

1

DAYANANDA SAGAR COLLEGE OF ENGINEERING

COMPUTER SCIENCE & ENGINEERING

Minor Project- Report

Aug-2021-2022

Course Faculty: Prof. Sunanda B & Dr. Deepak G

Course Name : Computer Networks Laboratory with Mini Project

Code: 19CS5DLCNL

Semester: 5

Date: 30-12-2021

AIRPORT NETWORKING SYSTEM				
STUDENT NAME	NEETHU R A	PALLAPOTHU LAKSHMI SHARANYA	REENA JASMINE EDWIN	SAI BRINDA
USN	1DS19CS729	1DS19CS730	1DS19CS738	1DS19CS741
INDIVIDUAL CONTRIBUTION	Implementation of DHCP,DNS, Access control lists, Mac address port Security, Mail server, Firewall.	Implementation of DHCP,DNS, Access control lists, Mac address port Security, Mail server, Firewall.	Implementation of DHCP,DNS, Access control lists, Mac address port Security, Mail server, Firewall.	Implementation of DHCP,DNS, Access control lists, Mac address port Security, Mail server, Firewall.
GUIDE	Prof. Sunanda B & Dr. Deepak G			

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PROJECT ABSTRACT :	<p>The aim of this project is airports network design and implementation and the introduction of a suitable network for most airports around the world. The following project focused on three main parts: Security, Quality, and Safety.</p> <p>In most countries around the world, there are many places that represent the main gates for entrance and exit. Each country takes many necessary measures to provide them with the best technology. Technology plays many different roles to protect and represent a high quality of services. Computer networking is the most crucial part of modern airports because this new technology takes the most important responsibilities . This sheds light on three main parts which are improved during the practical work: security, quality and safety.</p> <p>Security</p> <p>For the security component, the design uses a variety of tools to craft a network that provides a high security level. These utilities includes: hardware firewalls, IP access control lists, MAC address-based port security, domain servers.</p> <p>Quality</p> <p>a broad collection of services and strategies have been developed that, when combined, create a high service quality for users. These technical services include: failover firewalls utility, DHCP Server (Dynamic Host Configuration Protocol), DNS Server (Domain Name System), high grade cabling.</p> <p>Safety</p> <p>To meet safety standards, dual internet providers were adopted for the flight management department to ensure backup operations for the safety critical Primary and Backup Air Traffic Control Complex (BATCX) system.</p> <p>To increase the network safety of services, several strategies and systems are included:</p> <ul style="list-style-type: none">• Hardware Firewalls to increase the level of security and setup rules for network's activities.• IP access control list to prevent unauthorized activities from department.• Mac address port security to prevent foreign devices from connecting to the sensitive departments.• Domain Server to establish specific groups for specific tasks depending on needs. <p>To increase the network quality of services, several strategies and systems are included:</p> <ul style="list-style-type: none">• Fail over firewalls utility to support the network with ISP when the first fail.• DHCP Server (Dynamic Host Configuration Protocol) to provide IPs.• DNS Server (Domain Name System) to manage Airport's website.• Cabling system to provide the network an appropriate connection's system. <p>Additionally, safety critical systems were given additional protections and mechanisms:</p> <ul style="list-style-type: none">• Dual ISPs to provide Air Traffic Control System (ATC). <p>This Project implements the Application Layer Services and their Protocols.</p>
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INTRODUCTION	<p>The Project Airport Networking System is implemented using Cisco Packet Tracer. The primary goal was to deliver three principle system attributes: security, quality, and safety.</p> <p>The project has been provided with different utilities to introduce a network with a high security level for the airport. These utilities are hardware firewalls, an IP access control list, Mac address port security, a domain server. All of these utilities have been configured to provide a secure environment for the entire network and to prevent hackers from entering sensitive departments like the flight management and service providers departments.</p> <p>Improving the performance of any network requires a high quality of techniques and services which help to improve the general task of the network. The technical services that have been placed in the airport's network are failover firewalls utility, a Dynamic Host Configuration Protocol (DHCP) server, a Domain Name System (DNS) server and a cabling system. These tools can increase the performance of the network in general and provide a stable internet service for the Air Traffic Control System by using dual internet service providers. To meet safety standards, dual internet providers were adopted for the flight management department to ensure backup operations for the safety critical Primary and Backup Air Traffic Control Complex (BATCX) system.</p>
DESIGN	<p>Topology</p> <img alt="Screenshot of Cisco Packet Tracer showing the logical network topology of the Airport Networking System. The diagram illustrates various network components including servers, switches, and hosts across four main departments: Flight Management Dept., Service Providers Dept., Arrival, Departure & Guest Dept., and Smartphones Dept. The network is interconnected via multiple interfaces (Fa0, Fa1, Fa2, etc.) and IP addresses (e.g., 192.168.1.1, 192.168.1.2, 192.168.1.3, 192.168.1.4, 192.168.1.5, 192.168.1.6, 192.168.1.7, 192.168.1.8, 192.168.0.1, 192.168.0.2, 192.168.0.3, 192.168.0.4, 192.168.0.5, 192.168.0.6, 192.168.0.7, 192.168.0.8, 192.168.0.9, 192.168.0.10, 192.168.0.11, 192.168.0.12, 192.168.0.13, 192.168.0.14, 192.168.0.15, 192.168.0.16, 192.168.0.17, 192.168.0.18, 192.168.0.19, 192.168.0.20, 192.168.0.21, 192.168.0.22, 192.168.0.23, 192.168.0.24, 192.168.0.25, 192.168.0.26, 192.168.0.27, 192.168.0.28, 192.168.0.29, 192.168.0.30, 192.168.0.31, 192.168.0.32, 192.168.0.33, 192.168.0.34, 192.168.0.35, 192.168.0.36, 192.168.0.37, 192.168.0.38, 192.168.0.39, 192.168.0.40, 192.168.0.41, 192.168.0.42, 192.168.0.43, 192.168.0.44, 192.168.0.45, 192.168.0.46, 192.168.0.47, 192.168.0.48, 192.168.0.49, 192.168.0.50, 192.168.0.51, 192.168.0.52, 192.168.0.53, 192.168.0.54, 192.168.0.55, 192.168.0.56, 192.168.0.57, 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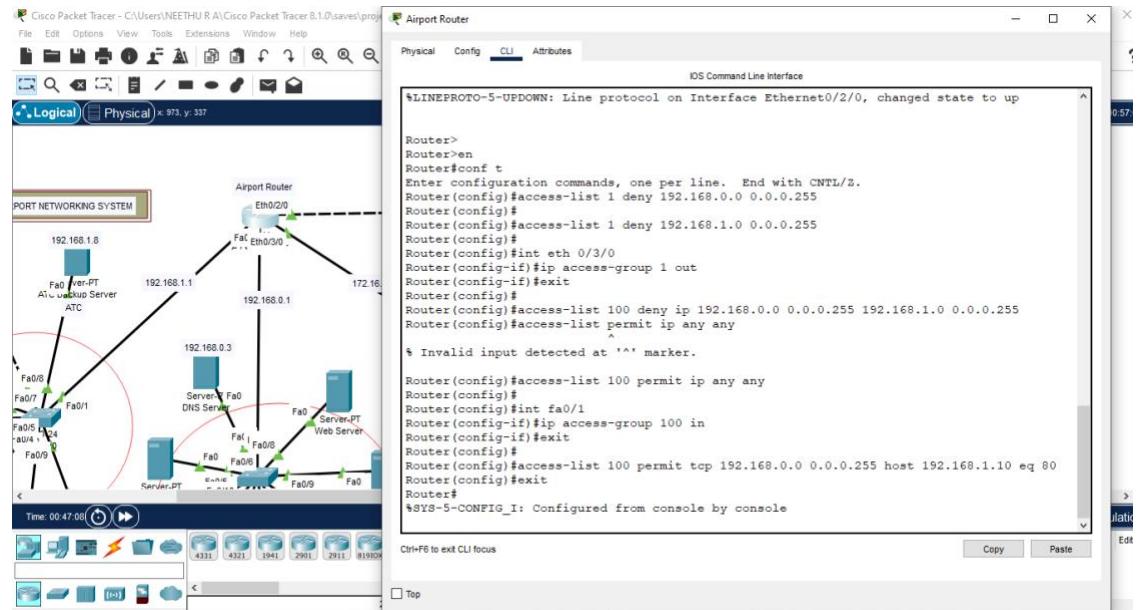
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PLATFORM USED (H/W & S/W TOOLS TO BE USED)	CISCO PACKET TRACER
PROJECT SOURCE CODE LINK (GITHUB/ GOOGLE DRIVE)	
CONCLUSION /FUTURE ENHANCEMENT	<p>Conclusion: An Airport Networking System is thus implemented focusing Security, Safety and Quality by providing various utilities to introduce a suitable network with a high security and quality of services for airports using Cisco Packet Tracer.</p> <p>Future Enhancements:</p> <ul style="list-style-type: none"> • Implementation of Proxy Server • Implementation of Domain Controller • Implementation of Dual ISP

