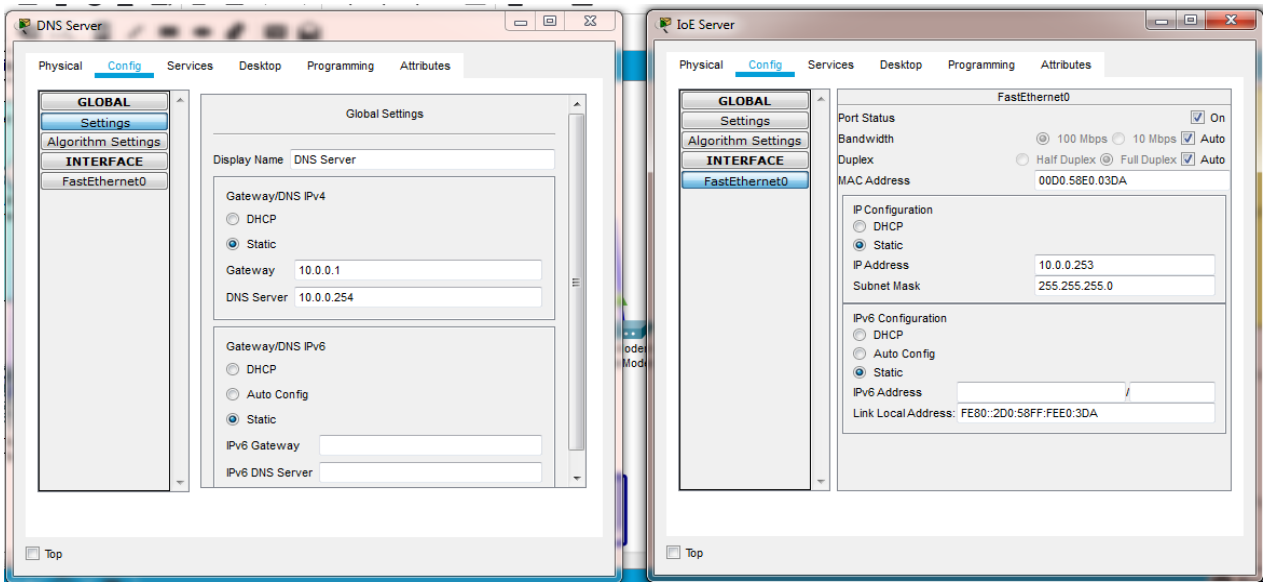
1. **Setting the remote server:**

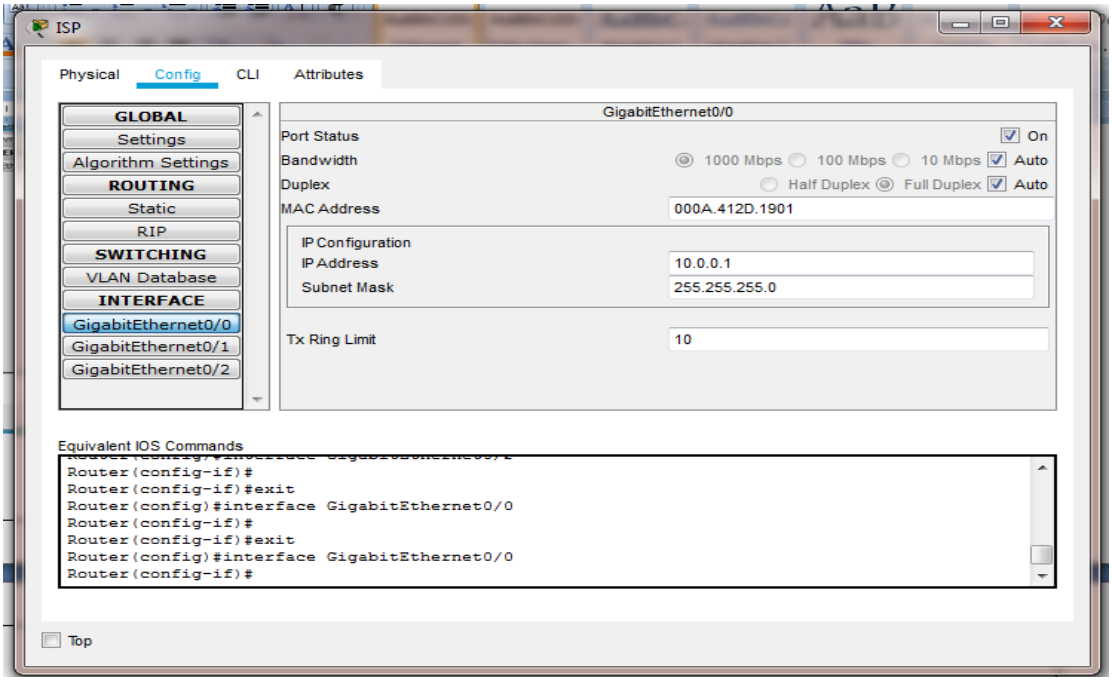
We have set the IP address 10.0.0.1 as a gate way for the remote server. IP configuration for IOE server is 10.0.0.253, this address is used as authentication for interacting with IOT monitoring process. IP configuration for DNS server is 10.0.0.254.

