# FIREWALL CONFIGURATION


**ABSTRACT:**

In this digital world Now a days personal computers and laptops usage are very high for every companies they have limited number of pc's according to that the hackers also increasing to take the data from the company servers, so we decided to use Cisco Packet Tracer, to establish a firewall configuration for the systems. Here we will provide firewall security for the server and we will let the information access by the server from the computers

**Methodology**:- Firewall configuration consists of modules like pc's, switches and servers. First the company pc's are connected to the servers through the switch here switch is the intermediate act between the servers and pc's . If the unknown IP address tries to login like hackers they can't login because the servers can't recognize their IP address and data is blocked. The company devices also are able to login using the switches to access the data from the servers.If the unknown ip address is repeating again and again the server is blocked.

**Major Result**:- Created a firewall configurations for the systems by using Cisco packet tracer that considers one of the most important protection that majority of the companies data storedsecurely in the servers if the companies pc's also not detected that pc also can't login .Majority of the companies use the firewall configuration because it is one of the latest ways of protecting the company's servers.And this implementation is done by using Cisco PacketTracer.

**Implications**:-The servers will be directly connected to the client systems through the switches. The ICMP(Internet control message protocol) is been blocked at the server and we have allowed only IP address so that pcs cant send the messages to the server and they can only access through the website address


**OBJECTIVE:-**

The aim of this project is to come up a simulation of firewall configurations for the systemsThat can be accessed by only clients and known IP addresses and show the concept of firewall configurations for the systems.Use of Cisco Packet Tracking Features simulated firewall configuration for the servers. This gives protection and safety to the company database.

**INTRODUCTION:-**

The Cisco ASA 5505 Firewall is the smallest model in the new 5500 Cisco series of hardware appliances. Although this model is suitable for small businesses, branch offices or even home use, its firewall security capabilities are the same as the biggest models (5510, 5520, 5540 etc). The Adaptive Security technology of the ASA firewalls offers solid and reliable firewall protection, advanced application-aware security, denial of service attack protection and much more. Moreover, the performance of the ASA 5505 appliance supports 150Mbps firewall throughput and 4000 firewall connections per second, which is more than enough for small networks. In this article, I will explain the basic Cisco ASA 5505 configuration for connecting a small network to the Internet (here the complete guides).

We assume that our ISP has assigned us a static public IP address (e.g 200.200.200.1 as an example) and that our internal network range is 192.168.1.0/24. We will use Port Address Translation (PAT) to translate our internal IP addresses to the public address of the outside interface. The difference of the 5505 model from the bigger ASA models is that it has an 8-port 10/100 switch which acts as Layer 2 only. That is, you can not configure the physical ports as Layer 3 ports, rather you have to create interface VLANS(VLANs allow network administrators to automatically limit access to a specified group of users by dividing workstations into different isolated LAN segments. When users move their workstations, administrators don't need to reconfigure the network or change VLAN groups.)and assign the Layer 2 interfaces in each VLAN. By default, interface Ethernet0/0 is assigned to VLAN 2 and it's the outside interface (the one which connects to the Internet), and the other 7 interfaces (Ethernet0/1 to 0/7) are assigned by default to VLAN 1 and are used for connecting to the internal network. Let's see the basic configuration setup of the most important steps that you need to configure.

Firewalls have existed since the late 1980's and started out as packet filters, which were networks set up to examine packets, or bytes, transferred between computers. Though packet filtering firewalls are still in use today, firewalls have come a long way as technology has developed throughout the decades.

A firewall can be defined as a special type of network security device or a software program that monitors and filters incoming and outgoing network traffic based on a defined set of security rules. It acts as a barrier between internal private networks and external sources (such as the public Internet).

The primary purpose of a firewall is to allow non-threatening traffic and prevent malicious or unwanted data traffic for protecting the computer from viruses and attacks. A firewall is a cybersecurity tool that filters network traffic and helps users block malicious software from accessing the Internet in infected computers.

