AN INTERNSHIP REPORT

SMART HOME USING CISCO PACKET TRACER

submitted by

AVINASH G S (113221041019)

in partial fulfillment of the award of the degree

of

BACHELOR OF ENGINEERING

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

VELAMMAL ENGINEERING COLLEGE, CHENNAI-66.

(An Autonomous Institution, Affiliated to Anna University, Chennai)

2023-2024

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Certified that this internship report **"SMART HOME USING CISCO PACKET TRACER"** is the bonafide work of **"AVINASH G S"(113221041019)** carried out at **"EAGLE TECH-IT SOLUTIONS"** during 06.12.2023 to 22.12.2023.

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CERTIFICATE FROM INDUSTRY

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TO WHOM IT MAY CONCERN

This is to certify that **AVINASH G S (Reg.No:21VEC-659)** studying BE- ECE from Velammal Engineering College, Chennai-600066 has successfully completed the internship work under the domain of "**Networking**" in our organization during the period of 06/12/2023 to 22/12/2023

We congratulate you on your presence with us. We are confident that your contribution will take us further in our journey towards becoming world leaders. We assure you of your support for your professional development and growth.

With Warm & Regards,

Manager
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This report of internship work submitted by the above students in partial fulfilment for the award of Bachelor of Electronics and Communication Engineering Degree in Anna University was evaluated and confirmed to be reports of the work done by the above student and then assessed.

Submitted for Internal Evaluation held on.....

EXAMINER 1 **EXAMINER 2** **EXAMINER 3**

ABSTRACT

The "Smart Home using Cisco Packet Tracer" project aims to design and simulate an intelligent and automated home environment leveraging the capabilities of Cisco Packet Tracer. The project focuses on integrating various smart devices, sensors, and networking components to create a seamless and efficient smart home ecosystem. Key components of the project include the deployment of IoT (Internet of Things) devices such as smart lights, thermostats, security cameras, and door locks. These devices are interconnected through a network infrastructure simulated using Cisco Packet Tracer, allowing for centralized control and monitoring. The implementation emphasizes the use of Cisco Packet Tracer's features to model real-world networking scenarios and simulate the communication between different devices. Users can remotely control and monitor their smart home devices through a user-friendly interface, either locally or via the internet. This project not only serves as a demonstration of smart home technologies but also provides a platform for exploring and understanding network design, IoT integration, and automation concepts within the Cisco Packet Tracer environment. The simulation allows for testing and refining the smart home system without the need for physical devices, making it an accessible and educational tool for individuals interested in home automation and network engineering.

ACKNOWLEDGEMENT

I am student of B.E. ELECTRONICS AND COMMUNICATION ENGINEERING, VELAMMAL ENGINEERING COLLEGE, Chennai, solemnly express my sincere gratitude **to "EAGLE TECH-IT SOLUTIONS"** for giving me this wonderful opportunity to gain Profound knowledge about the **"NETWORKING".**

I am highly indebted to my Corporate Mentor Mr.K.LOKESHWARAN and also, I wish to express my hearty thanks to him for giving me this opportunity. I deeply owe a deep sense of gratitude to my Project Guide Mr.K.LOKESHWARAN for his guidance to successfully completing my assigned project.

I wish to thank all the engineers and the operators for spending their time in enriching my knowledge and the support they provide for my work.

UNDER THE GUIDANCE OF

Mr.K.LOKESHWARAN
EAGLE TECH-IT SOLUTIONS,
CHENNAI.

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LIST OF ABBREVIATIONS

TERMS	ABBREVIATION
CPT	Cisco Packet Tracer
LAN	Local Area Network
WAN	Wide Area Network
DHCP	Dynamic Host Configuration Protocol
AAA	Authentication, Authorization and Accounting

CHAPTER 1

INTRODUCTION

1.1 PURPOSE OF THE PROJECT

The purpose of the "Smart Home using Cisco Packet Tracer" project is to provide an educational and hands-on experience for learning network design, IoT integration, and home automation. It serves as a cost-effective and accessible tool for users to explore and simulate smart home technologies, showcasing the capabilities of Cisco Packet Tracer in modeling complex network scenarios.

1.2 ABOUT THE COMPANY

Eagle-Tech IT Solutions is a Technology Solution Providing firm that has been providing industry 4.0 solutions and services to many notable organizations since 2016. They specialize in providing IT-related support services such as Annual Maintenance, Network Consulting, Content Development, etc., and solutions in Artificial Intelligence, Networking, Server, Storage, etc. Its goal is to give customers freedom and satisfaction by providing the highest level of service. They are committed to providing cost-efficient and quality service to customers.

As a Technology Solution Provider, Eagle-Tech IT Solutions builds the industry's best and latest technology IT solutions that fit the unique requirements of customers. Representing the most influential OEMs in the industry, Eagle-Tech IT Solutions rides the cutting edge of the technology wave. They digitally transform Very Large Enterprises, Small and Medium Enterprises, Small and Medium Businesses, and start-ups inside out. The solutions we represent, implement, and support are designed to launch customers from their current state into a more mature IT arena, setting them above the competition. They strive to build quality solutions that bring efficiency, effectiveness and return on investments.

Fig 1.1 Eagle-Tech IT Solutions logo

1.3 SOLUTIONS AND SERVICES

They provide Industry 4.0 solutions such as AI, AR/VR, Data Center, Machine learning, Security, Networking, Server and storage, Robotic Process Automation, and Deep learning. Services include Annual Maintenance Contract (AMC), Color Calibration, Data Center, Infrastructure Management, IT Consulting, Content Development VR/AR/MR, Networking Consulting, Cyber Security, and Security Auditing. They also use software such as Adobe, IBM, Microsoft, Oracle, Commvault, VMware, Citrix, Kaspersky, McAfee, etc.

1.4 EVENTS

They also conducted various events with Adobe, EVO, Dell, Oracle, etc. Eagle-Tech IT Solutions. It was an elaborate explanation of the product and the audience was said to attend the event. We got a list of positive feedback from the attendees. It was an informative event. The speakers have skilfully presented “Oracle Database Appliance – The Cloud-ready engineered system for Business”. They had interactions with the audience about the technical benefit of the spoken product features and its competitive analysis. The audience of the event was happy that they gained worthy information about the leading products.

ETS is one of the leading bootstrapped pure-play IT Services and Software development companies that are on a mission to provide an industry-leading platform for software applications. ETS is constantly expanding its family and is looking for dynamic freshers and graduates with a background in Computer Science. Once a part of the family, you can be confident that your career is in safe hands. ETS has clients all over the world that hand you the opportunity to work on a variety of projects. If you believe testing to be your forte, then ETS is one of the best places you could work in.

CHAPTER 2

PROBLEM STATEMENT

2.1 REALITY

In reality, a smart home using Cisco Packet Tracer would be a simulated environment rather than an actual implementation. Cisco Packet Tracer is a network simulation tool, not a physical home automation platform. In a real-world scenario, implementing a smart home involves using dedicated hardware devices, sensors, and a compatible home automation system or platform. However, using simulation tools like Cisco Packet Tracer is valuable for educational and testing purposes, allowing users to experiment with network configurations and understand the principles of smart home technologies without the need for physical devices. Real-world smart home implementations typically involve devices from various manufacturers, communication protocols (such as Zigbee, Z-Wave, or Wi-Fi), and a central hub or cloud-based platform for control and automation.

2.2 CONSEQUENCES

Using simulation tools like Cisco Packet Tracer for a smart home provides a cost-effective and safe learning environment but lacks the real-world complexities. Actual implementations offer practical experience, but involve higher costs, interoperability challenges, and security considerations. The choice depends on learning goals and available resources.

2.3 IDEAL SOLUTION

- ✓ Practical Experience: Hands-on understanding of device installation and troubleshooting.

- ✓ Interoperability Challenges: Devices from different manufacturers may not seamlessly integrate.
- ✓ Cost Considerations: Involves purchasing physical devices, maintenance costs, and potential infrastructure expenses.
- ✓ Security and Privacy Concerns: Connecting physical devices raises security and privacy considerations.

The choice depends on learning objectives, resources, and goals.

2.4 PROPOSAL

Implement an educational smart home using Cisco Packet Tracer for cost-effective learning. Simulate network scenarios, IoT integration, and automation. Combine with real-world devices for practical experience, addressing interoperability, cost, and security considerations. A blended approach for comprehensive skill development.

CHAPTER 3

LITERATURE REVIEW

3.1 NETWORKING

Networking, also known as computer networking, is the practice of transporting and exchanging data between nodes over a shared medium in an information system. Networking comprises not only the design, construction and use of a network, but also the management, maintenance and operation of the network infrastructure, software and policies. Computer networking enables devices and endpoints to be connected to each other on a local area network (LAN) or to a larger network, such as the internet or a private wide area network (WAN). This is an essential function for service providers, businesses and consumers worldwide to share resources, use or offer services, and communicate. Networking facilitates everything from telephone calls to text messaging to streaming video to the internet of things (IoT).The level of skill required to operate a network directly correlates to the complexity of a given network. For example, a large enterprise may have thousands of nodes and rigorous security requirements, such as end-to-end encryption, requiring specialized network administrators to oversee the network. At the other end of the spectrum, a layperson may set up and perform basic troubleshooting for a home Wi-Fi network with a short instruction manual. Both examples constitute computer networking. It involves the establishment of connections or relationships between different components to facilitate the exchange of information, resources, or services. In the context of computer systems, networking specifically pertains to the arrangement and configuration of devices, such as computers or servers, to enable communication and collaboration through data transmission, typically over a network infrastructure.