Now on router, since router is connected to home gateway and to servers (IOE Server & CO Server) they need to be configured with IP Address, Subnet mask, Default gateway and DNS server, we have enabled DHCP server so that packet tracer will only configured the address automatically. To enable the DHCP Addressing on Home gateway and servers we have to do the setting in router itself. We need to do the following setting in routerip dhcp excluded-address 209.165.201.225 209.165.201.229

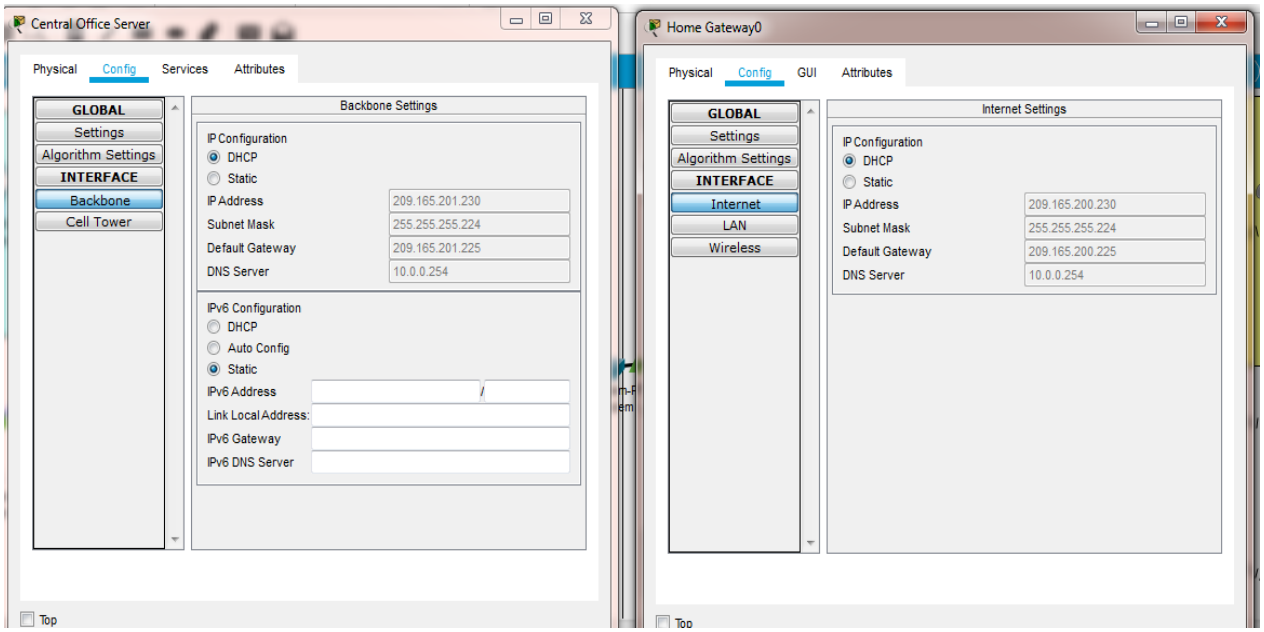
ip dhcp pool CELL
network 209.165.201.224 255.255.255.224
default-router 209.165.201.225
dns-server 10.0.0.254

Below figure shows the configuration of system.



