AIR QUALITY MONITORING SYSTEM

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Team Details

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Abstract

The Internet of Things (IOT) has opened up new opportunities for creating innovative solutions to address various environmental and health-related issues. Air quality monitoring is one such application where LOT-based systems can be particularly useful. The Cisco Networking Academy has developed an air quality monitoring system using 10T technology to measure and monitor air pollution levels in real-time. The system uses various sensors, including gas sensors and particle sensors, to measure the concentration Of pollutants such as carbon monoxide, nitrogen dioxide, and particulate matter. The data collected from these sensors are processed and analyzed using cloud computing technologies, and the results are displayed on a web-based dashboard. The system also includes an alert mechanism that notifies relevant authorities in case of any alarming situations. This abstract provides an overview of the Cisco Networking Academy's air quality monitoring system and highlights its key features and benefits. The proposed system can be an effective solution for monitoring air quality in various settings, including homes, schools, and industrial areas, to ensure public health and safety.T0 understand the advanced topics in wireless networks and 10T devices, it is necessary to use one of the practical learning tools, called Packet Tracer. This wireless network simulator is freely available by Cisco Networking Academy. In this project, we will use Packet Tracer to design a Air Quality Monitoring System.

Objective

To provide a reliable and cost-effective solution for monitoring air pollution levels in real-time. To simulate an air quality monitoring system using IOT technology in a virtual environment using Packet Tracer. To provide a hands-on learning experience for students and professionals to design, configure, and troubleshoot air quality monitoring systems. To use Packet Tracer to create a system that can measure and monitor air pollution levels in real-time using various sensors, including gas sensors and particle sensors. To process and analyze the data collected from the sensors using cloud computing technologies, and to display the results on a simulated web-based dashboard. To develop an alert mechanism in the simulated air quality monitoring system that can notify relevant authorities in case of any alarming situations, such as high levels of air pollution. To promote awareness about air pollution and its health impacts, and to encourage individuals and communities to take action to improve air quality. To develop a scalable and customizable air quality monitoring system using IOT technology that can be simulated using Packet Tracer for various settings, including homes, schools, and industrial areas. To provide a platform for students and professionals to collaborate and share knowledge and best practices for developing effective air quality monitoring solutions.