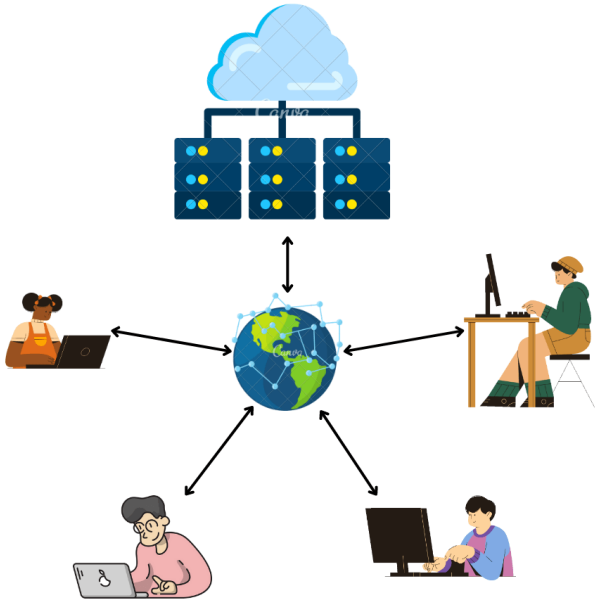


Fig 3.1 RealTime Networking

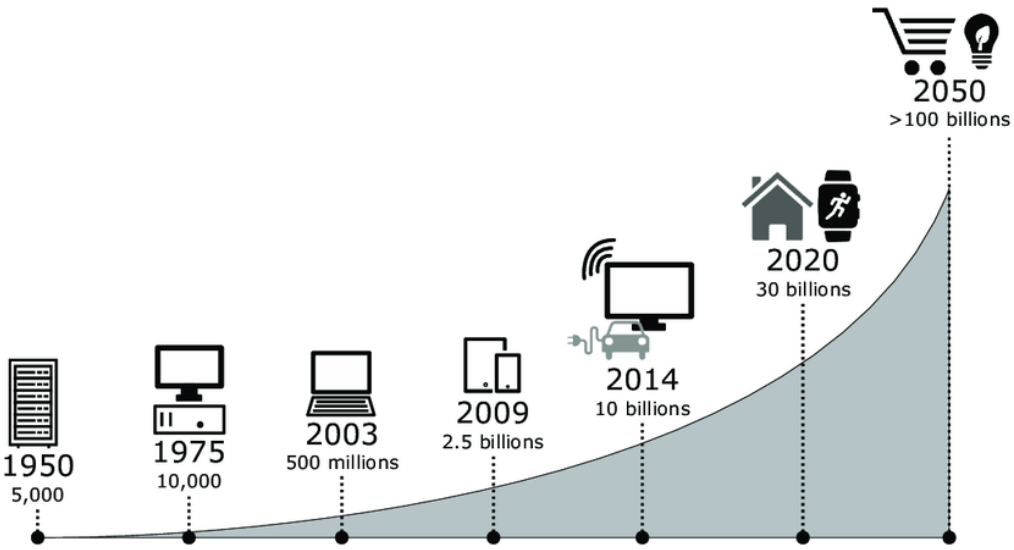


Fig 3.2 Growth of IoT

3.2 CISCO PACKET TRACER

Cisco Packet Tracer stands as a pivotal tool in the realm of network simulation, developed by the networking giant Cisco Systems. Renowned for its versatility, this application provides users with a comprehensive platform to design, configure, and simulate network environments within a virtual space. Offering an immersive experience, Packet Tracer allows users to create intricate network topologies, test configurations, and gain hands-on experience with Cisco devices without the requirement for physical hardware. By replicating real-world networking scenarios, Packet Tracer enables learners to explore and comprehend the intricacies of routing, switching, and network protocols. Its intuitive interface supports the emulation of various Cisco devices, including routers, switches, and end devices, facilitating a holistic understanding of network infrastructure. Cisco Packet Tracer's impact extends beyond the classroom, serving as a valuable resource for network professionals seeking to test and validate configurations in a risk-free environment. Its versatility allows for the emulation of WAN connections, servers, and IoT devices, making it a comprehensive tool for simulating complex network architectures. The application's continuous updates and improvements underscore Cisco's commitment to providing a cutting-edge platform for network simulation and education. In essence, Cisco Packet Tracer stands as a cornerstone in the educational and professional journey of networking enthusiasts, offering a powerful and accessible means to explore the intricacies of networking technology. Essentially, Packet Tracer provides a virtual platform for learning and practicing networking concepts. Users can design and implement network topologies, configure devices like routers and switches, and observe how data flows within the simulated network.

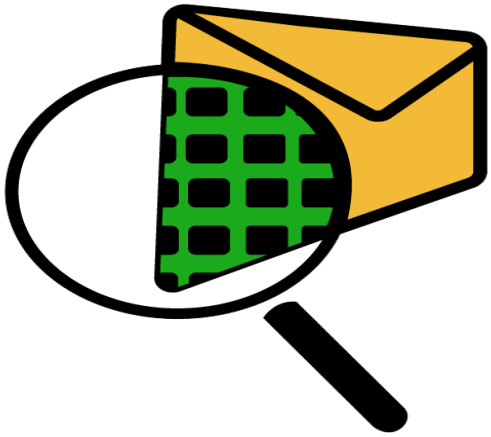


Fig 3.3 Cisco Packet Tracer Logo

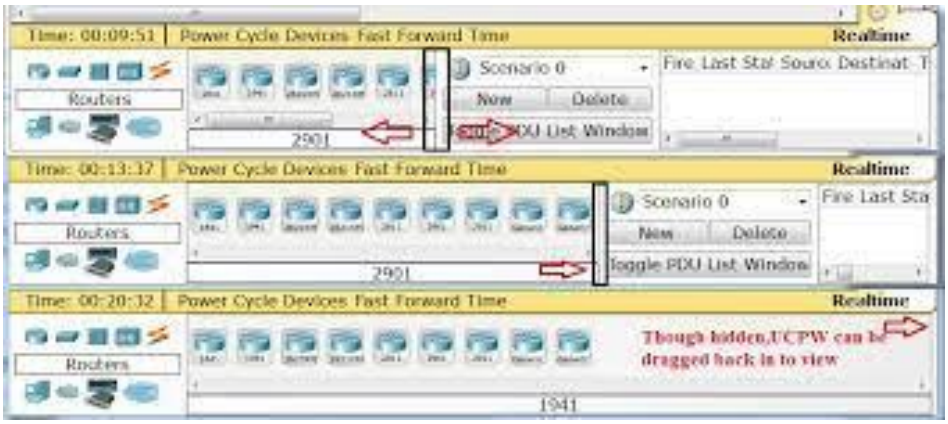


Fig 3.4 Interface of CPT

3.3 ADVANTAGES OF CPT

Cisco Packet Tracer offers cost-effective and versatile network simulation for educational purposes. Its user-friendly interface and real-time simulation capabilities make it accessible for learners at various levels. The tool supports a wide range of devices and protocols, integrates with Cisco Networking Academy, and continually receives updates, ensuring relevance and up-to-date learning experiences. Its ability to emulate WAN connections enhances its utility for diverse networking scenarios. Overall, Packet Tracer is a valuable resource for hands-on learning and skill development in networking.

3.4 SUBNETTING

Subnetting is the practice of dividing a larger network into smaller, more manageable segments. It involves breaking down IP addresses into smaller groups, called subnets, which helps with efficient address usage, improved network performance, and enhanced security. This process is achieved by using subnet masks, which define the boundary between the network and host portions of an IP address.