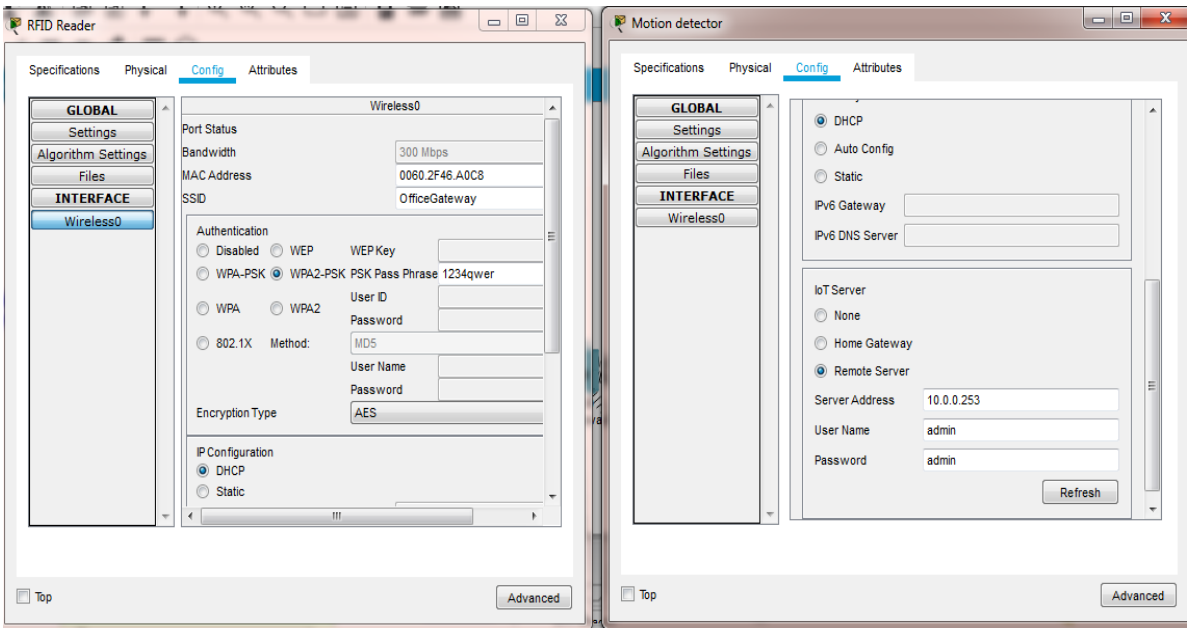


The ip dhcp excluded-address command may be used to reserve addresses that are statically assigned to key hosts Now we can see the homegateway and servers configured automatically with provided addresses as shown bellow.



2. Connection of sensors:

All the sensors are connected to office gateway. In config wireless setting we need to provide Authentication as WPA2-PSK with certain password. DHCP IP Configuration is enabled for IOE Server to get connected. Further all the sensors is been set to Remote server providing the server address as 10.0.0.253 – IOE server IP address, and provide the respective user name and password.



Working of sensor:

1. **Webcam:**

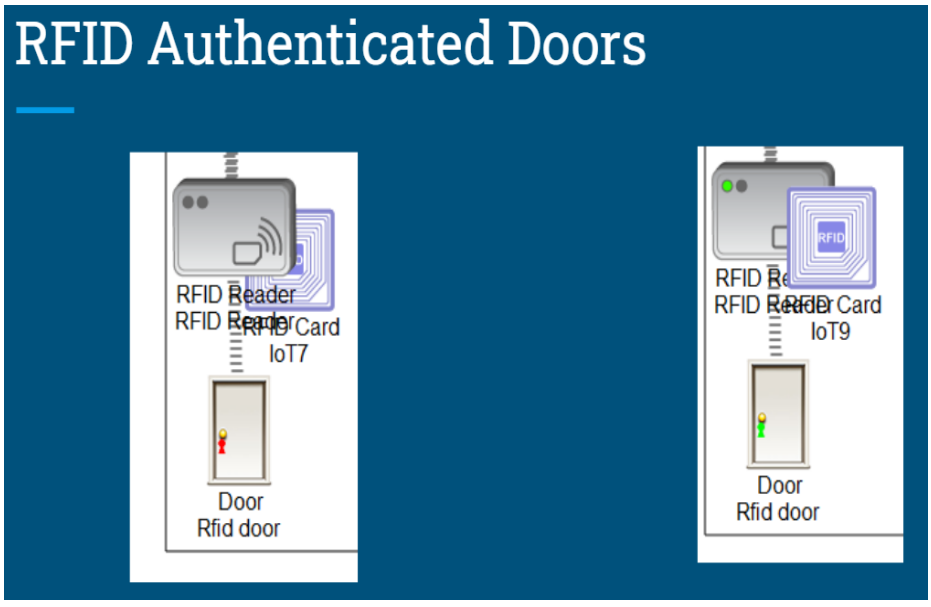
Webcamera is used to record and send the data over the to end-client side. Data would be in the form of image or video.

Features:

- Registration Server Compatible
- Off
- On
- Video recording

2. **RFID Authenticated Doors:**

RFID contain two main component RFID tag and RFIF reader reader is used to identify the fake tag and unique tag. Once the tag is moved over the reader, it checks for the unique tag, if the card is been verified succefully it will proceed further. We have added a condition for the doors to be opened - Door can be unlocked only by using valid RFID card. If anyone wants to enter in the office, he or she has to show RFID. If the RFID is valid, the door will be opened, otherwise not.

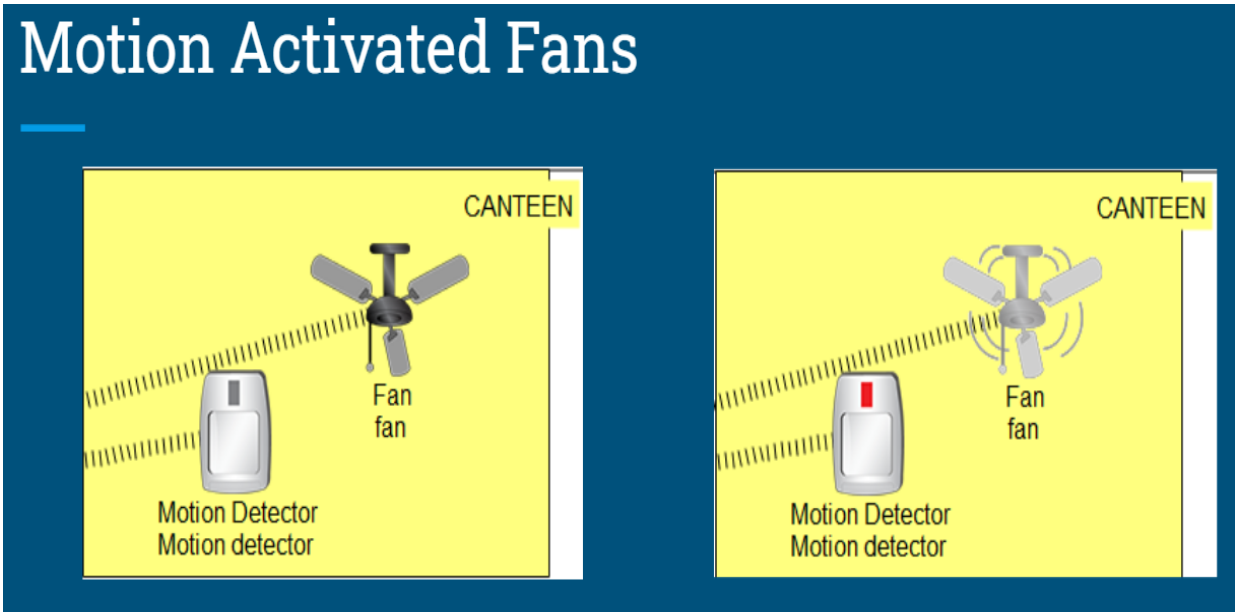


3. Motion Activated fans:

Features:

- Registration Server Compatible
- Detects motion from mouse movement.
- Automatically deactivates after 5 seconds without any mouse movement.