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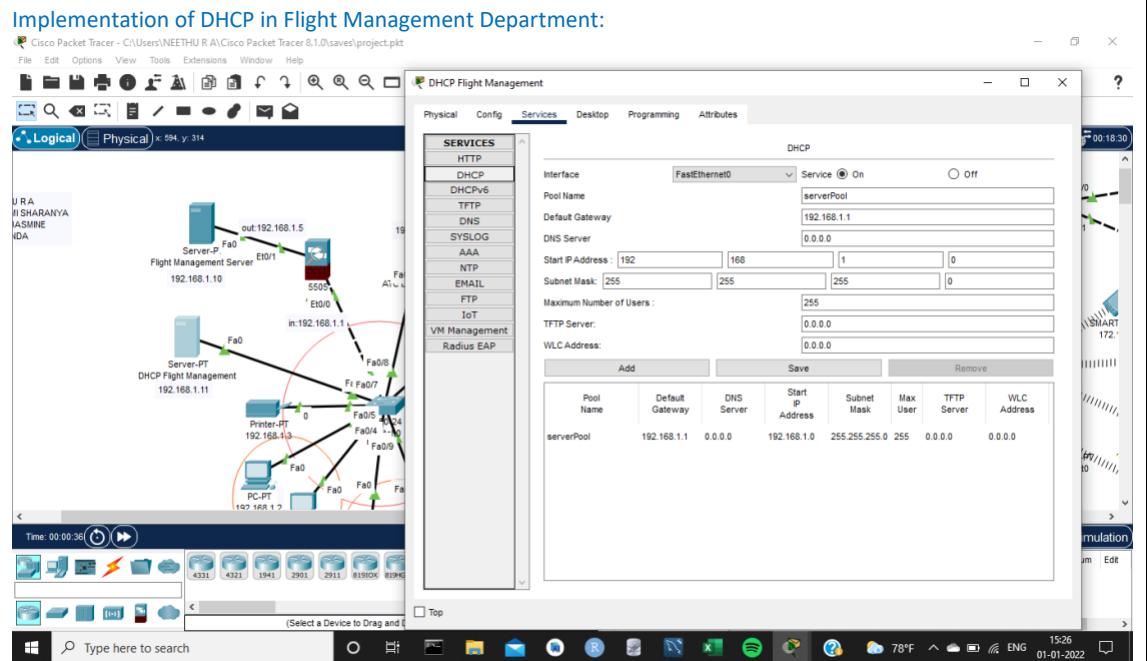
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Implementation of Access-Control-List:



UI SCREENSHOTS

Implementation of DHCP (Dynamic Host Configuration Protocol):