**MODULES:-**

**SERVERS:-**Server Is used to store the companies data and store every work related to usage of the companies .The role of a server is to share data as well as to share resources and distribute work. A server computer can serve its own computer programs as well; depending on the scenario, this could be part of a quid pro quo transaction, or simply a technical possibility. To protect the data from the unauthorized persons or unkwo address the servers can be used. A physical server is simply a computer that is used to run server software. The differences between a server and a desktop computer will be discussed in detail in the next section. A virtual server is a virtual representation of a physical server. Like a physical server, a virtual server includes its own operating system andapplications. These are kept separate from any other virtual servers that might be running on the physical server. The process of creating virtual machines involves installing a lightweight software component called a hypervisor onto a physical server. The hypervisor's job is to enable the physical server to function as a virtualization host. The virtualization host makes the physical server's hardware resources such as CPU time, memory, storage and network bandwidth -- available to one or more virtual machines. An administrative console gives administrators the ability to allocate specific hardware resources to each virtual server. This helps dramatically drive down hardware costs because a single physical server can run multiple virtual servers, as opposed to each workload needing its own physical server.

Client–server systems are usually most frequently implemented by (and often identified with) the request response model: a client sends a request to the server, which performs some action and sends a response back to the client, typically with a result or acknowledgment. Designating a computer as "server-class hardware" implies that it is specialized for running servers on it. This often implies that it is more powerful and reliable than standard personal computers, but alternatively, large computing clusters may be composed of many relatively simple, replaceable server components.

**SWITCHES:-** The switches will be accessed in the Data link layer It takes in packets being sent by devices that are connected to its physical ports and sends them out again, but only through the ports that lead to the devices the packets are intended to reach Once a device is connected to a switch, the switch notes its media access control (MAC) address, a code that's baked into the device's network-interface card (NIC) that attaches to an ethernet cable that attaches to the switch. The switch uses the MAC address to identify which attached device outgoing packets are being sent from and where to deliver incoming packets. Switches are networking devices operating at layer 2 or a data link layer of the OSI model. They connect devices in a network and use packet switching to send, receive or forward data packets or data frames over the network. A switch has many ports, to which computers are plugged in. When a data frame arrives at any port of a network switch, it examines the destination address, performs necessary checks and sends the frame to the corresponding device(s).It supports unicast, multicast as well as broadcast communications.

**Unmanaged Switch** − These are inexpensive switches commonly used in home networks and small businesses. They can be set up by simply plugging in to the network, after which they instantly start operating. When more devices needs to be added, more switches are simply added by this plug and play method. They are referred to as u managed since they do not require to be configured or monitored.

**Managed Switch** − These are costly switches that are used in organisations with large and complex networks, since they can be customized to augment the functionalities of a standard switch. The augmented features may be QoS (Quality of Service) like higher security levels, better precision control and complete network management. Despite their cost, they are preferred in growing organizations due to their scalability and flexibility. Simple Network Management Protocol (SNMP) is used for configuring managed switches.

**LAN Switch** − Local Area Network (LAN) switches connects devices in the internal LAN of an organization. They are also referred as Ethernet switches or data switches. These switches are particularly helpful in reducing network congestion or bottlenecks. They allocate bandwidth in a manner so that there is no overlapping of data packets in a network.

**PoE Switch** − Power over Ethernet (PoE) switches are used in PoE Gogabit Ethernets. PoE technology combine data and power transmission over the same cable so that devices connected to it can receive both electricity as well as data over the same line. PoE switches offer greater flexibility and simplifies the cabling connections