Here when anyone enters the canteen, fan turns on itself detecting the motion. Also admin can control the fan easily.



4. Fire Detection System

- Fire monitor:

It Detects flames by checking for a property and finding if the "IR" property value is in the range the detector considers a fire and outputs a digital signal. Objects that can be on fire should have a device property "IR" with value. The IR range that is detected as fire is specified in the script. Anything near the detector end will be checked for fire and a digital signal of HIGH or LOW will be sent based on the current detection. HIGH for fire, LOW for no fire detected

- Fire Sprinkler

It’s a Sprinkler that puts out fire. It is used to Raises the water level. If anything catches fire, the fire detector will give siren to alert everyone and Fire sprinkler will set On. fire sprinkler is connected with fire monitor by microcontroller unit. MCU is used to set the range of IR.

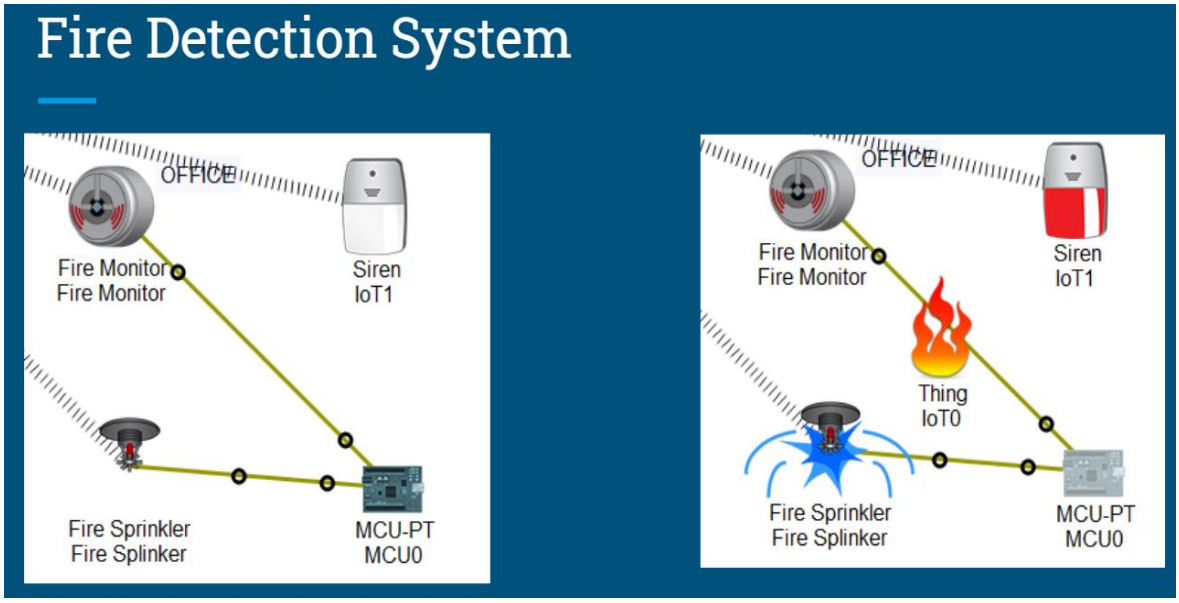
Code:

**********MCU**********

```
from gpio import *
from time import *
def handleSensorData():
        value = digitalRead(0)
        if value == 0:
                customWrite(1, '0')
        else:
                customWrite(1, '1')
def main():
        add_event_detect(0, handleSensorData)
        while True:
                delay(1000)
if __name__ == "__main__":
        main()
```