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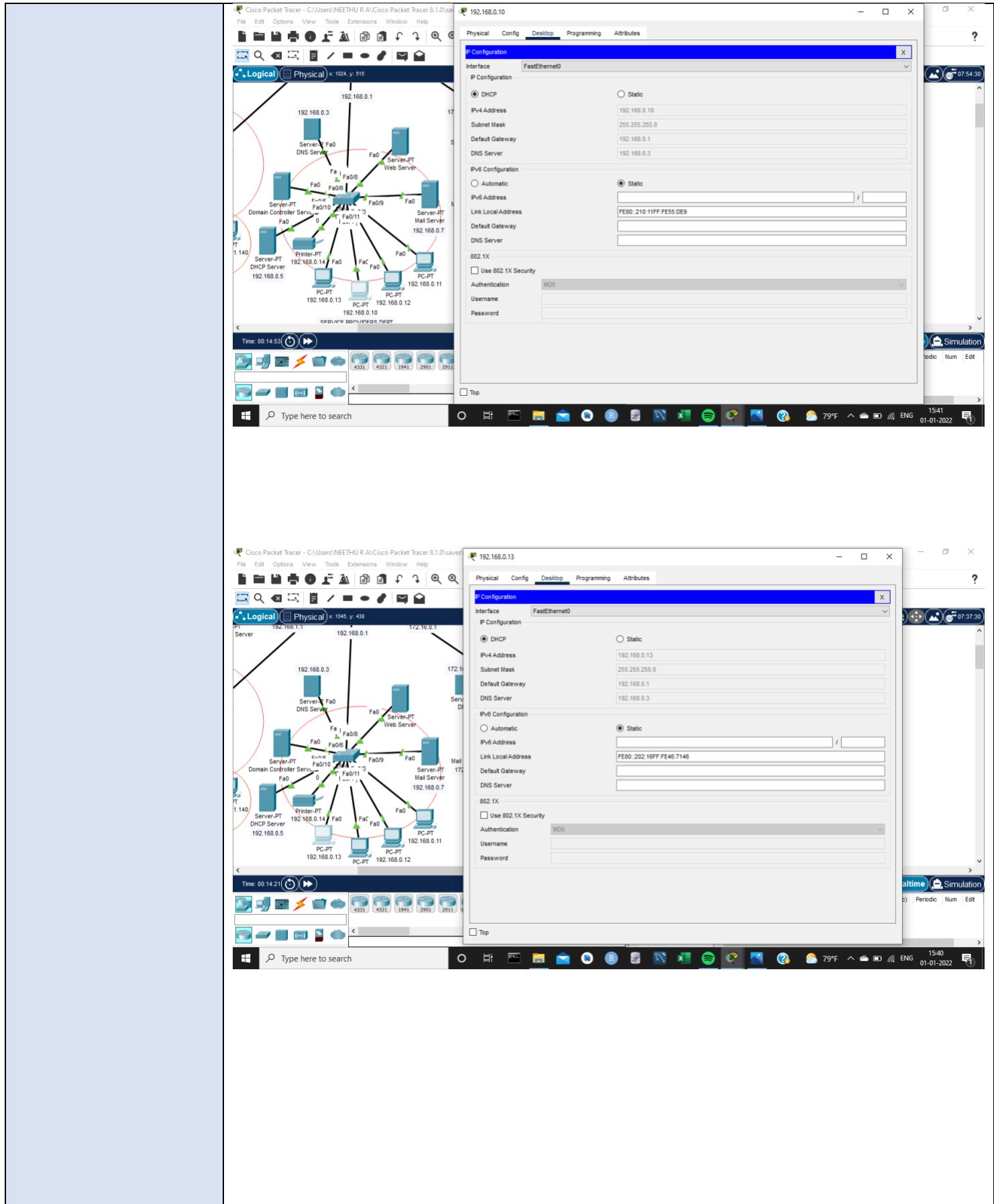
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Implementation of DHCP in Service Provider Department:

The screenshot shows a Cisco Packet Tracer simulation window. On the left, a network diagram is displayed with various devices including servers, PCs, and printers connected via FastEthernet ports (Fa0-Fa11). A specific interface, FastEthernet0, is selected for configuration. On the right, a configuration dialog box titled "IP Configuration" is open for this interface. The "DHCP" radio button is selected, and the IP address is set to 192.168.1.3. The subnet mask is 255.255.255.0, and the default gateway is 192.168.1.1. The DNS server is listed as 0.0.0.0. Below these settings, there are sections for IPv6 Configuration, 802.1X Security, Authentication, Username, and Password. The status message "DHCP request successful." is visible. The bottom of the screen shows a Windows taskbar with various icons and system information.