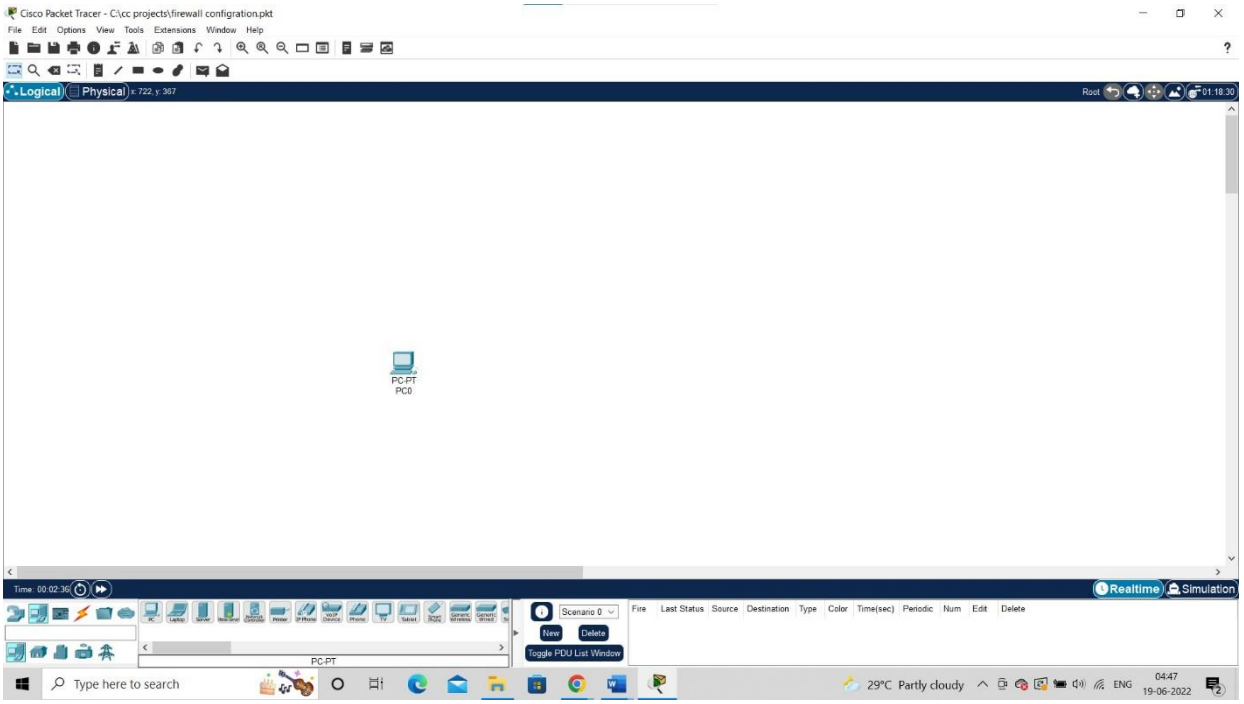
- A switch operates in the layer 2, i.e. data link layer of the OSI model.
- It is an intelligent network device that can be conceived as a multiport network bridge.
- It uses MAC addresses (addresses of medium access control sublayer) to send data packets to selected destination ports.
- It uses packet switching technique to receive and forward data packets from the source to the destination device.
- It is supports unicast (one-to-one), multicast (one-to-many) and broadcast (one-to-all) communications.
- Transmission mode is full duplex, i.e. communication in the channel occurs in both the directions at the same time. Due to this, collisions do not occur.