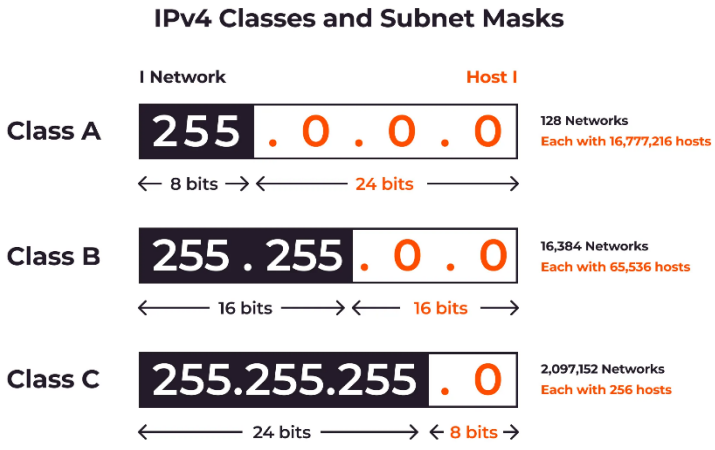


Fig 3.5 Subnet Masks

3.5 DHCP

Dynamic Host Configuration Protocol (DHCP) is a network protocol that facilitates the automatic allocation and management of IP addresses and other essential network configuration parameters for devices within a network. Its primary function is to streamline the process of assigning IP addresses dynamically to devices, eliminating the need for manual configuration. In the DHCP process, when a device connects to the network, it sends a DHCP request broadcast to discover available DHCP servers. A DHCP server, responsible for managing IP address assignments, responds with a DHCP offer, providing an available IP address along with configuration details. If the device accepts the offered IP address, it sends a DHCP request to the server, and upon receiving this request, the DHCP server sends a DHCP acknowledgment, finalizing the IP address assignment. One of the key features of DHCP is its ability to lease IP addresses for a specific duration. This dynamic allocation ensures that IP addresses are efficiently utilized and can be reclaimed when not in use, allowing for optimal resource management. Beyond IP address assignment, DHCP can also provide devices with additional configuration information such as subnet masks, default gateways, DNS server addresses, and more. This comprehensive approach simplifies network administration, reduces the risk of address conflicts, and accommodates changes in network configurations with greater ease. Overall, DHCP plays a crucial role in automating the network configuration process, enhancing efficiency, and simplifying the management of IP addresses in dynamic network environments. In simpler terms, DHCP is like an automated system that hands out unique identification numbers (IP addresses) to devices when they connect to a network. This simplifies network administration and ensures efficient use of IP addresses by dynamically assigning and reclaiming them as devices join or leave the network.

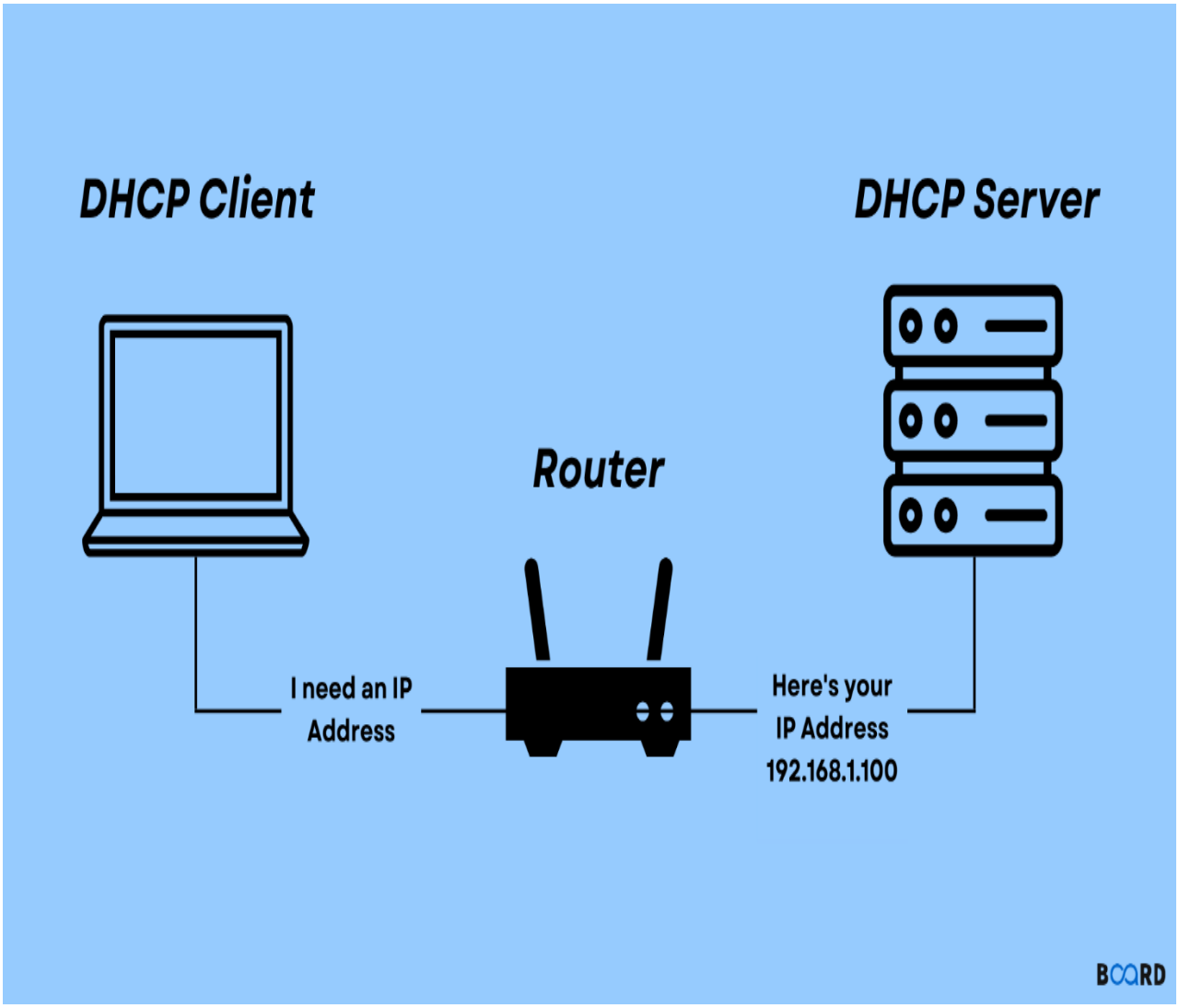


Fig 3.6 Dynamic Host Configuration Protocol

CHAPTER 4

RESULT AND DISCUSSION

4.1 ALGORITHM

The Algorithm is explained as follows

Step 1: Start the project.

Step 2: Open the pkt file and save the file.

Step 3: Add the required components to the work space as packet tracer simultor shown above. Step 4: Connect all devices in work space Using cables.

Step 5 : Configure the device and setup internet service provider router.

Step 6: Add Home Gateway to the Network.

Step 7 : Connect smart Devices to the Wireless Network.