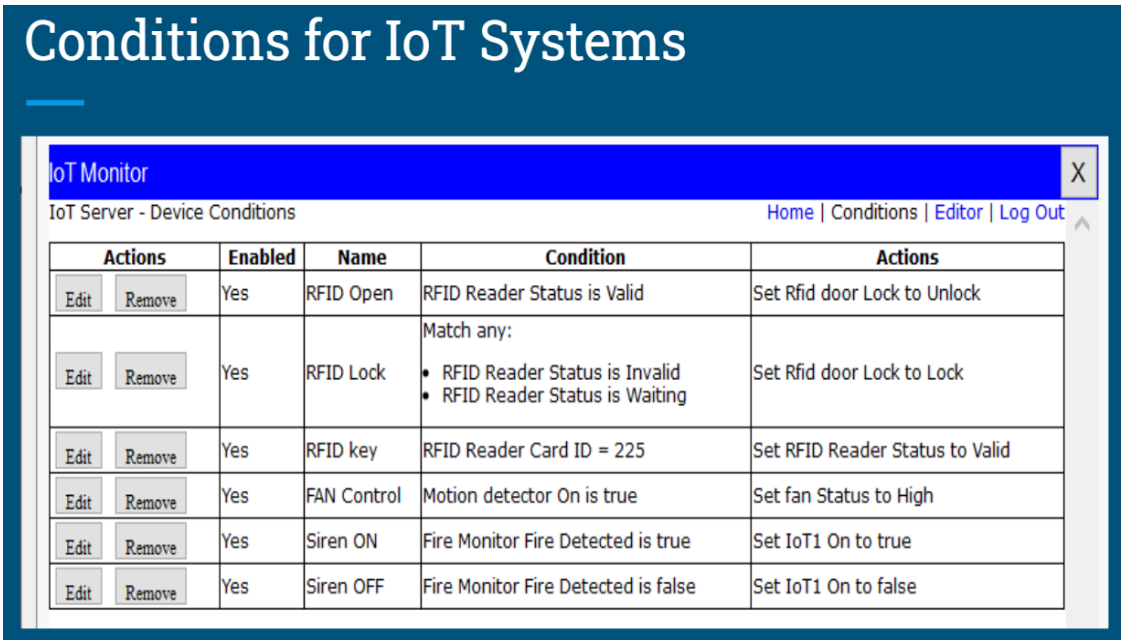
**********code of fire**********

```
from physical import *
def setup ():
   setDeviceProperty(getName(), 'IR', 900)
if __name__ == "__main__":
   setup()
```



Conditions

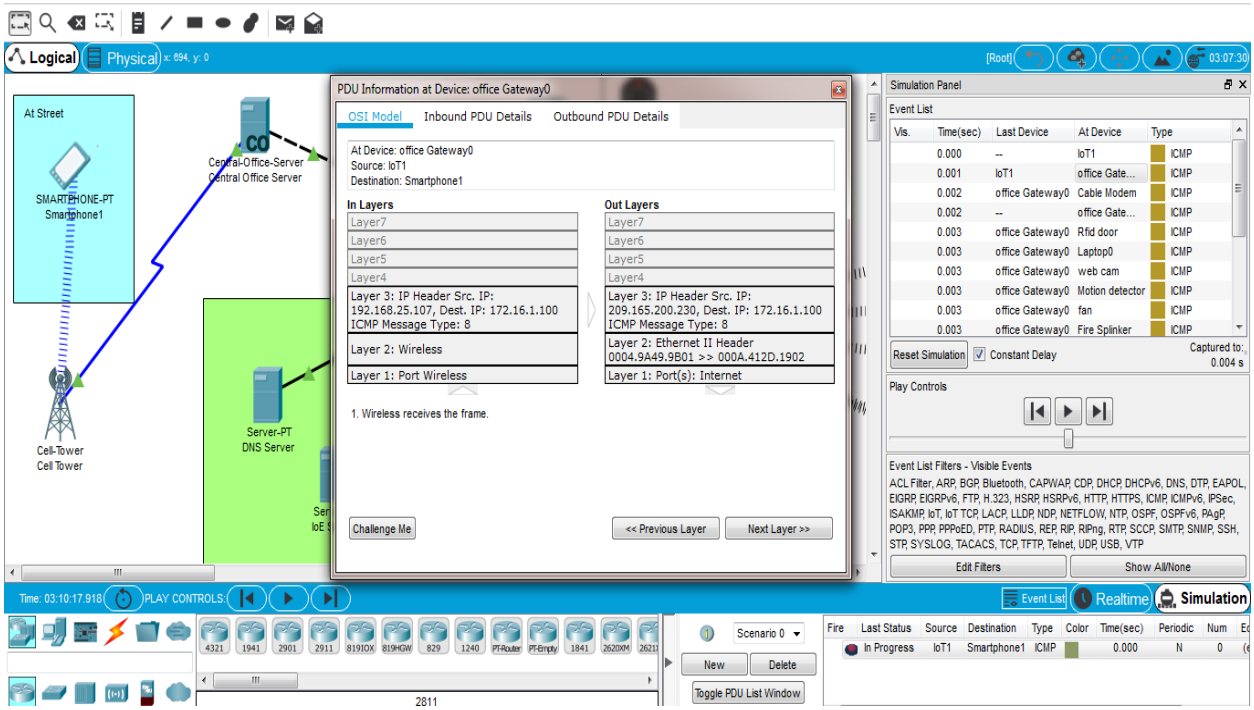
There are certain conditions we have set for the sensor such as Fan will set ON if motion detected by Motion detector, Siren will set ON if Fire monitor detects the fire, etc.