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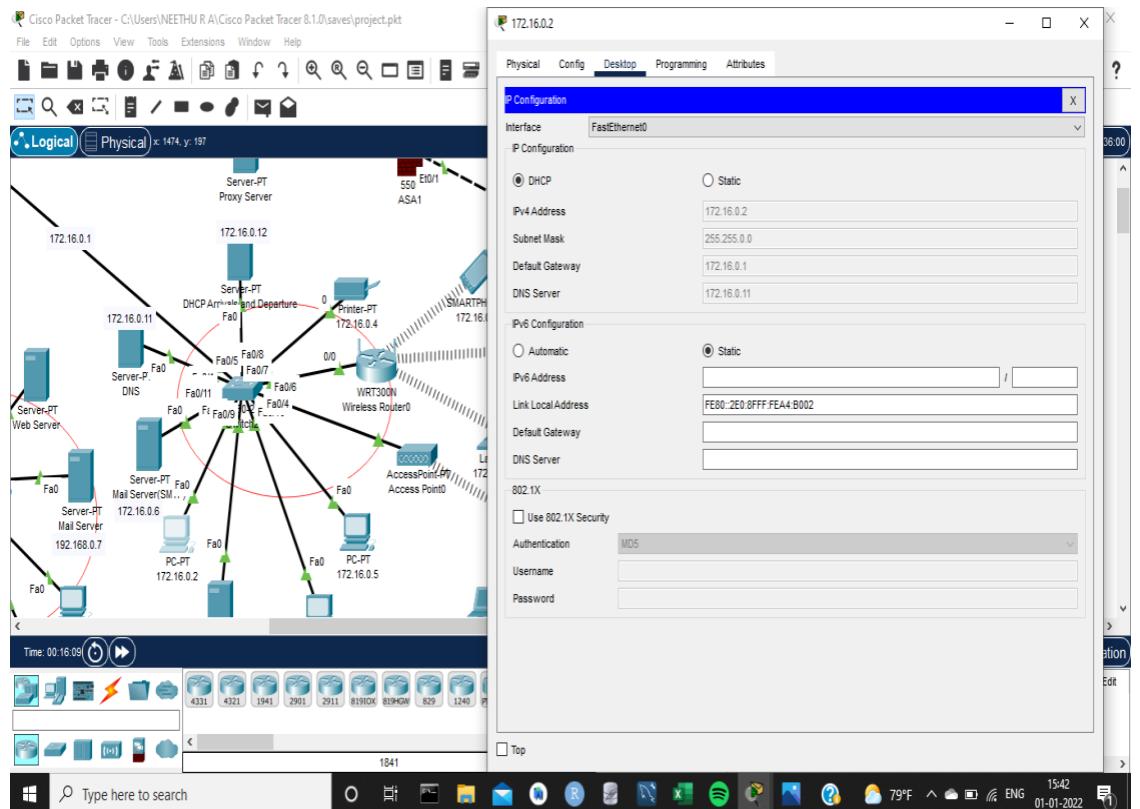
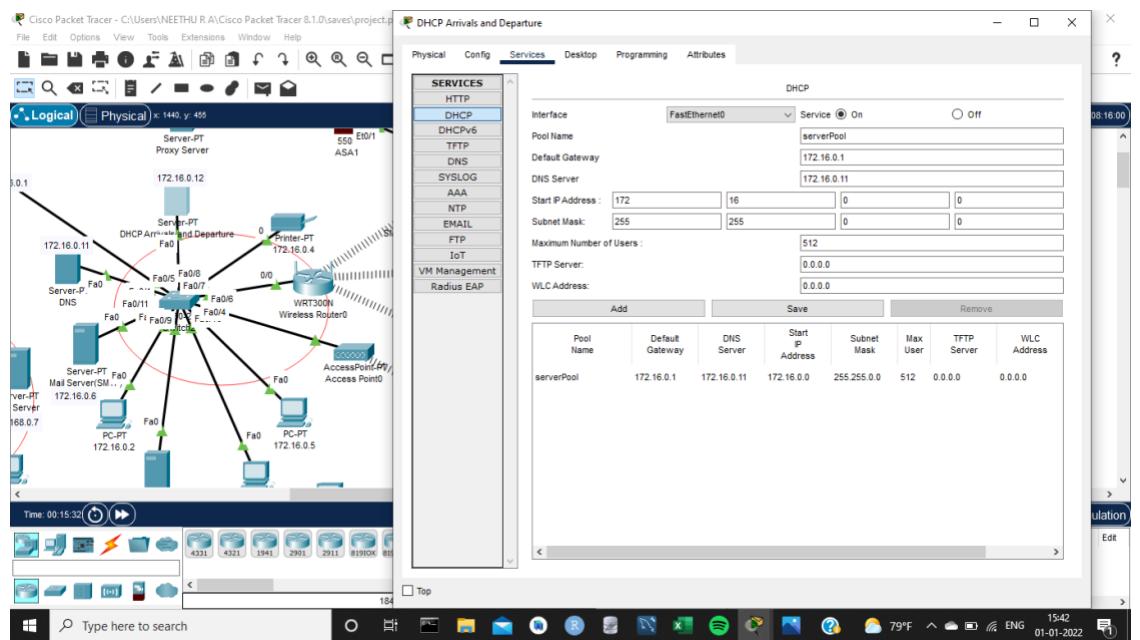
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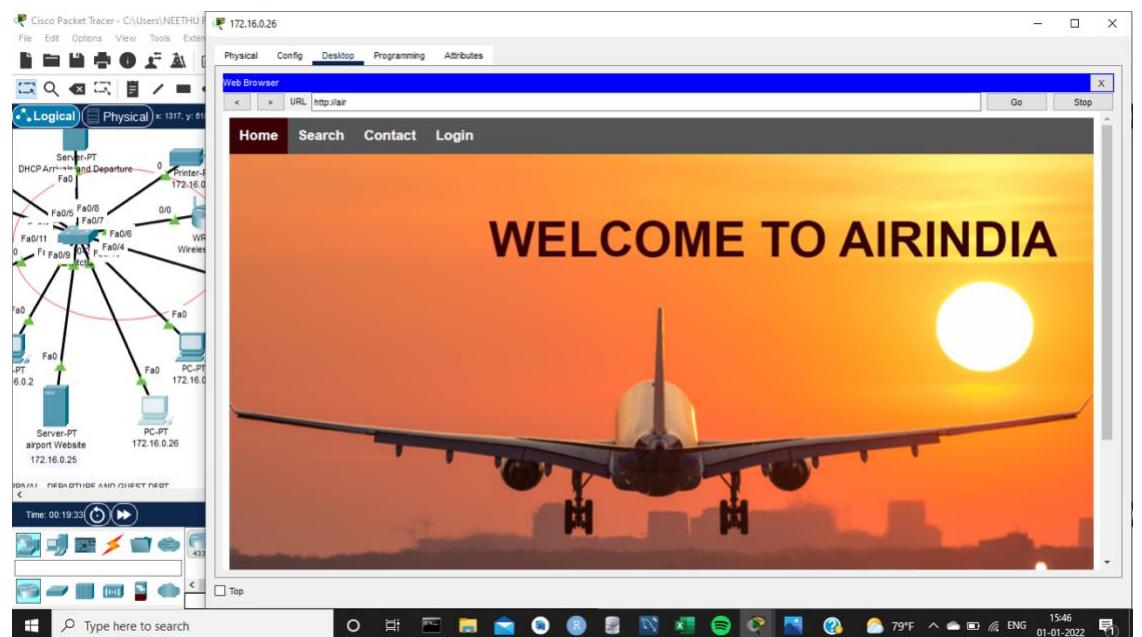
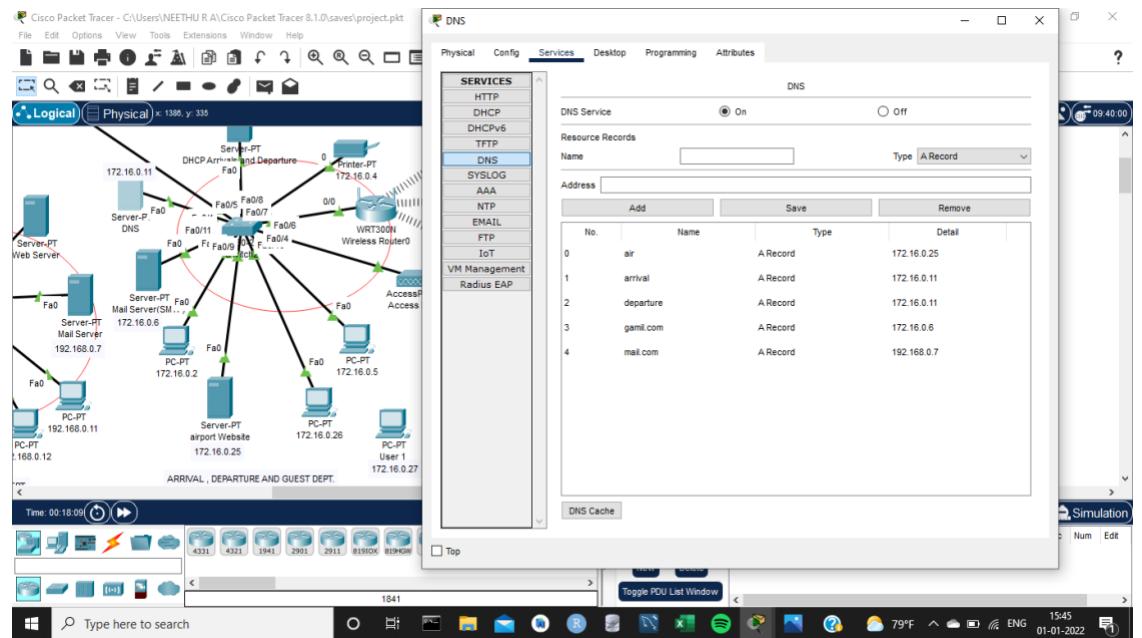
Implementation of DHCP for Arrivals and Departure Department:



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Implementation of DNS (Domain Name System):

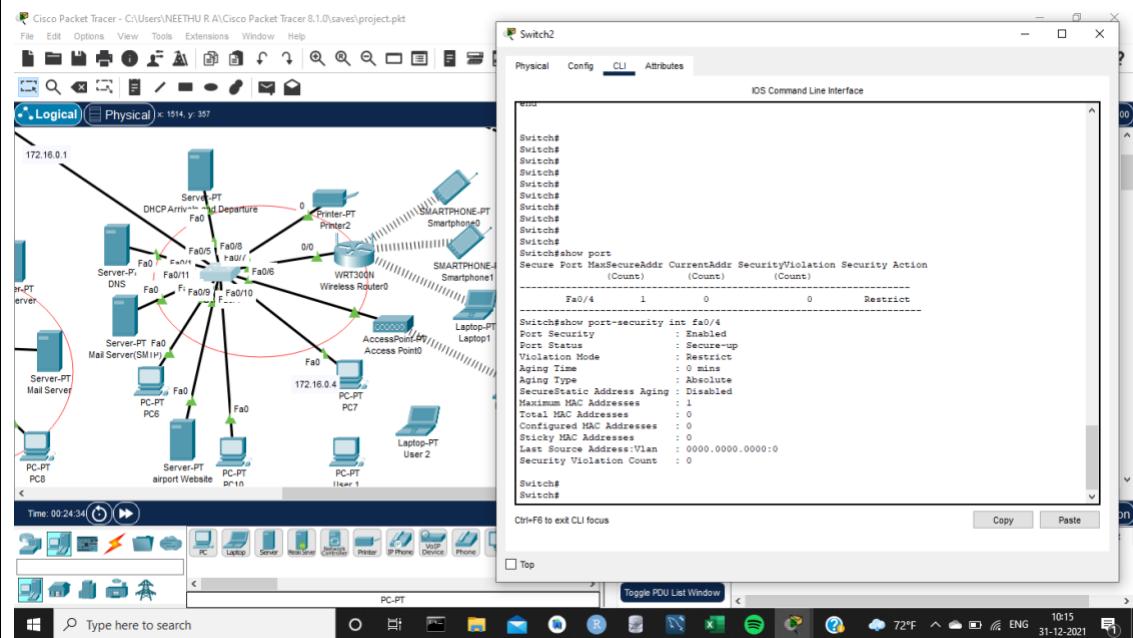
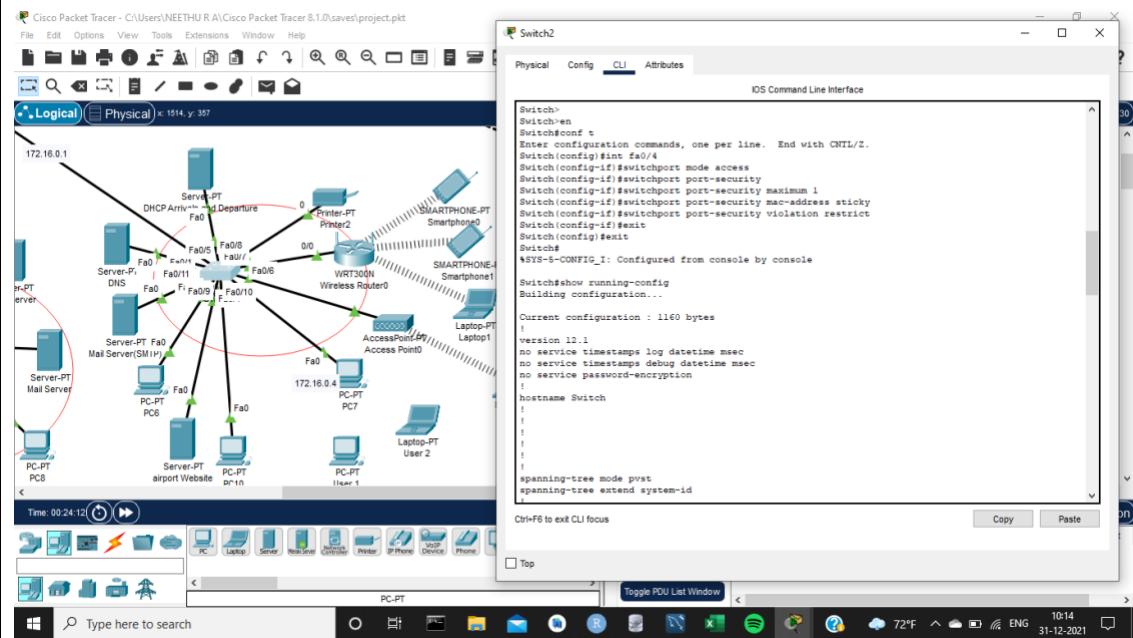


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10

Implementation of MAC-Address Port Security:

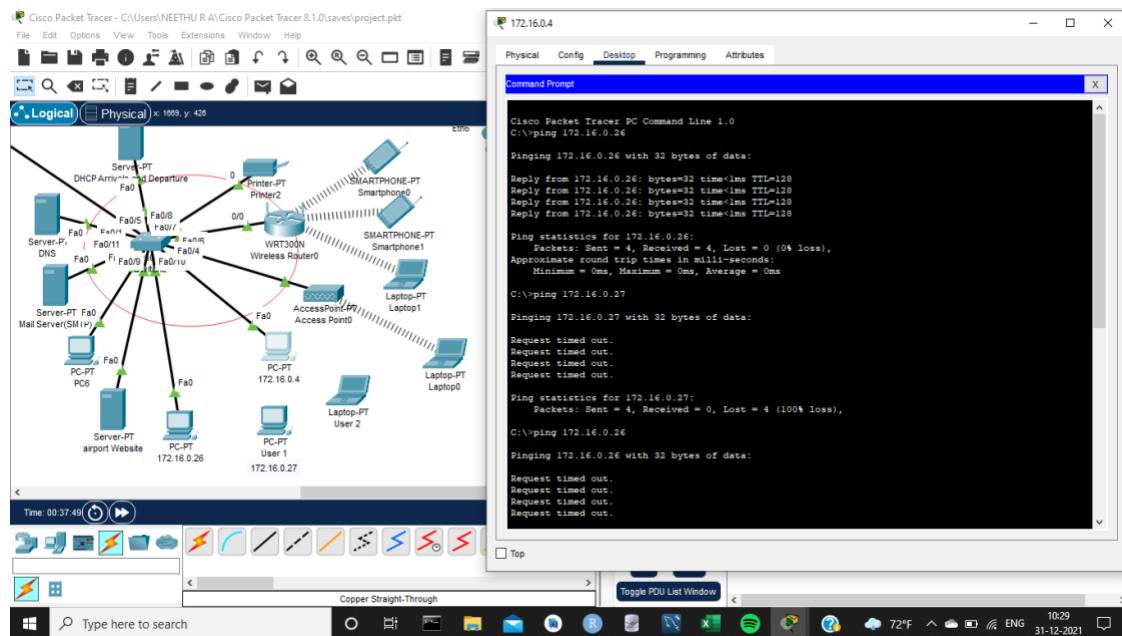


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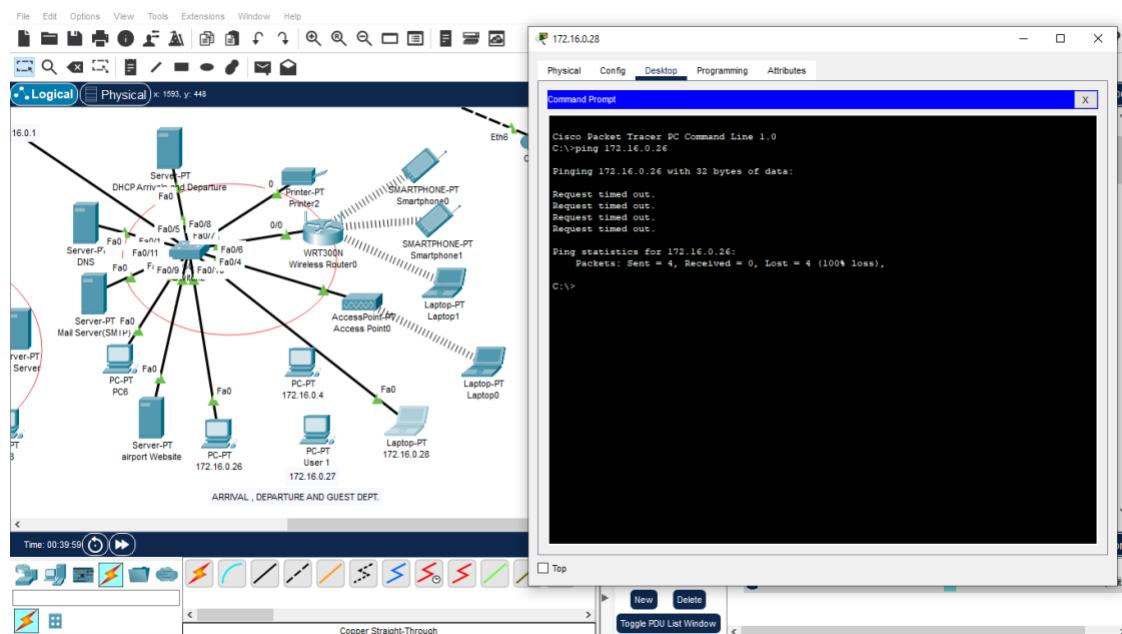
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11

Mac-Address Port Security is implemented on the PC with IP address 172.16.0.4 through the interface Fa 0/4:



The Same connection (Fa 0/4) is being used by a new device with IP Address 172.16.0.28 and checking the implementation of Mac-address port Security:

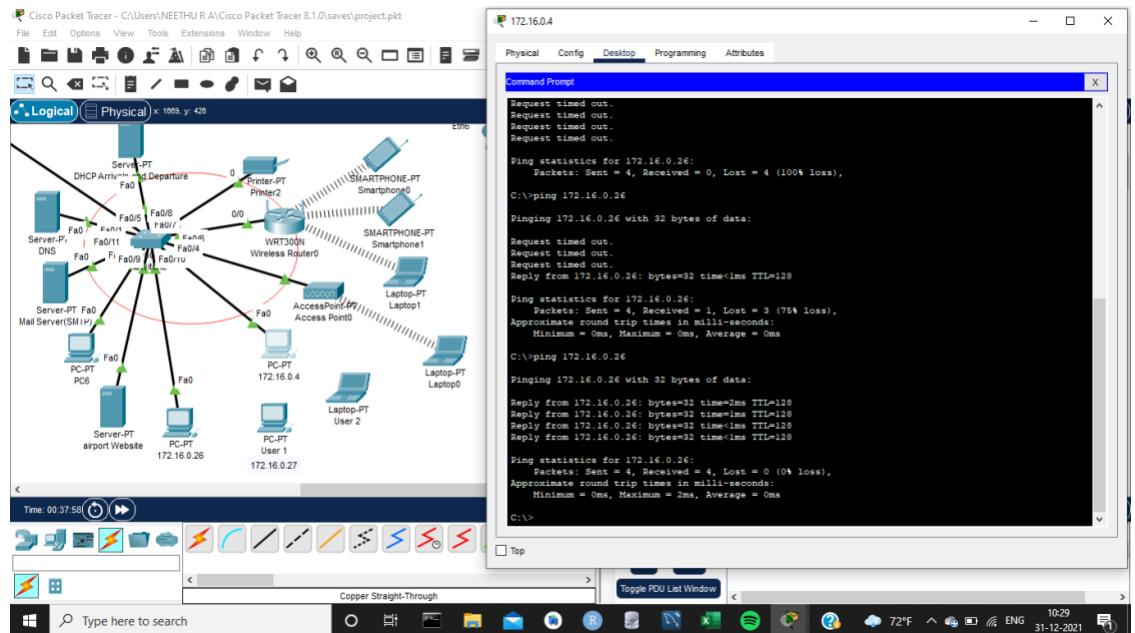


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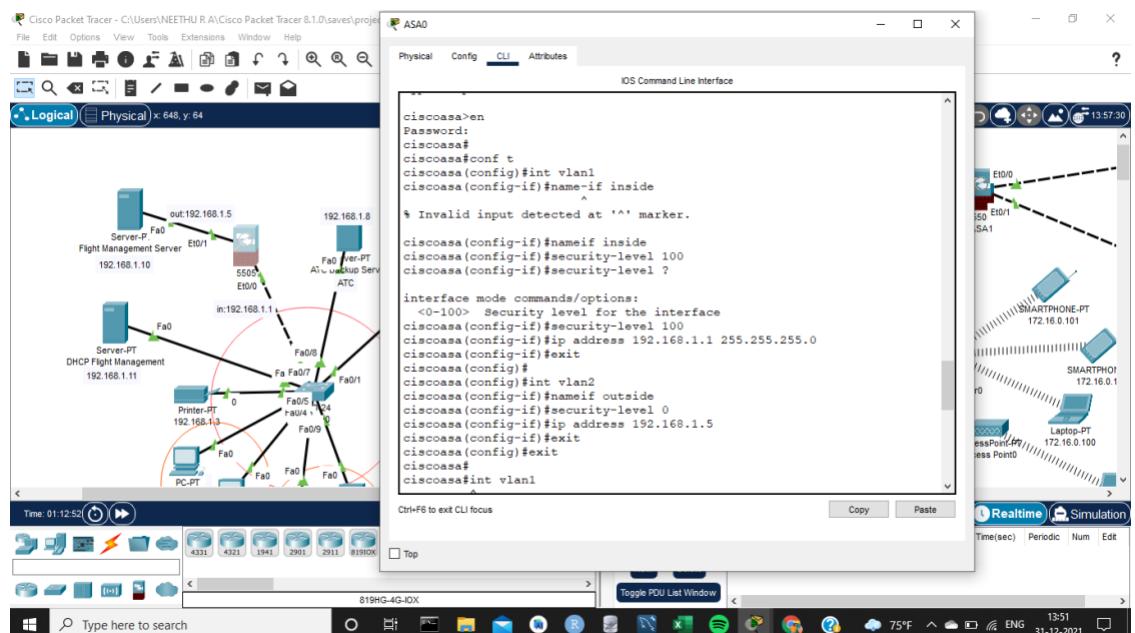
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13

Connecting back the interface to the designated PC and checking the implementation of Mac-Address Port Security:



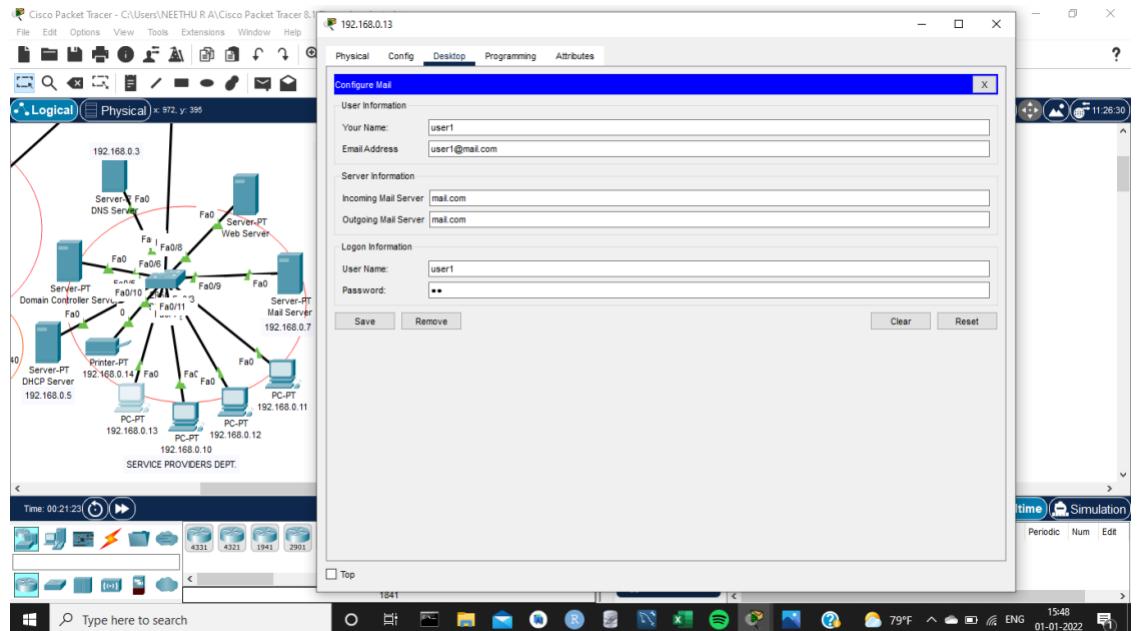
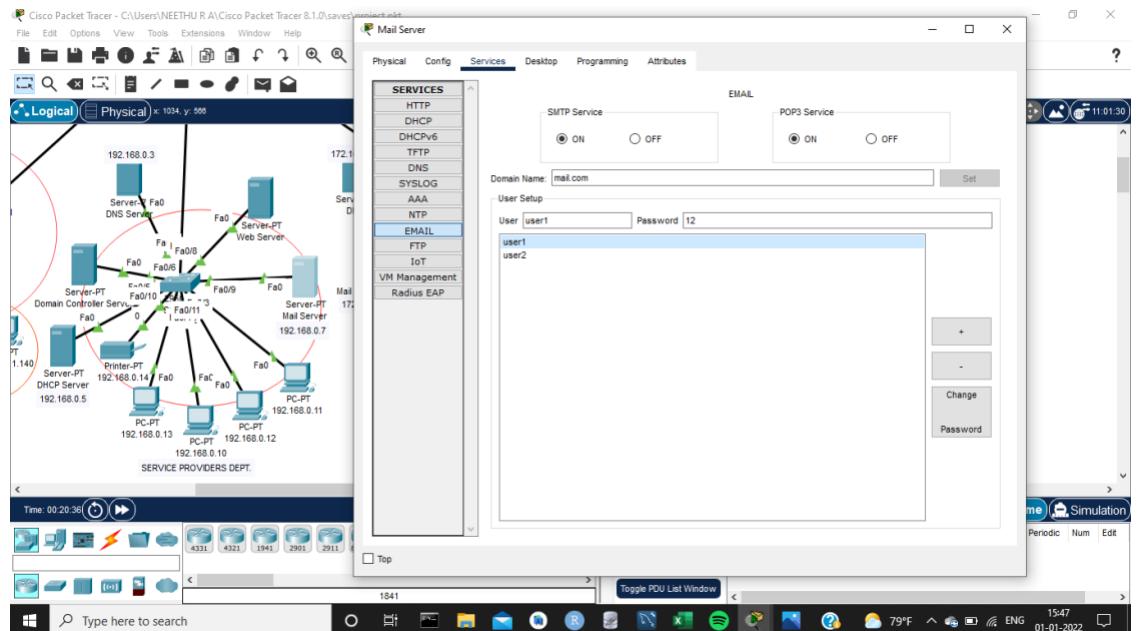
Implementation of Firewall:



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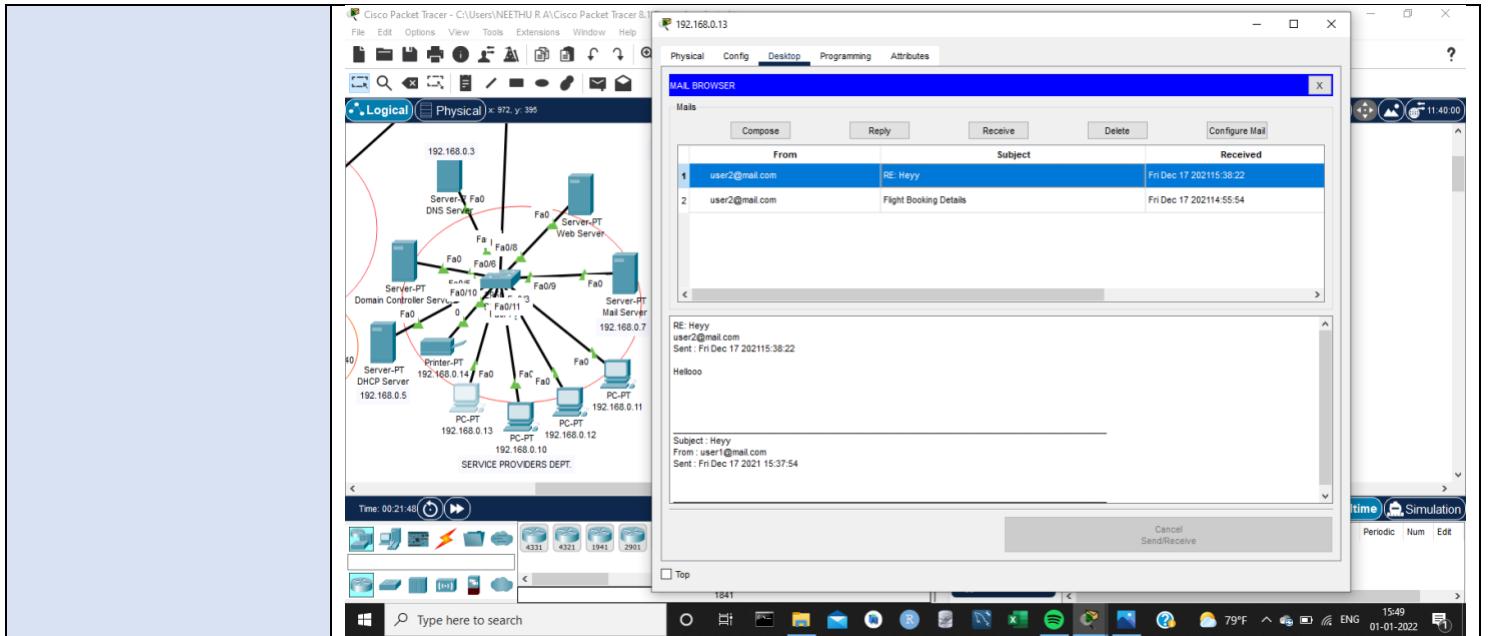
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Implementation of Mail Server:

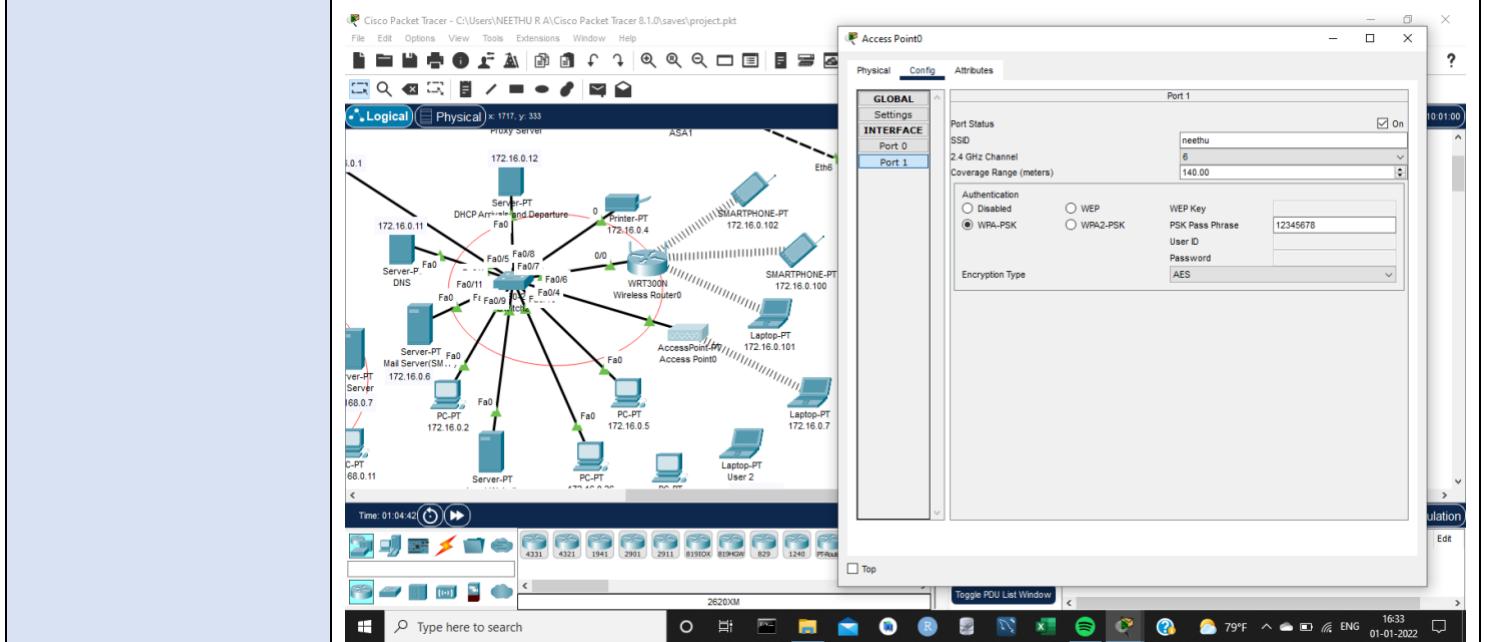


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Implementation of Access-Point:



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