Step 8 : Add End User Device to the Network

Step 9: Stop

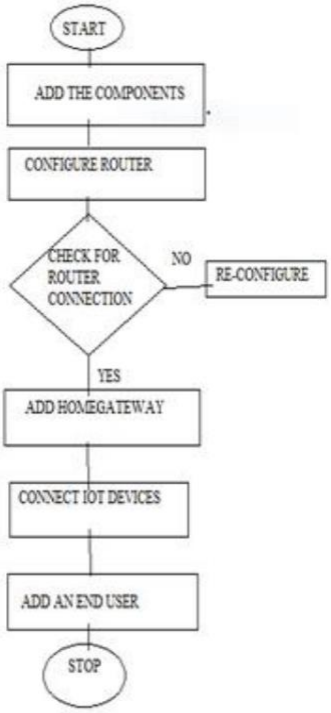


Fig 4.1 Flow Chart

4.2 SERVER & ROUTER CONFIGURATIONS

✓ SERVER CONFIGURATION

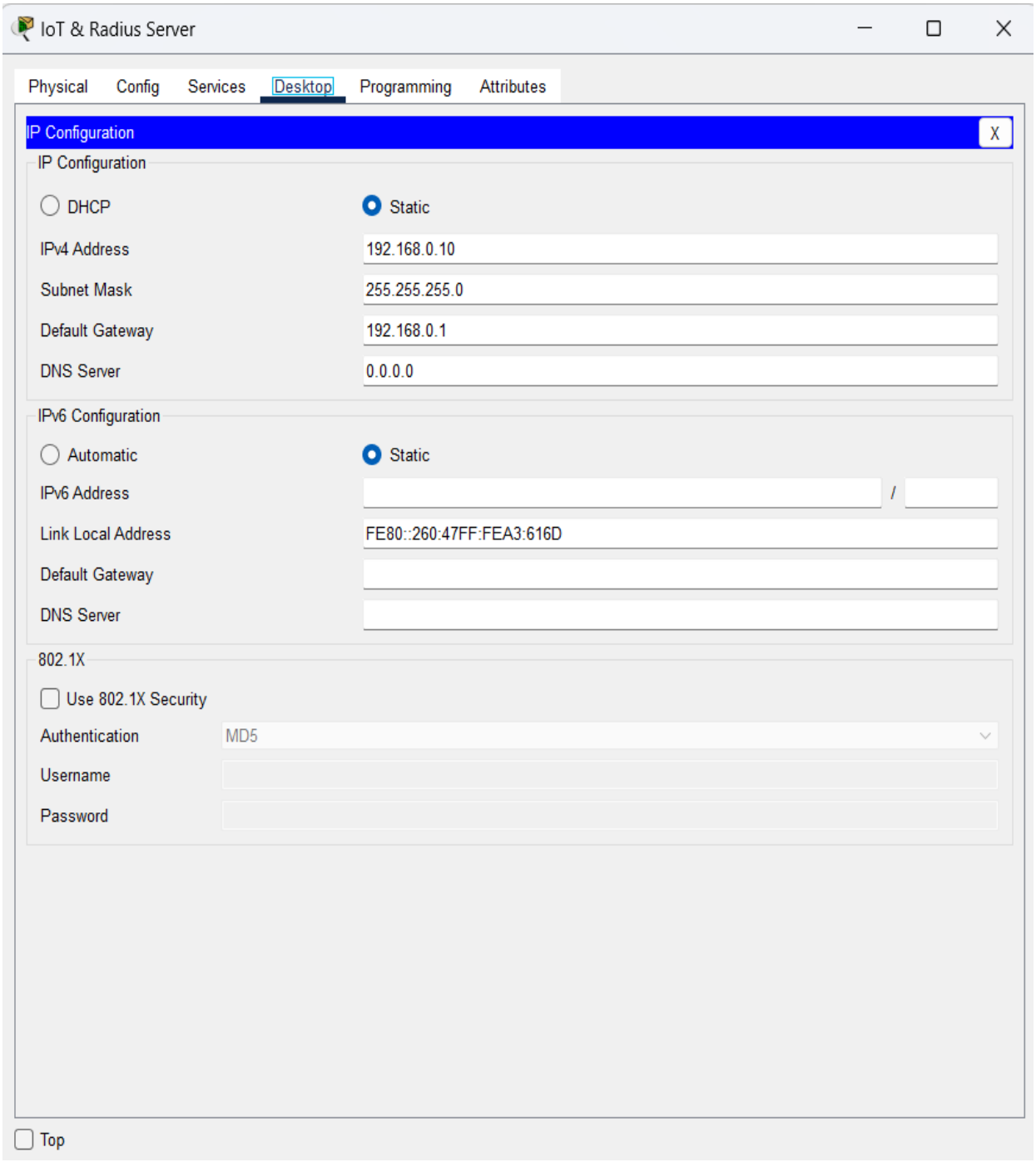


Fig 4.2 IP addressing

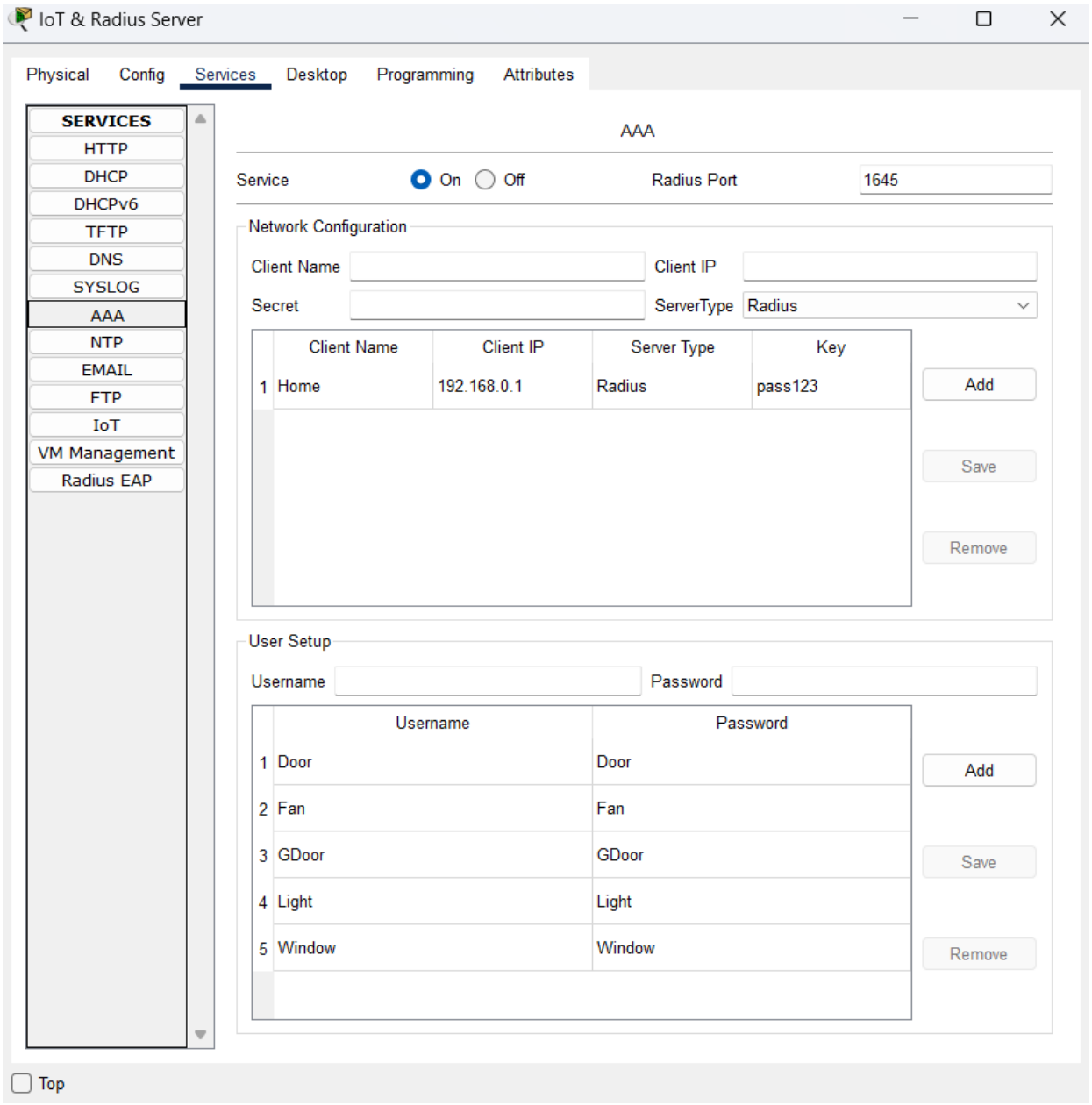


Fig 4.3 AAA

✓ ROUTER CONFIGURATION

The **Wireless-N Broadband Router** combines the functions of a Cable/DSL router and a wireless access point into one compact device. The router allows you to share your internet connection between several computers that can connect via the draft 802.11n wireless protocol or via any of 4 wired RJ-45 ethernet ports.

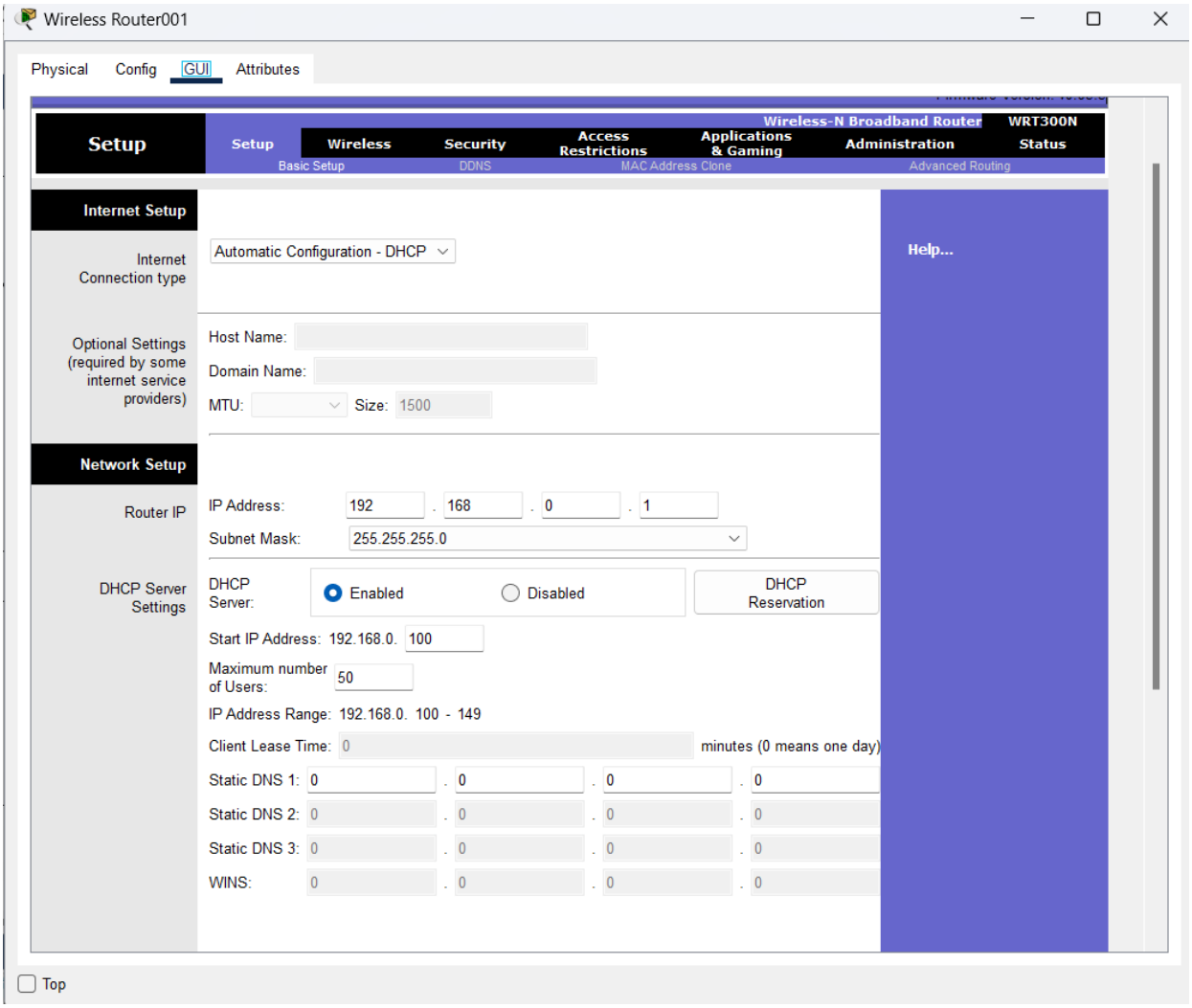


Fig 4.4 Setup of Router

4.3 IoT DEVICES

In this project we have used IoT devices like fan , window , garage door , light and a normal door for smart home services . Implementation of an Internet of Things (IoT) infrastructure in our project, featuring automated services for household elements such as the fan, window, garage door, light, and conventional door, aiming to enhance home functionality through intelligent and interconnected systems.