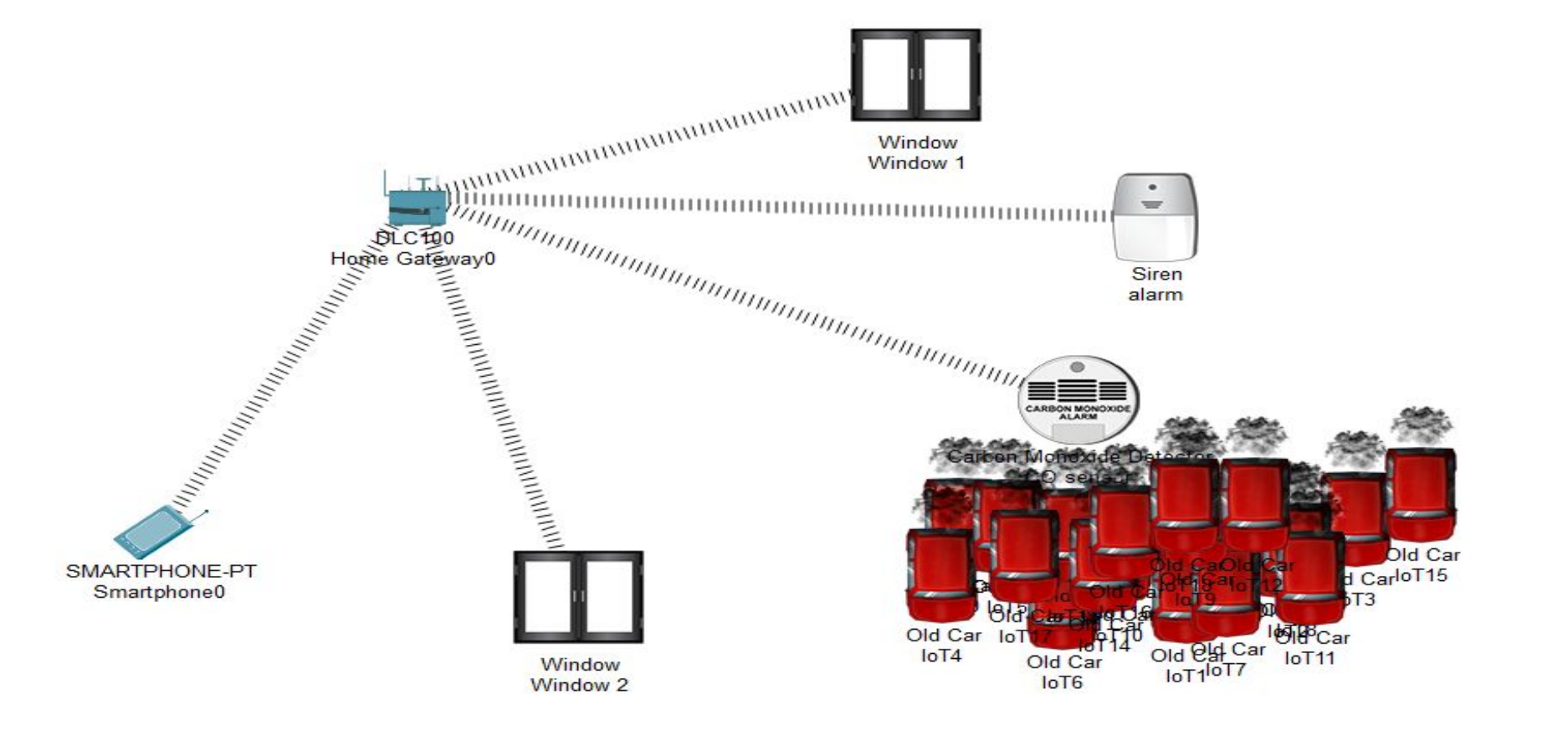
Introduction

An air quality monitoring system is a critical tool for measuring and assessing the level of pollutants and other harmful substances in the air. It helps in safe guarding the environment, ensuring public health and safety, and mitigating the effects of climate change. In this context, Packet Tracer can be a useful tool for simulating and testing air quality monitoring systems. Packet Tracer is a network simulation software developed by Cisco Systems that enables users to design, configure, and troubleshoot complex network topologies in a virtual environment.

By using Packet Tracer, users can create a simulated air quality monitoring system that can be used to monitor and control the air quality in real-time. The system can collect data from various sensors, process the data, and generate reports and alerts based on the analysis. This introduction will provide an overview of the key components and features of an air quality monitoring system using Packet Tracer, and how it can be implemented in different scenarios.