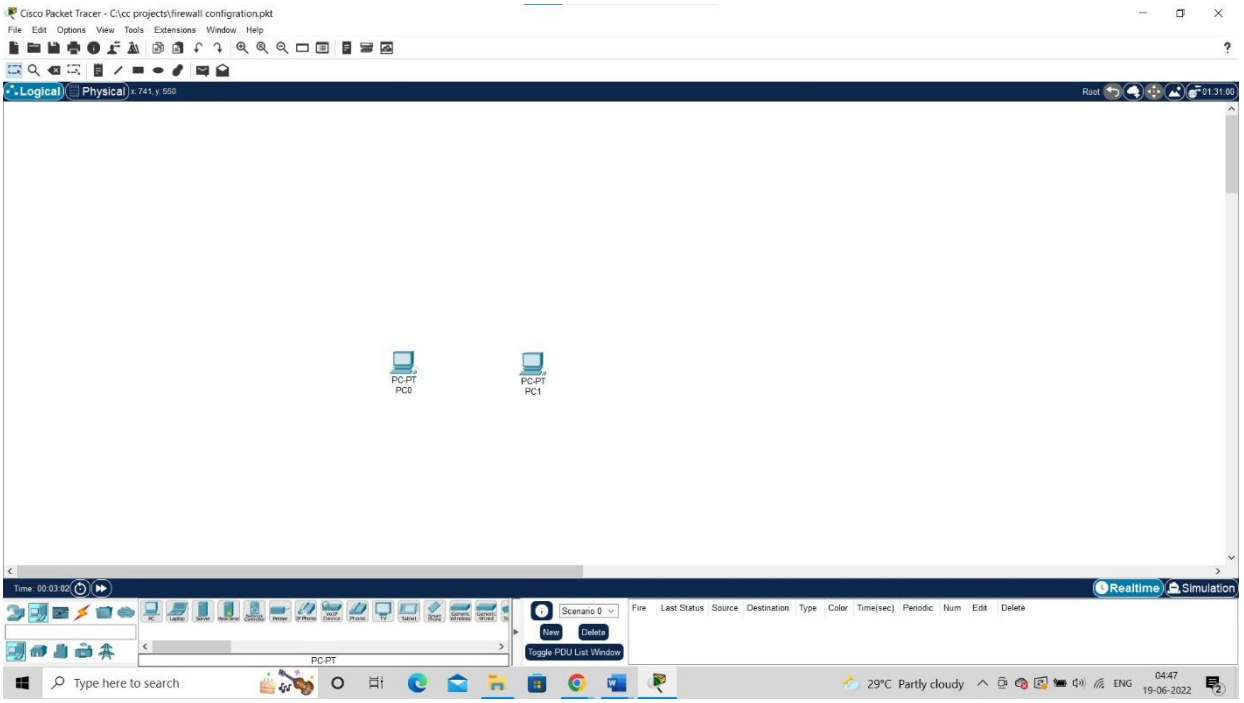
- Switches are active devices, equipped with network software and network management capabilities.
- Switches can perform some error checking before forwarding data to the destined port.
- The number of ports is higher – 24/48.

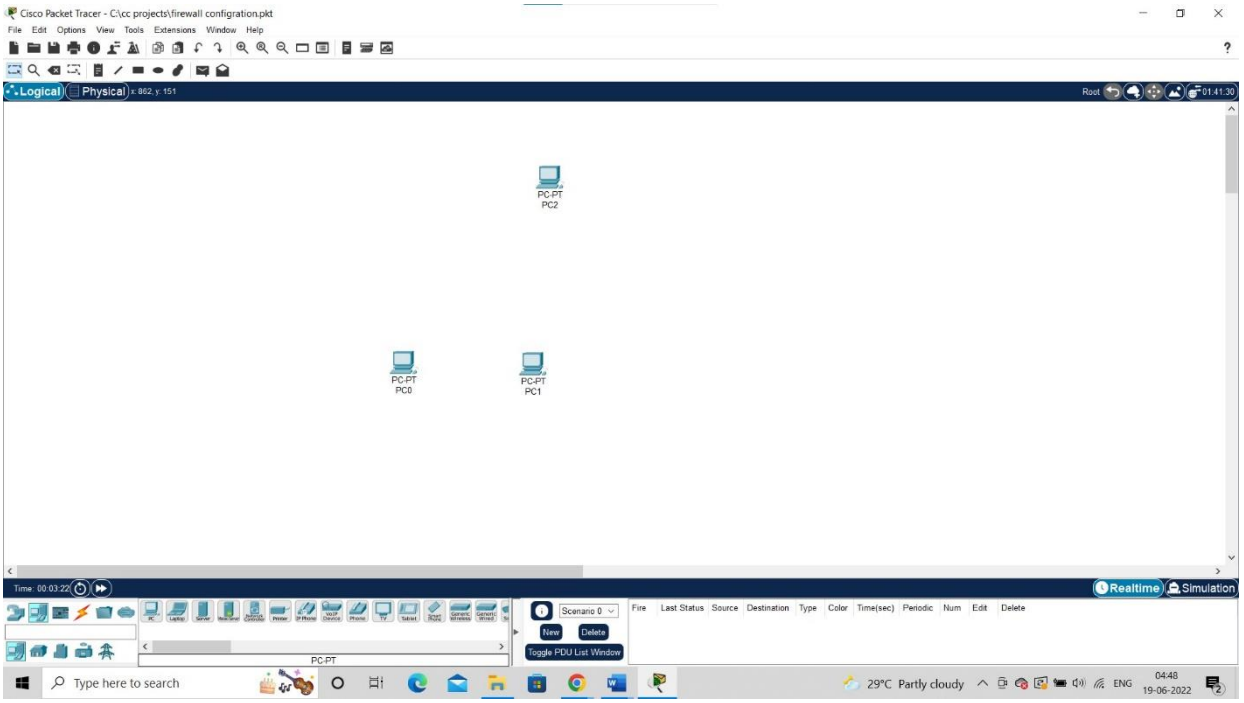
**PC'S:-** The use of the personal computers in the companies are to create any documents, projects reports according to the company needs. And the personal computers assigned to every employee in the company.Only the known ip address or mac address which connected to the switches based on the company needs. personal computer (PC)**,** a digital computer designed for use by only one person at a time. A typical personal computer assemblage consists of a central programing unit (CPU), which contains the computer's arithmetic, logic, and control circuitry on an integrated circuit two types of computer memory main memory, such as digital Random access memory (RAM), and auxiliary memory, such as magnetic hard disks and special optical compact discs or read-only memory (ROM) discs (CD-ROMs and DVD-ROMs); and various secondary devices, including a display screen, keyboard and mouse, and printer.