✓ FAN CONFIGURATION

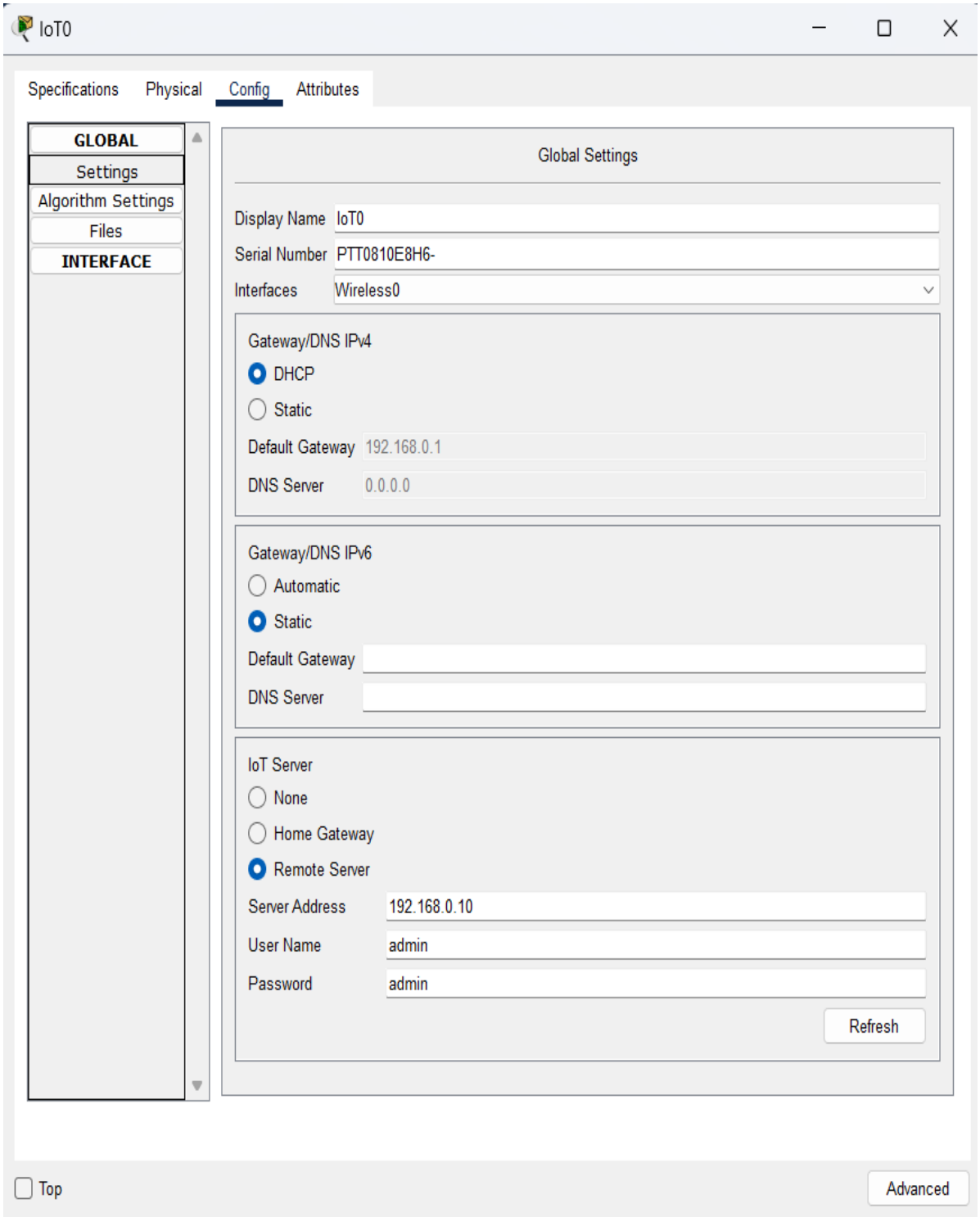


Fig 4.5 Fan Configuration

✓ DOOR CONFIGURATION

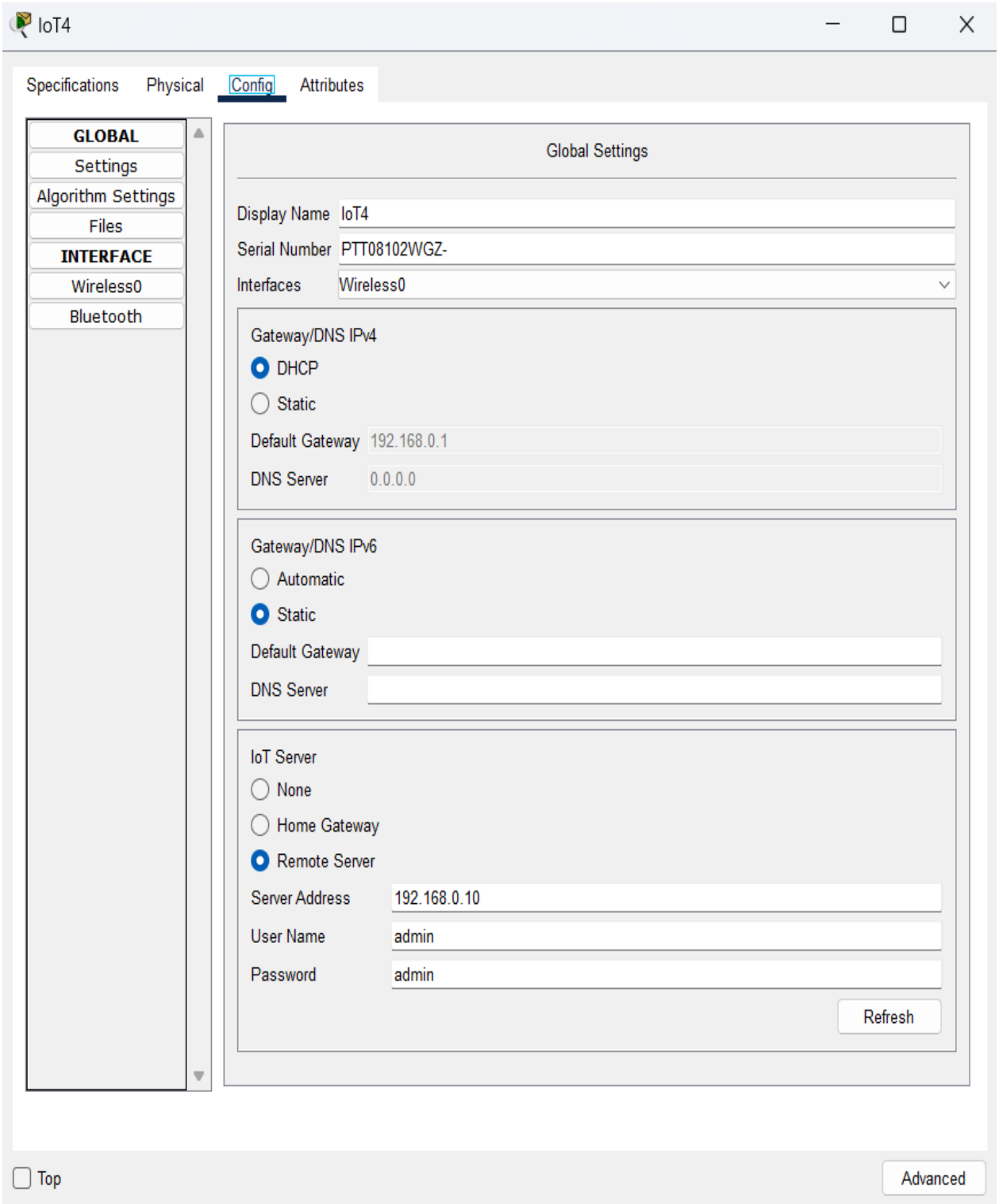


Fig 4.6 Door Configuration

✓ WINDOW CONFIGURATION

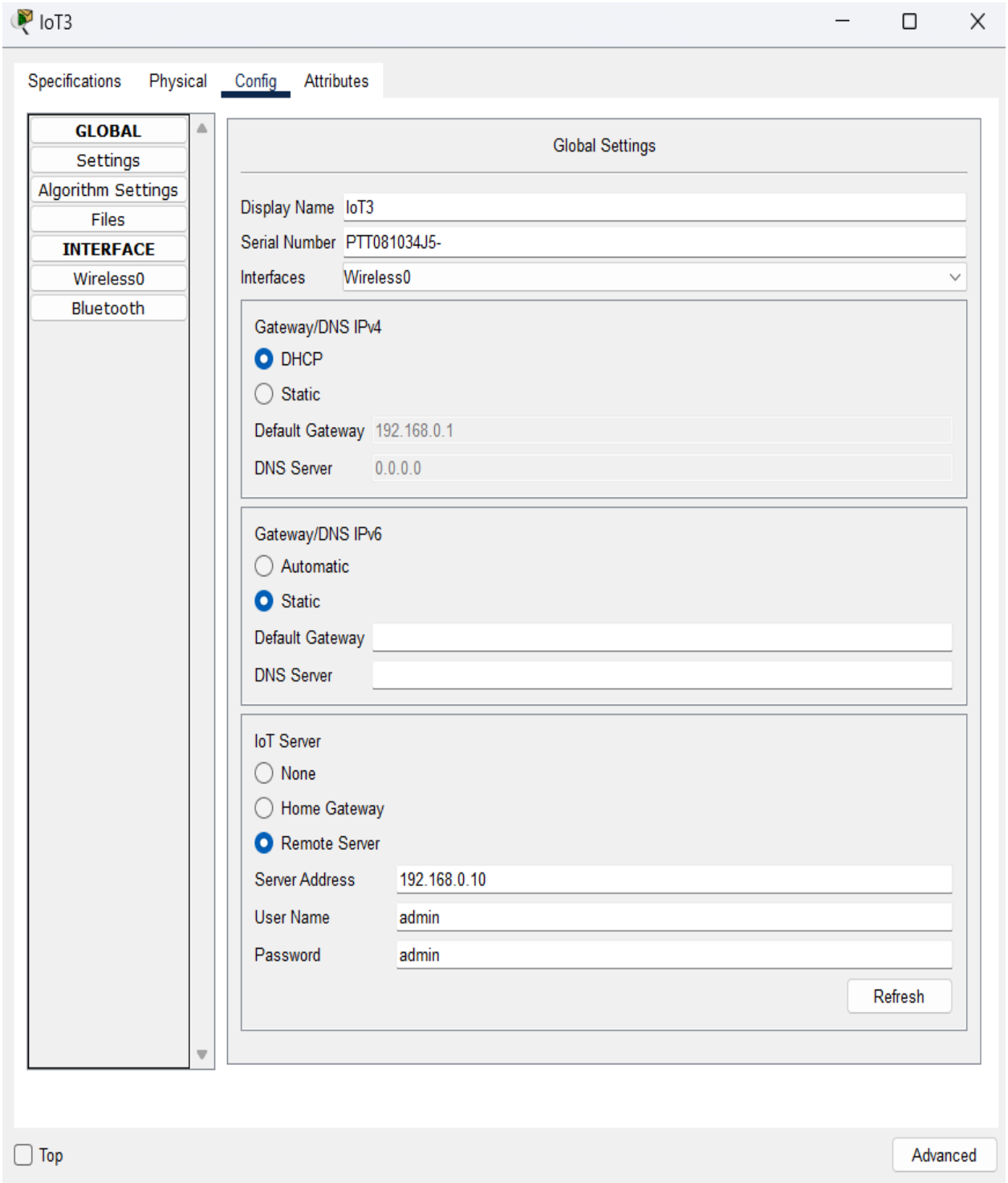


Fig 4.7 Window Configuration