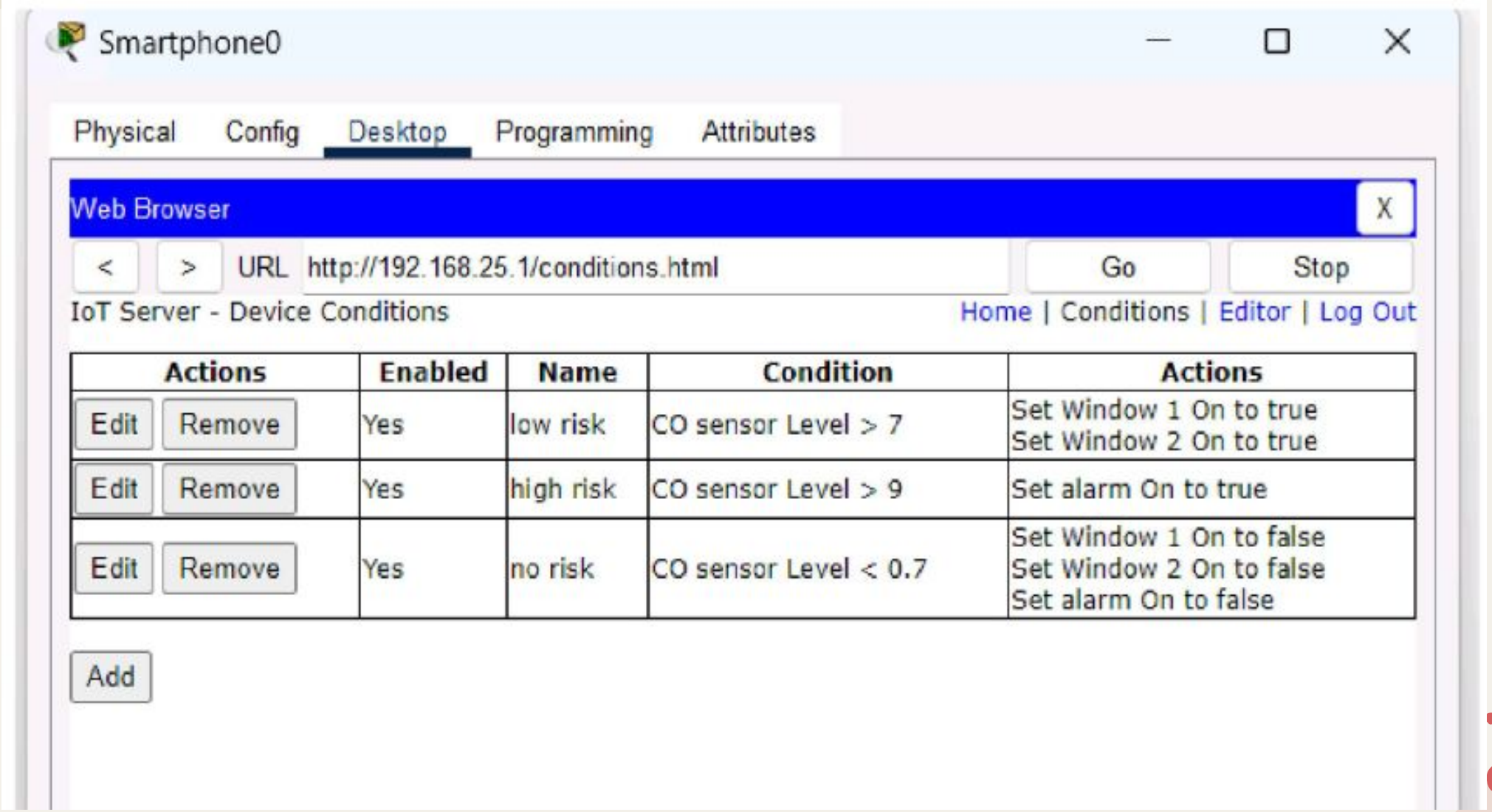
Modules

Air Quality Monitoring System Topology



Network Layout

In network layout we are using
1)one Home Gatewat 0
2)2 window
3)Siren
4)1 Carban Monooxide Sensor
5)Smartphone


Smartphone0
Physical
Config
Desktop
Programming
Attributes
Web Browser
X
<
>
URL
http://192.168.25.1/conditions.html
Go
Stop
IoT Server - Device Conditions
Home | Conditions | Editor | Log Out
Actions
Enabled
Name
Condition
Actions
Edit
Remove
Yes
low risk
CO sensor Level > 7
Set Window 1 On to true
Set Window 2 On to true
Edit
Remove
Yes
high risk
CO sensor Level > 9
Set alarm On to true
Edit
Remove
Yes
no risk
CO sensor Level < 0.7
Set Window 1 On to false
Set Window 2 On to false
Set alarm On to false
Add

Here There are conditions in which the alarm system will work Condition one when there is low risk