Actions	Enabled	Name	Condition	Actions
Edit Remove	Yes	RFID Open	RFID Reader Status is Valid	Set Rfid door Lock to Unlock
Edit Remove	Yes	RFID Lock	Match any: • RFID Reader Status is Invalid • RFID Reader Status is Waiting	Set Rfid door Lock to Lock
Edit Remove	Yes	RFID key	RFID Reader Card ID = 225	Set RFID Reader Status to Valid
Edit Remove	Yes	FAN Control	Motion detector On is true	Set fan Status to High
Edit Remove	Yes	Siren ON	Fire Monitor Fire Detected is true	Set IoT1 On to true
Edit Remove	Yes	Siren OFF	Fire Monitor Fire Detected is false	Set IoT1 On to false

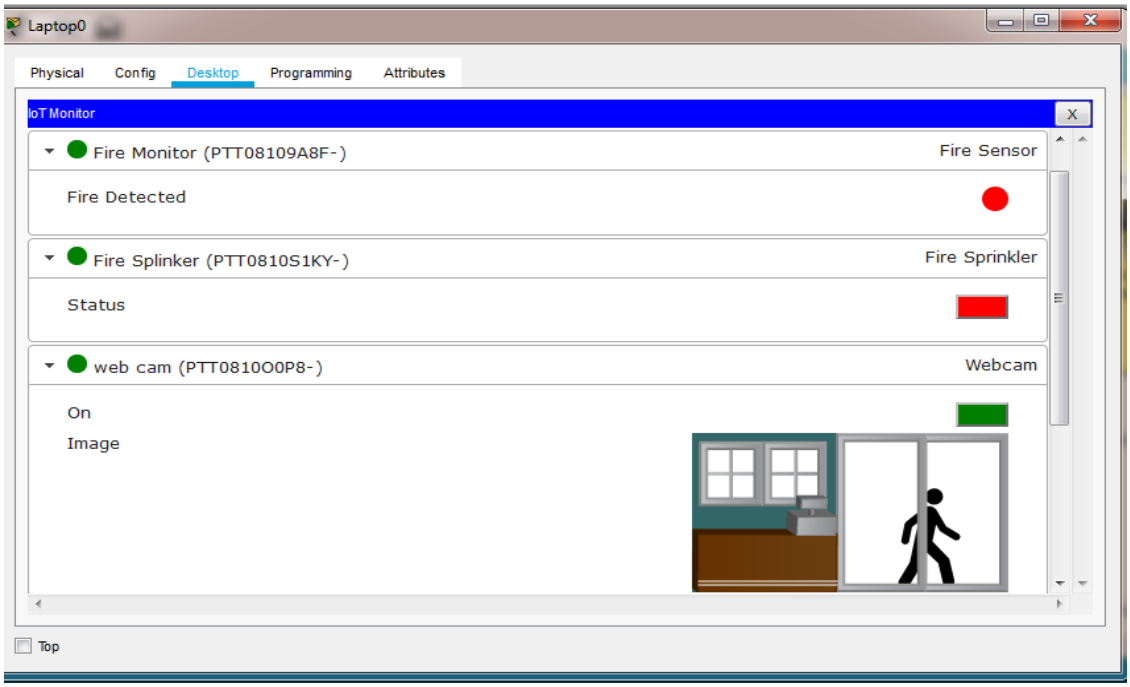
Simulation mode:

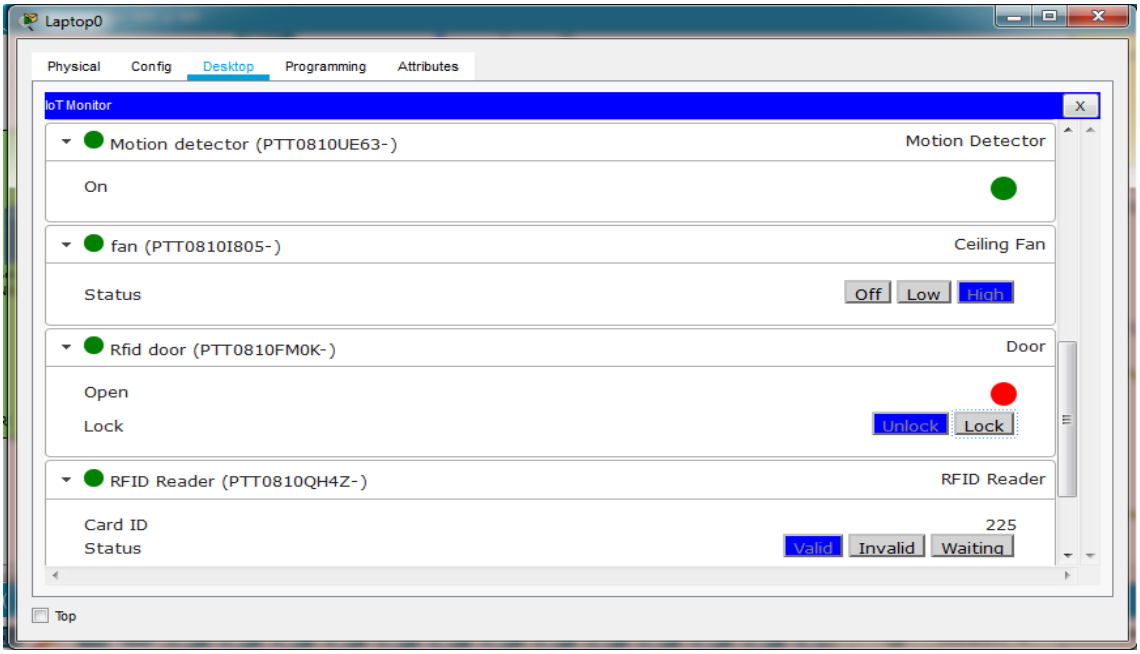
Simulation mode helps to visualize the packets flowing from one node to another and can also click on a packet to see detailed information categorized by OSI layers. The simulation mode specifies the time required for packet to get send from one location to another along with the type or protocol used by them. At each layer the protocol is described here, Transmission control protocol (TCP) for transport layer and HTTP at application layer IP for network layer.



Result:

All the data of sensors can be easily visualized at cliinet side, i.e. through smart phones or laptop. Admin also have the right to control over all the sensors of office.





Conclusion

A smart office is a workplace where modern technology is leveraged to help employees work smarter, better, and faster. This can be achieved by clearing the way of hurdles for the employees. By removing menial tasks and unnecessary obstacles – activities that drain time and energy from the workforce. Workplace surrounded by Internet connectivity, useful sensors and the mobile devices, enables employees to manage time, space and energy effectively and efficiently