✓ LIGHT CONFIGURATION

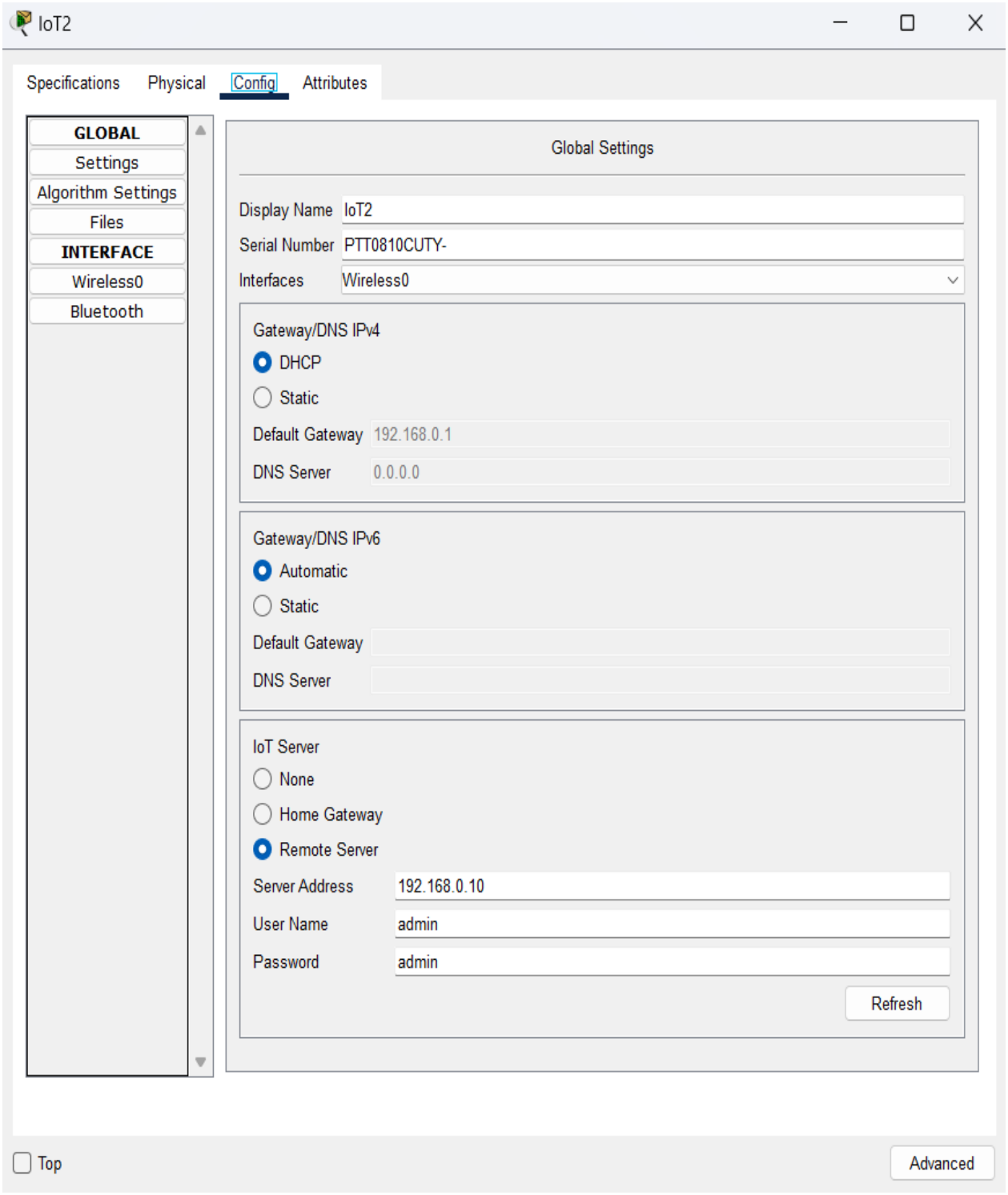


Fig 4.8 Light Configuration

✓ ASSIGNING USER ID AND PASSWORD

In this project , I have assigned SSID as ‘Home’ and for enabling the devices I assigned each device name as their USER ID and Password.