- CO sensor Level>7

All the windows are opened

- Condition Two when there is high risk

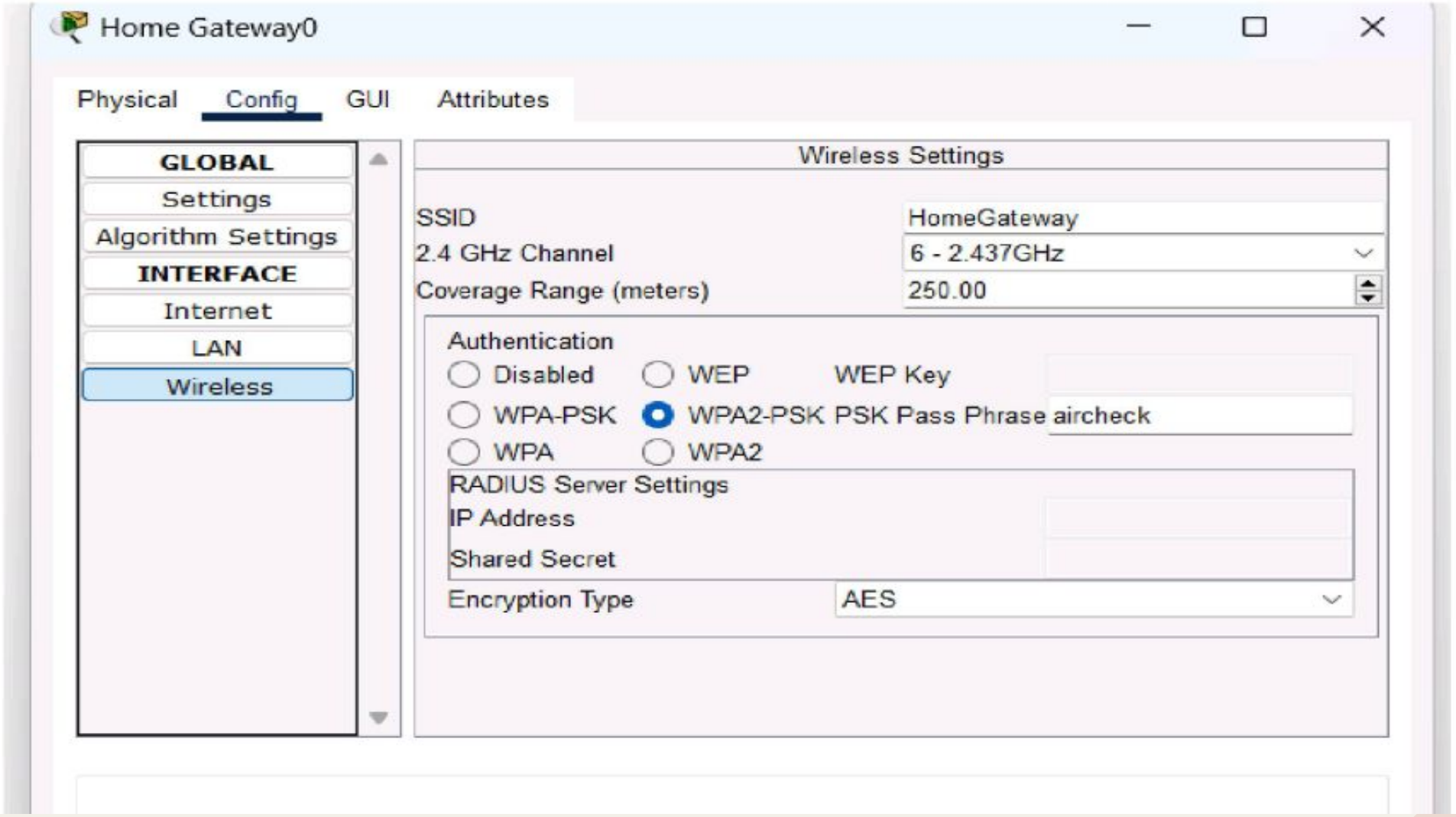
Co sensor level >9

Then the alarm starts ringing

DESIGN REQUIREMENT_ANALYSIS:

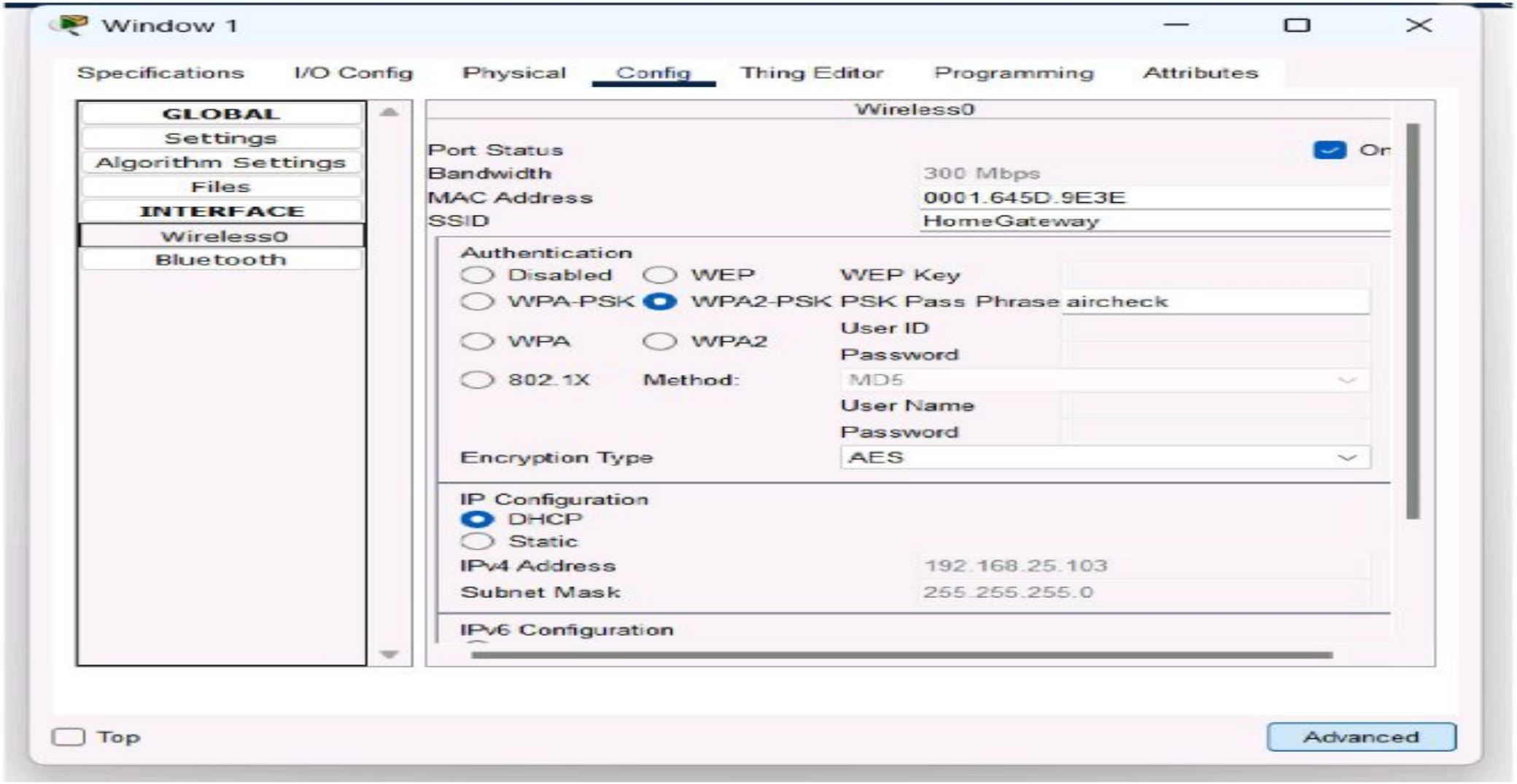
1. The Home gate way is configured with an Ip address and an account is created in the web browser to establish connection with all the connected devices such window, Siren , Carbon Monooxide.
2. Home Gateway is also configured with an Ip address and connected to the registration server via the access point through wireless connection.
3. We also take a couple of old cars to produce smoke. as soon as the connection is established with the necessary conditions, the smoke is let out through the cars and we can see an increase in the level of smoke in Carban Monoxide Sensor
4. As it passes the given conditions of all the risk then it siren starts.