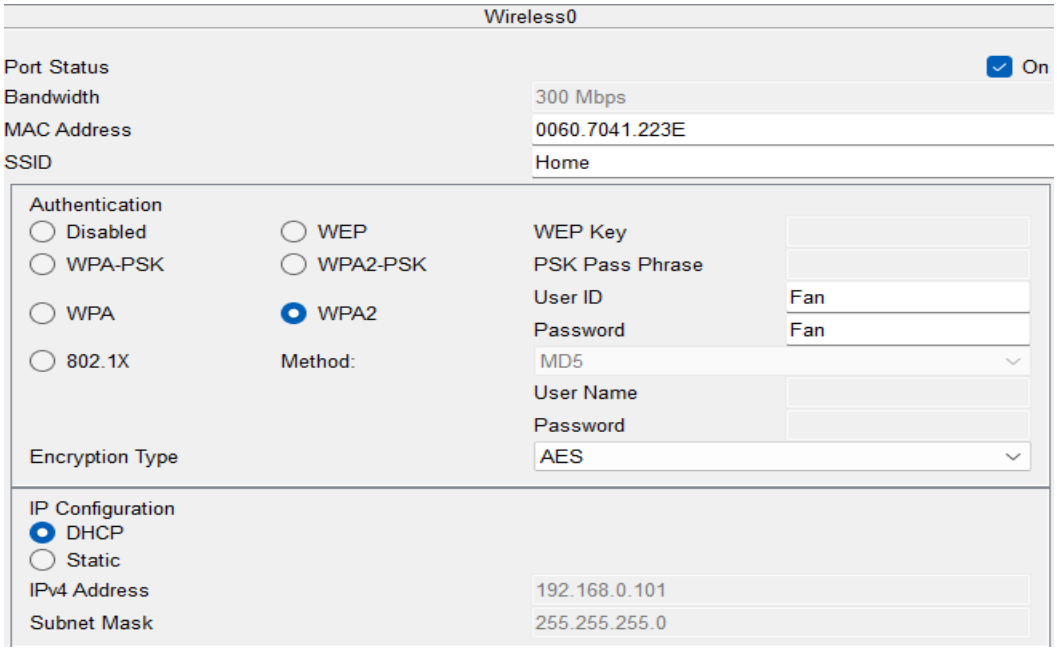


Fig 4.9 Authentication

4.4 CLIENT CONFIGURATION

➢ Register a IoT account using web browser

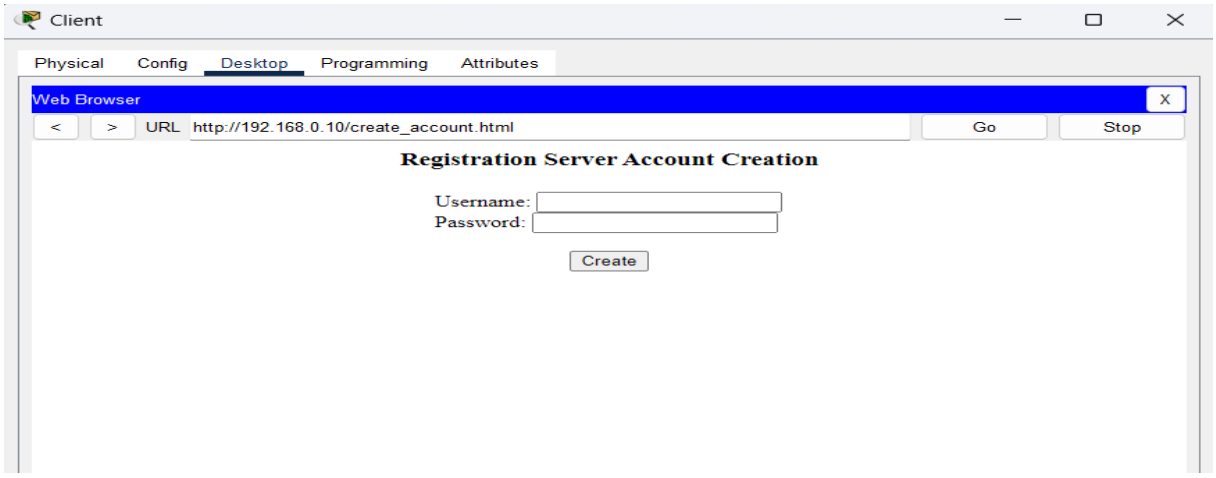


Fig 4.10 Signing up to an IoT account

- **Now Login to the IoT Monitor and connect to remote gateway in all IoT devices**

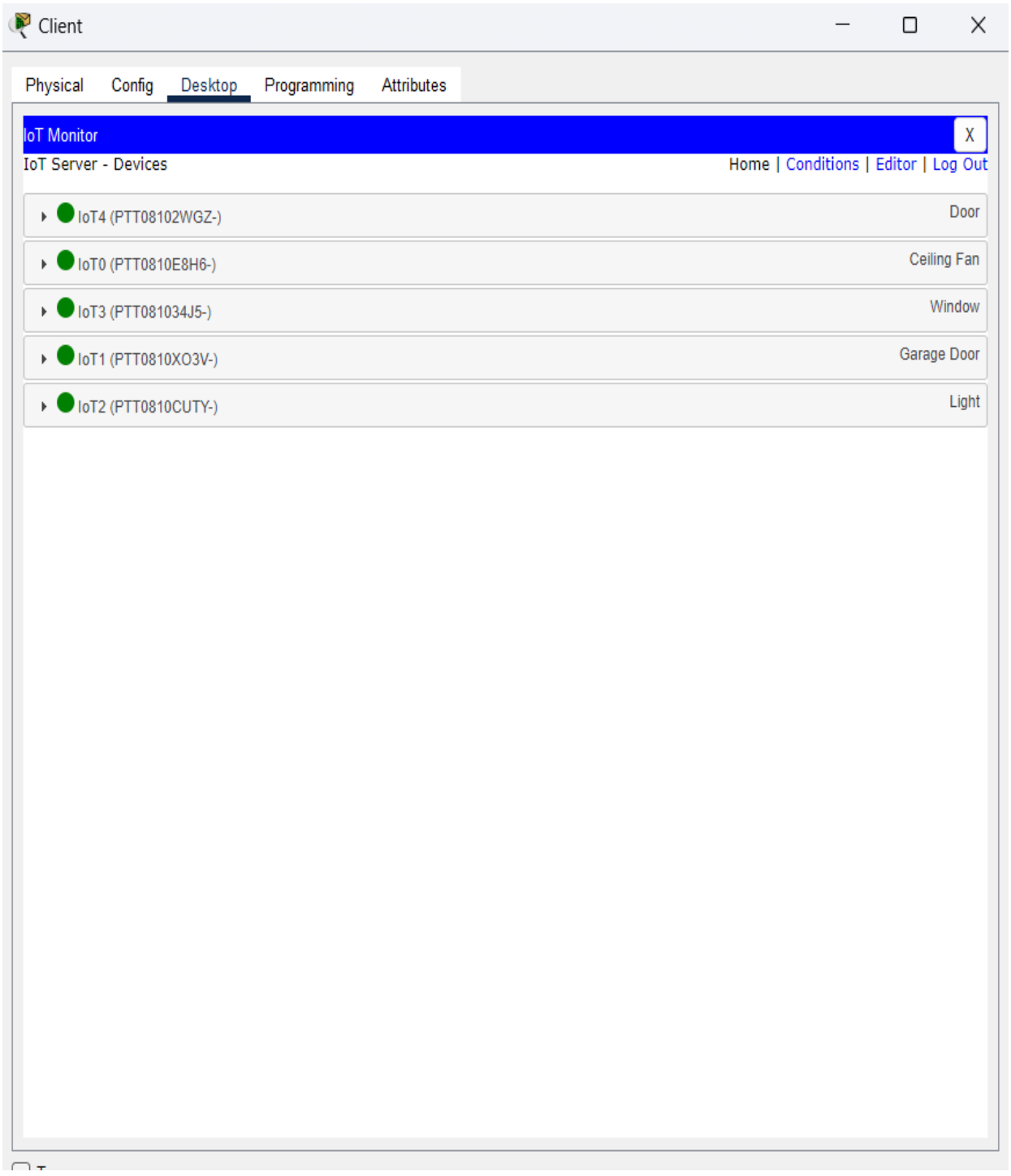


Fig 4.11 Logged in

4.5 ACCESSING THE DEVICES

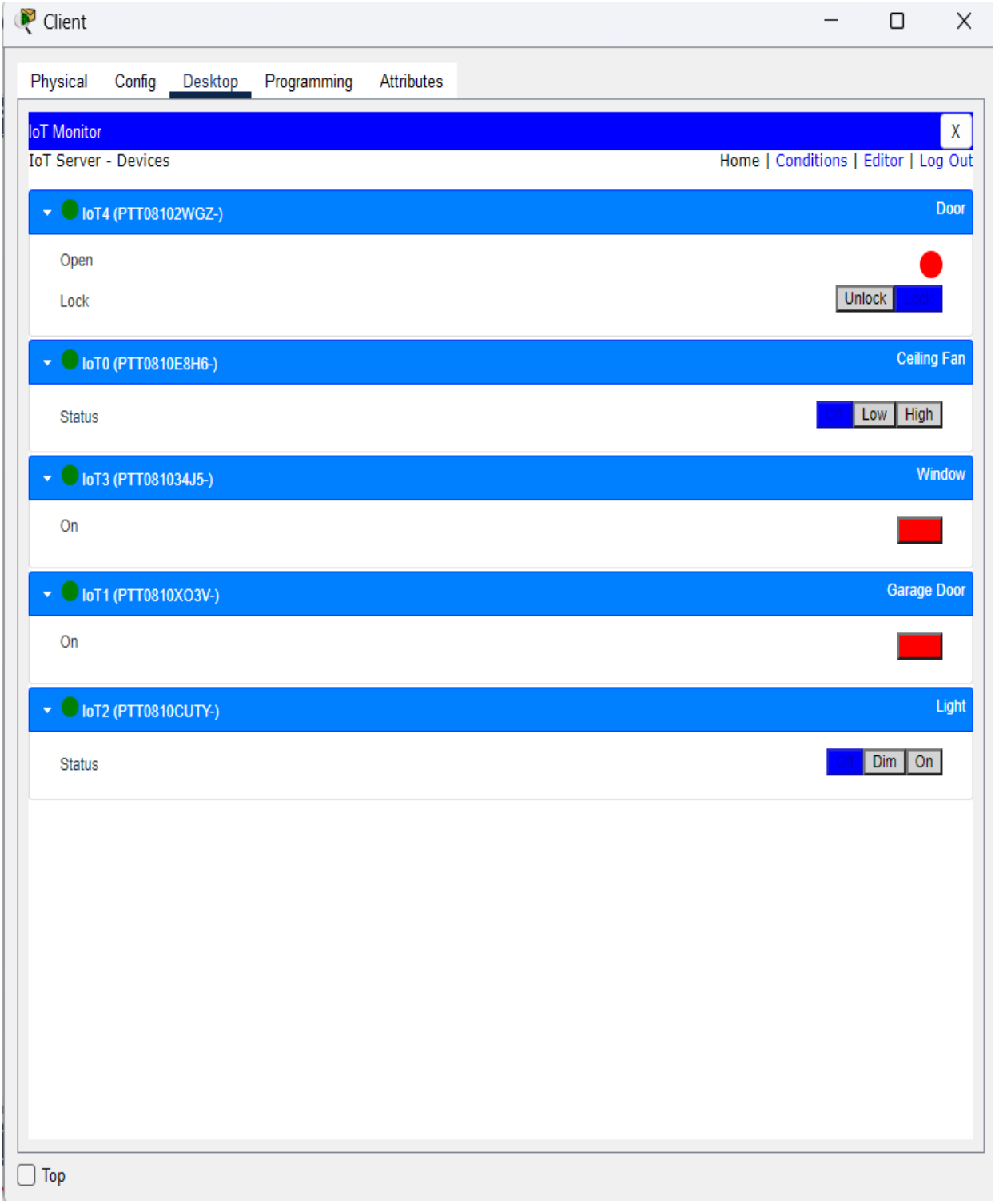


Fig 4.12 Accessing devices in remote way

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 CONCLUSION

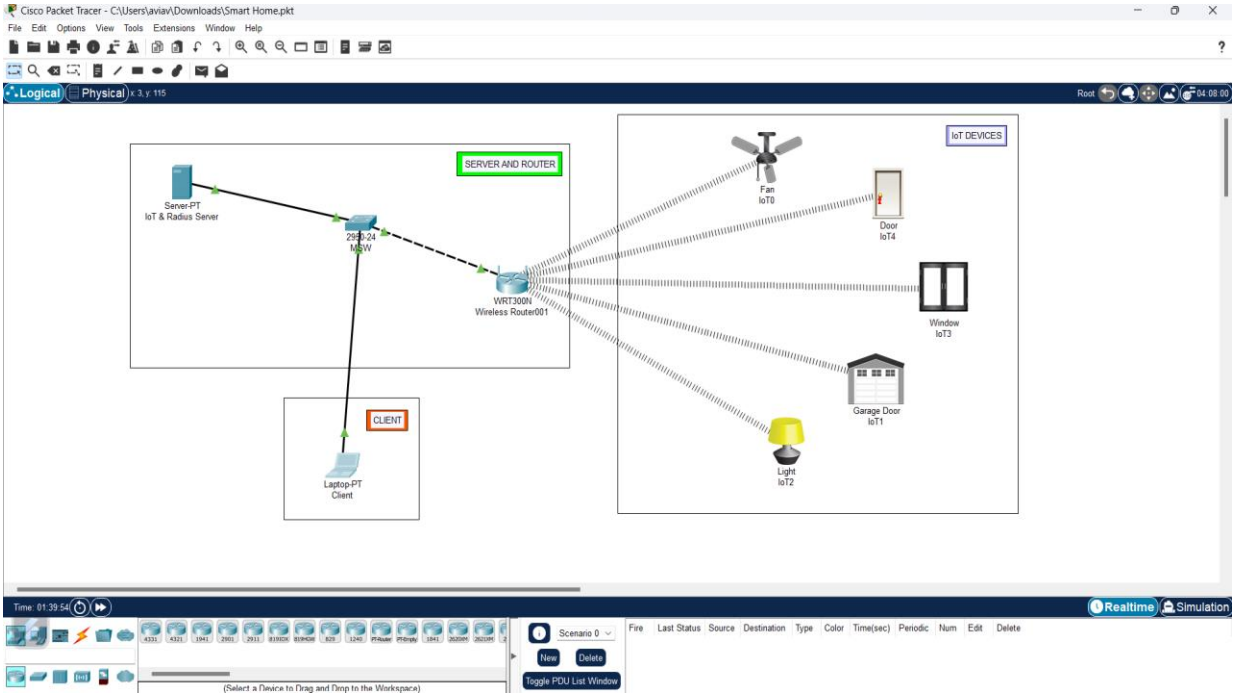
In conclusion, Cisco Packet Tracer stands as a powerful and indispensable tool in the realm of network simulation. Its educational focus, cost-effectiveness, and versatility make it a preferred choice for learners and educators alike. The dynamic real-time simulation, user-friendly interface, and continual updates contribute to a rich and engaging learning experience. The tool's ability to emulate a variety of network scenarios, coupled with its integration with Cisco Networking Academy, positions it as a valuable resource for developing practical networking skills. Whether used in educational institutions or by professionals seeking to enhance their skills, Packet Tracer remains a cornerstone in the journey of understanding and mastering networking concepts.

5.2 FUTURE ENHANCEMENT

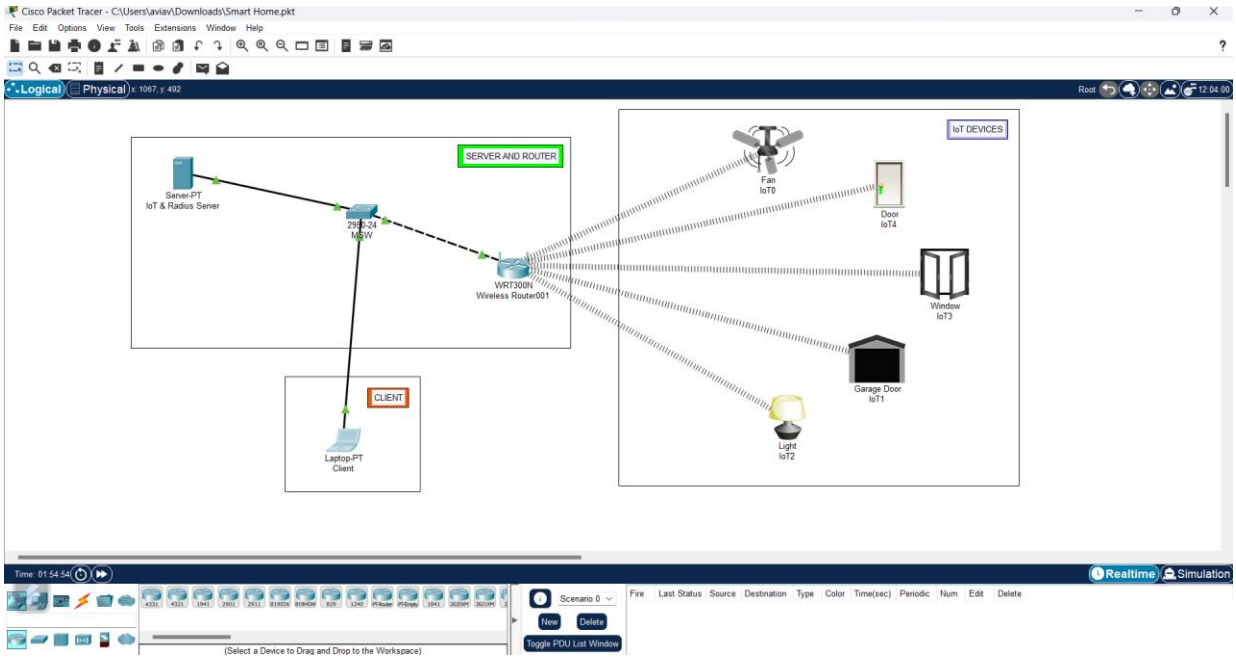
Future enhancements for Cisco Packet Tracer could encompass advanced support for emerging networking protocols, improved simulation capabilities for IoT devices, integration with cloud services, exploration of augmented reality features, implementation of machine learning for dynamic simulations, broader device compatibility, collaborative tools for group learning, incorporation of gamification elements, continual refinement of the user interface, and the development of scenario-based learning modules for diverse applications. These enhancements aim to keep Packet Tracer at the forefront of network simulation, offering an increasingly immersive and adaptive learning experience.

APPENDIX – I

CIRCUIT IN OFF CONDITION



CIRCUIT IN ON CONDITION



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