IP ADDRESS DESIGN:

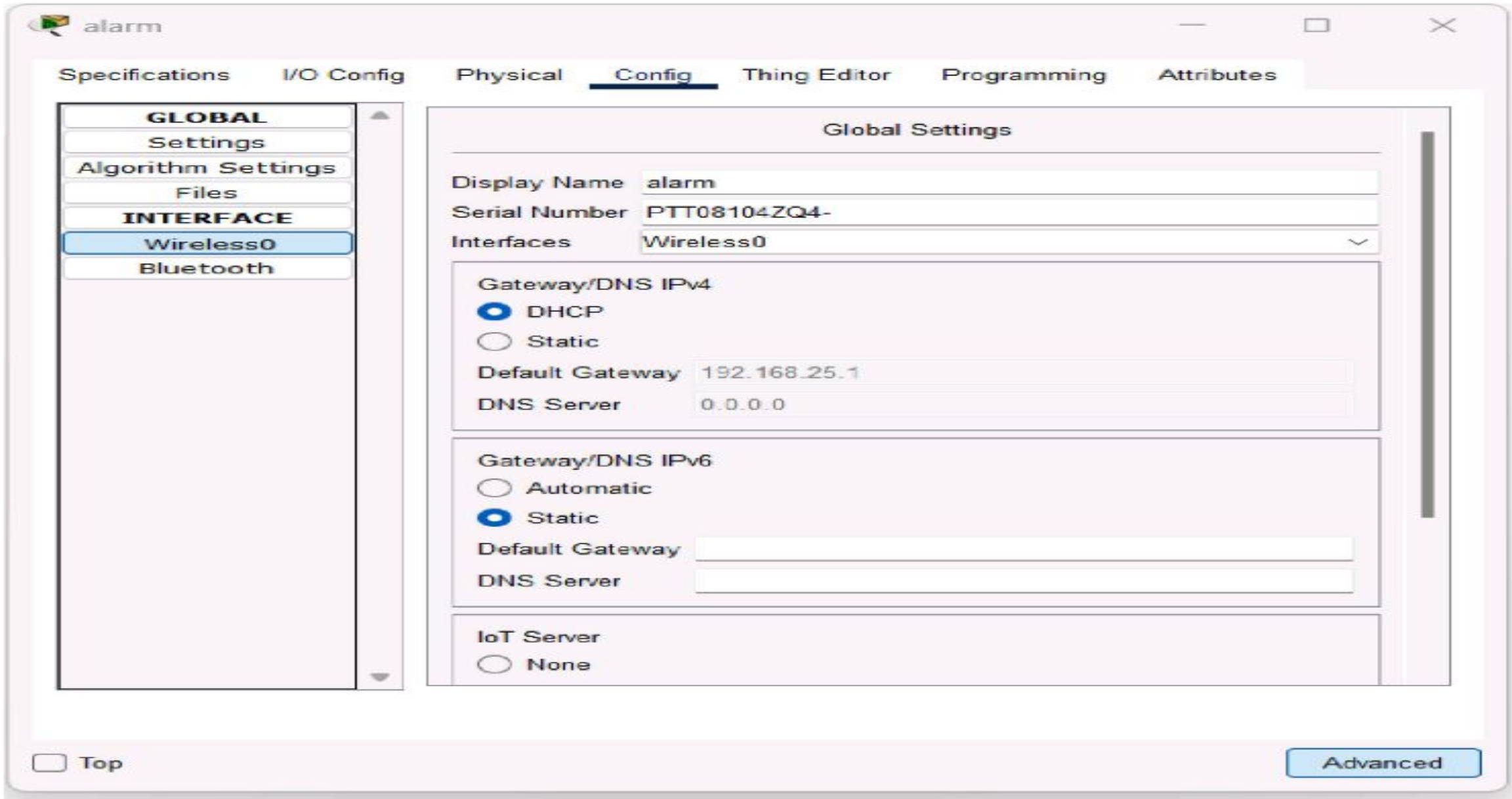


configuration of IP addressing of Home Gateway

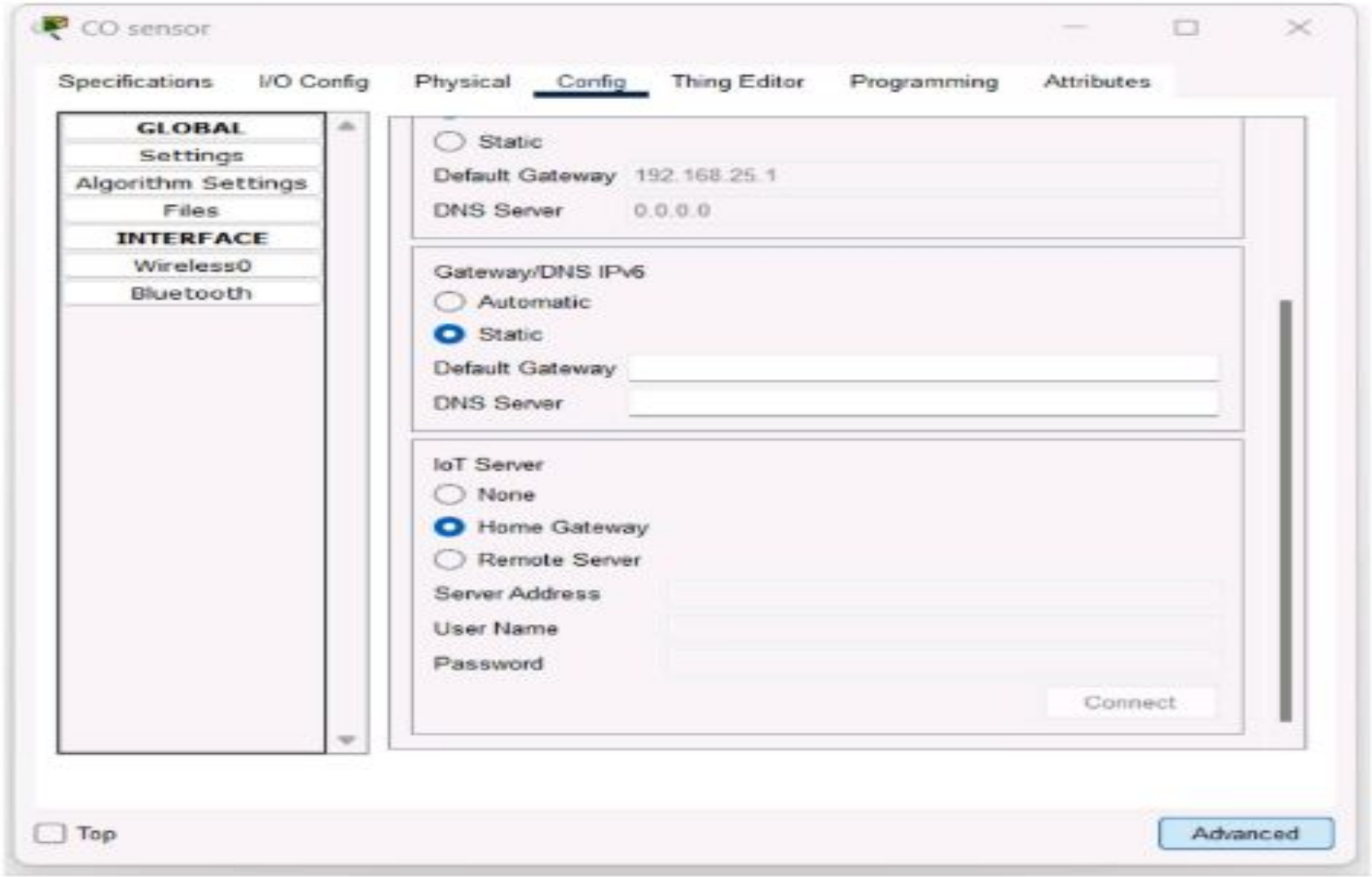
1) **Ip address of Home gateway is 192.168.25.1**



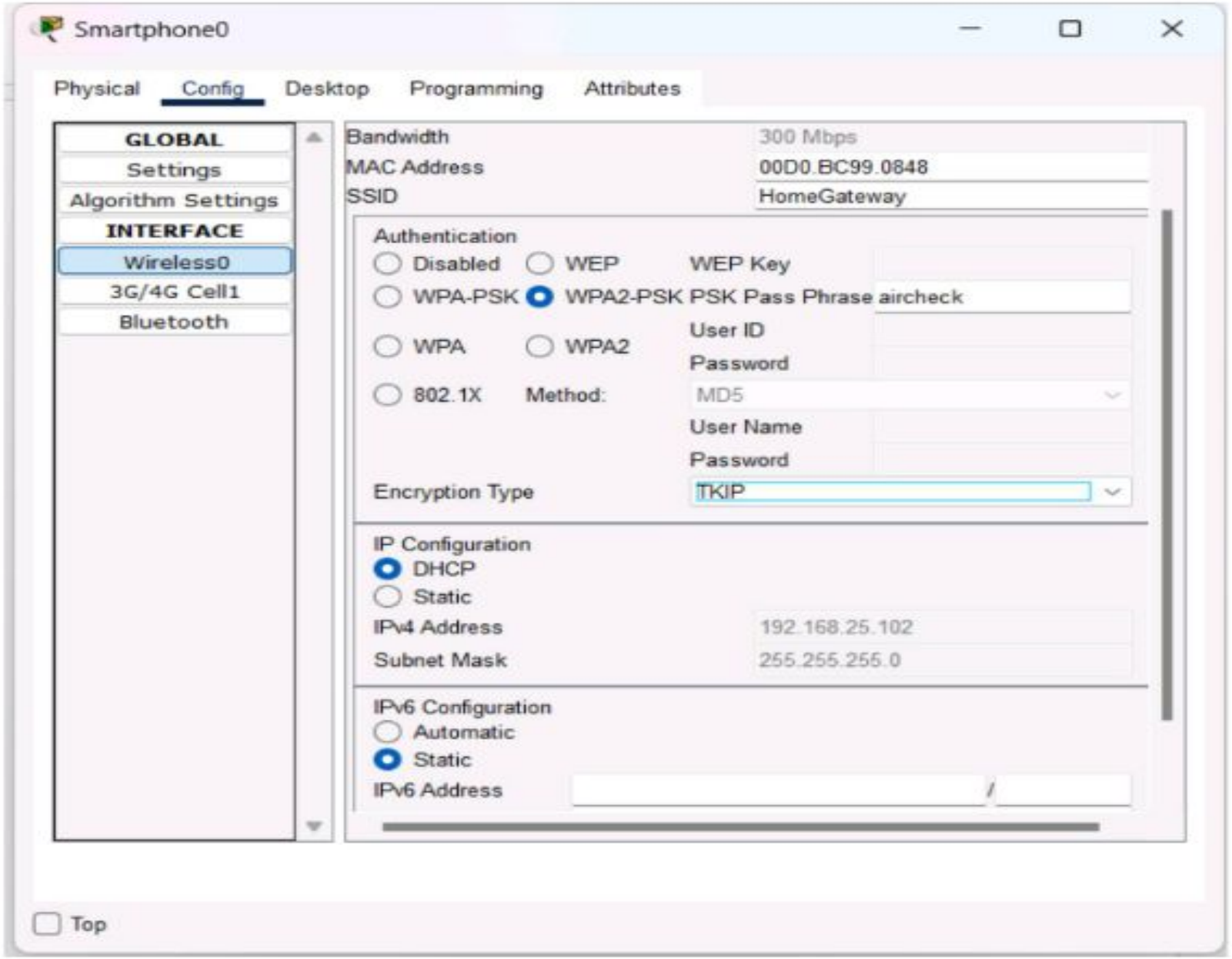
Configuration of Ip Adressing of window 1and window 2



Here we are doing the IP addressing configuration of Alarm to the home Gateway



Configuration of CO sensor with IP Addressing

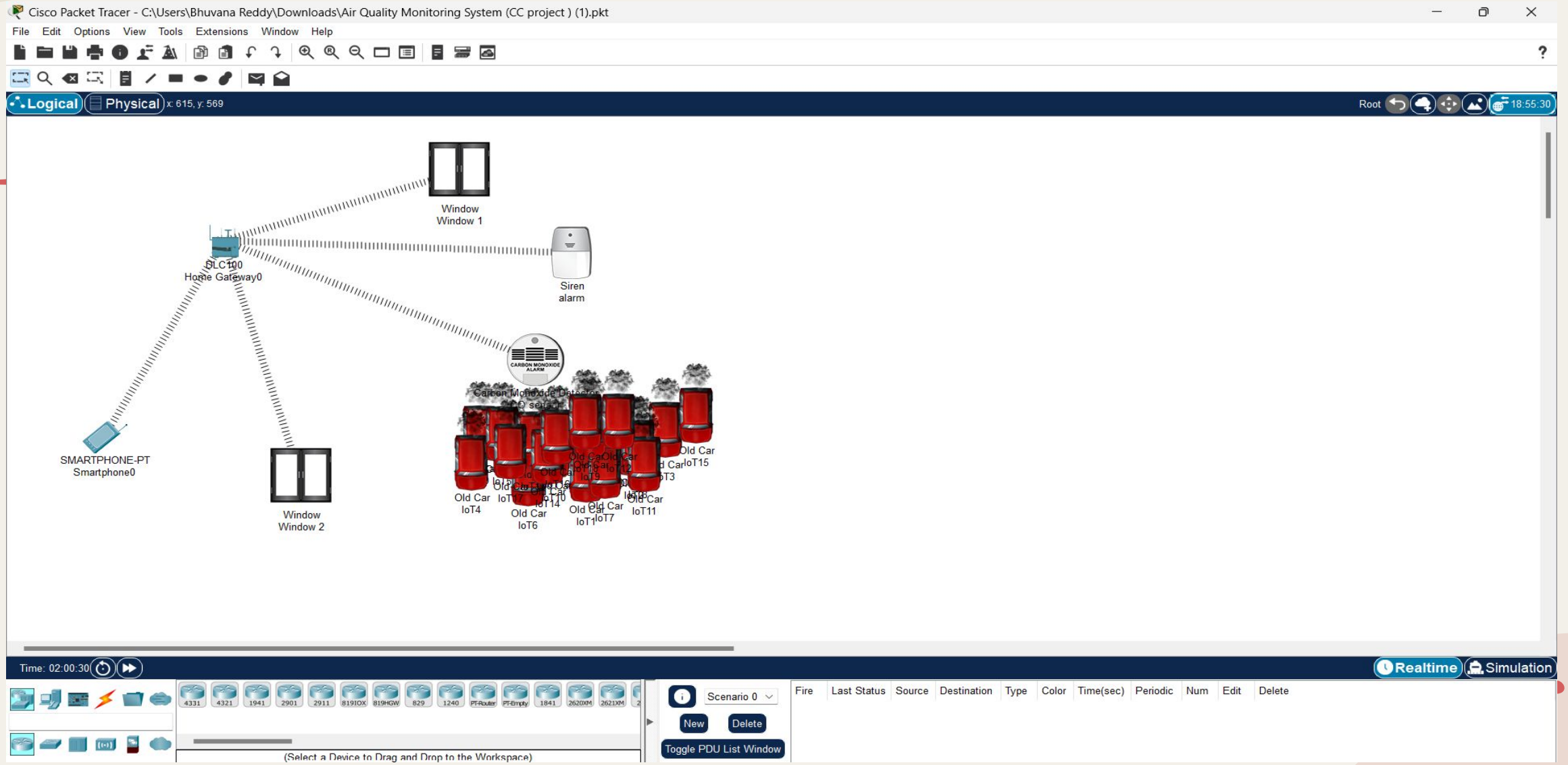


Configuration of IP Addresing Of Home Gateway with Smartphone

Applications

Public Health: Air pollution can cause a range of health problems, including respiratory issues, heart disease, and cancer. Air quality monitoring systems can help identify areas where pollution levels are high, allowing public health officials to take action to reduce exposure and protect public health. Environmental Monitoring: Air quality monitoring systems can be used to track changes in the environment over time, such as the impact of industrial activity or changes in weather patterns. Traffic Management: Air quality monitoring systems can be used to manage traffic by identifying areas where emissions are high and implementing strategies to reduce congestion and improve air quality. Industrial Applications: Air quality monitoring systems can be used in industrial settings to monitor emissions and ensure compliance with environmental regulations. Climate Change Research: Air quality monitoring systems can help researchers understand the impact of climate change on air quality, and how changes in temperature and weather patterns are affecting air pollution levels. Disaster Response: Air quality monitoring systems can be used in disaster response situations, such as wildfires or industrial accidents, to track the spread of pollutants and inform emergency response efforts.

Implementation



Conclusion

To minimize interference, air quality monitoring systems must be designed and maintained to high standards, with regular calibration and quality assurance checks. It is also important to carefully select monitoring sites and account for environmental factors that can impact measurements. Additionally, advanced analytical techniques can help to

identify and remove interference from data, improving the accuracy and reliability of air quality measurements.

Reference

www.packettracernetwork.com

www.researchgate.net

THANK YOU