The personal computer industry truly began in 1977, with the introduction of three preassembled mass-produced personal computers: the Apple Computer, Inc. (now Apple Inc.), AppleII, the Tandy Radio Shack TRS-80, and the commodore business machines Personal Electronic Transactor (PET). These machines used eight-bit microprocessors (which process information in groups of eight bits, or binary digits, at a time) and possessed rather limited memory capacity—i.e., the ability to address a given quantity of data held in memory storage. But because personal computers were much less expensive than mainframe computers (the bigger computers typically deployed by large business, industry, and government organizations), they could be purchased by individuals, small and medium-sized businesses, and primary and secondary schools. Of these computers, the TRS-80 dominated the market. The TRS-80 microcomputer came with four kilobytes of memory, a Z80 microprocessor, a BASIC programming language, and cassettes for data storage. To cut costs, the machine was built without the ability to type lowercase letters. Thanks to Tandy's chain of Radio Shack stores and the breakthrough price ($399 fully assembled and tested), the machine was successful enough to persuade the company to introduce a more powerful computer two years later, the TRS-80 Model II, which could reasonable be marketed be marketed as a small-business computer

## SIMULATION OF THE PROJECT:-

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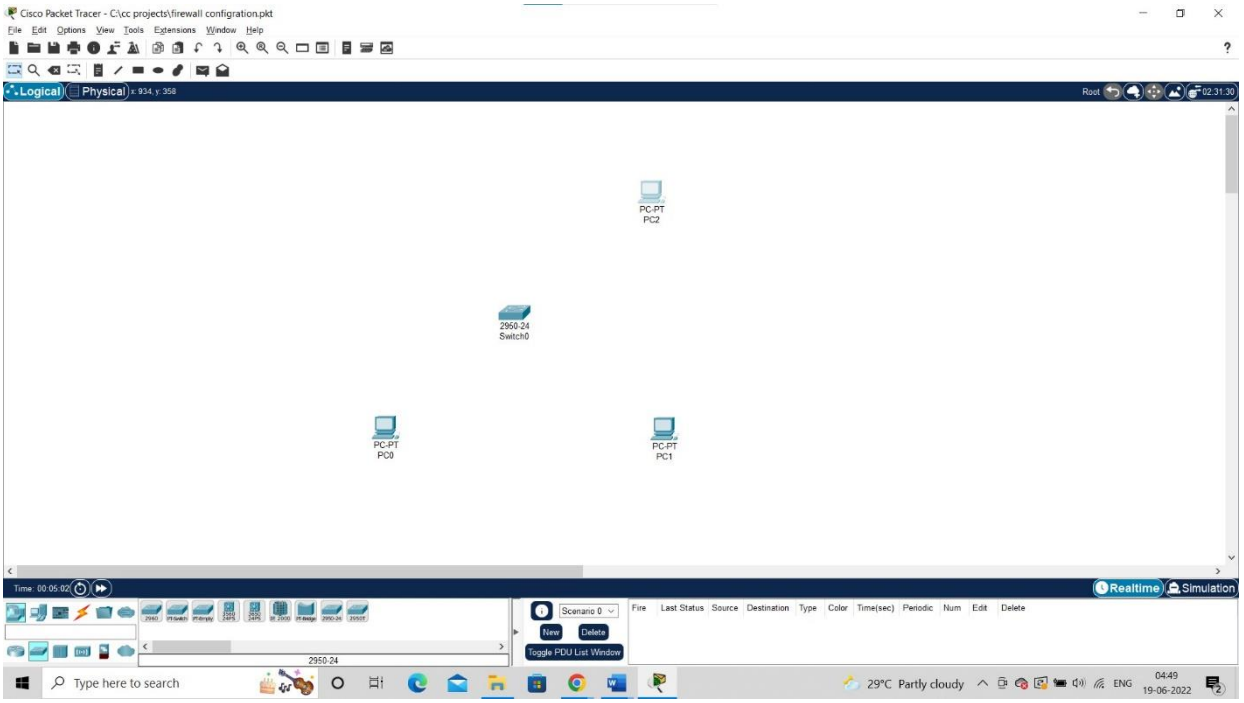
File Edit Options View Tools Extensions Window Help
Logical Physical x: 862, y: 151
Root 01:41:30
PC-PT PC2
PC-PT PC0
PC-PT PC1
Time: 00:03:22
Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
PC-PT
Type here to search
29°C Partly cloudy
ENG
04:48
19-06-2022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Logical Physical x: 934, y: 358
Root 02:31:30
PC-PT PC2
2960-24 Switch0
PC-PT PC0
PC-PT PC1
Time: 00:05:02
Realtime Simulation
Scenario 0
New Delete
Toggle PDU List Window
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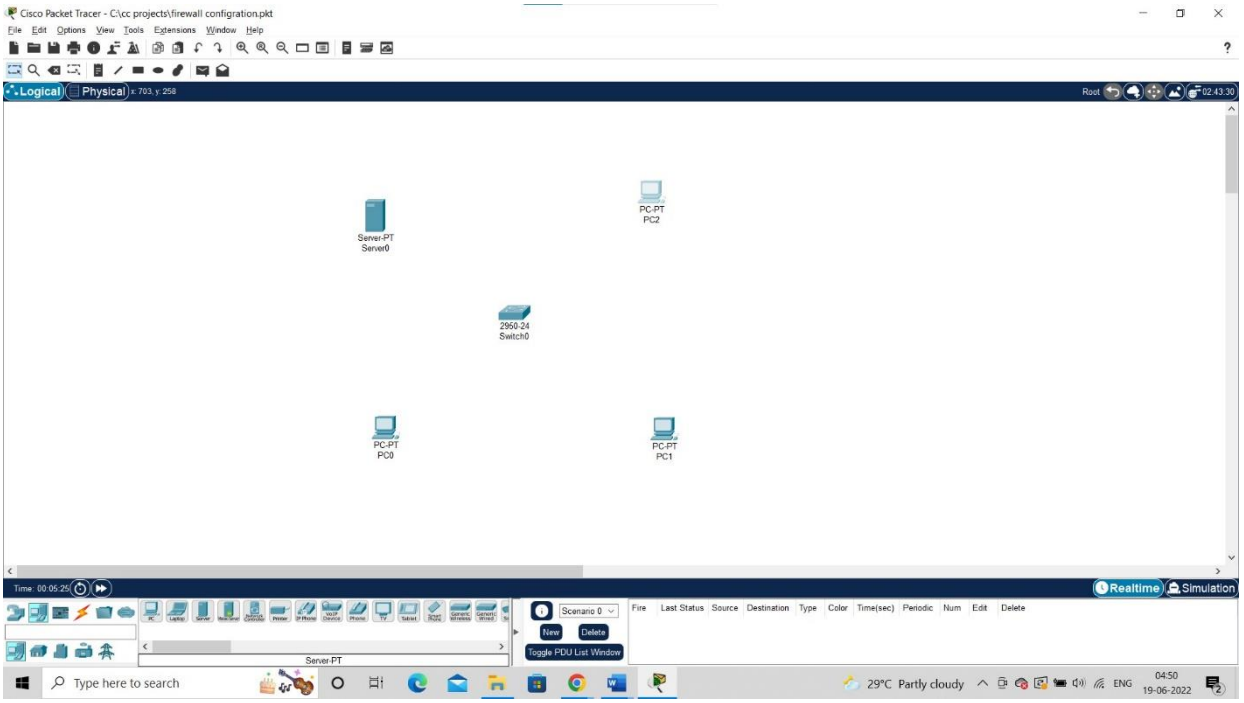
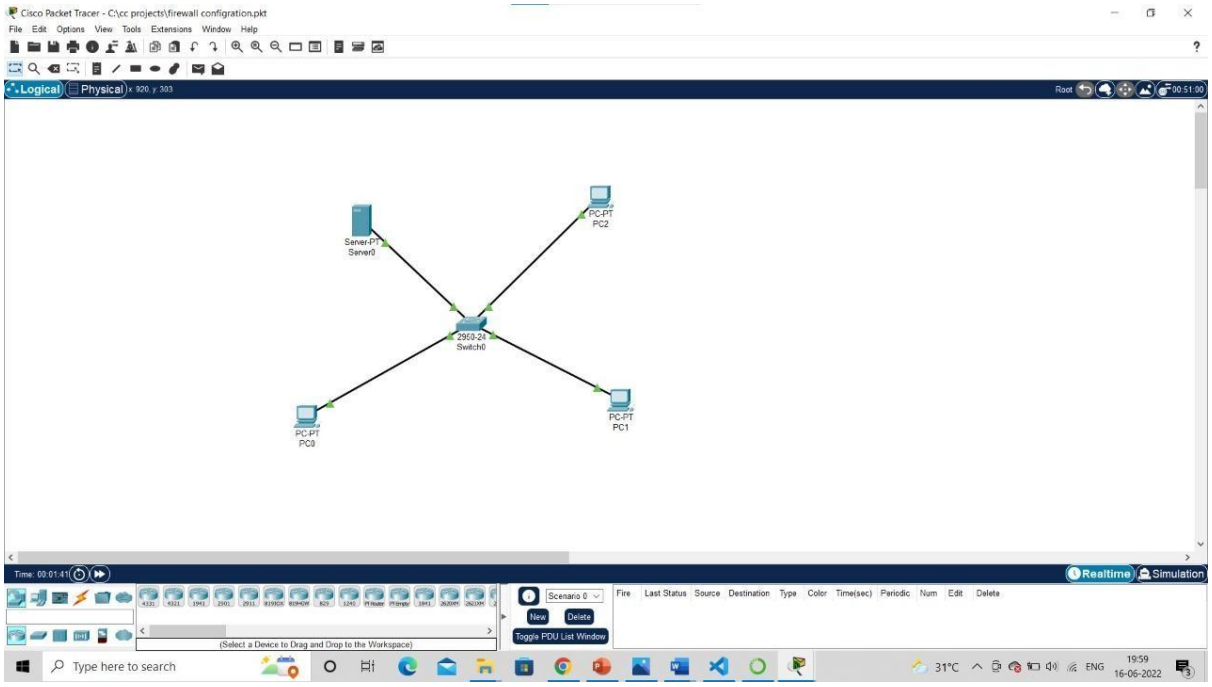
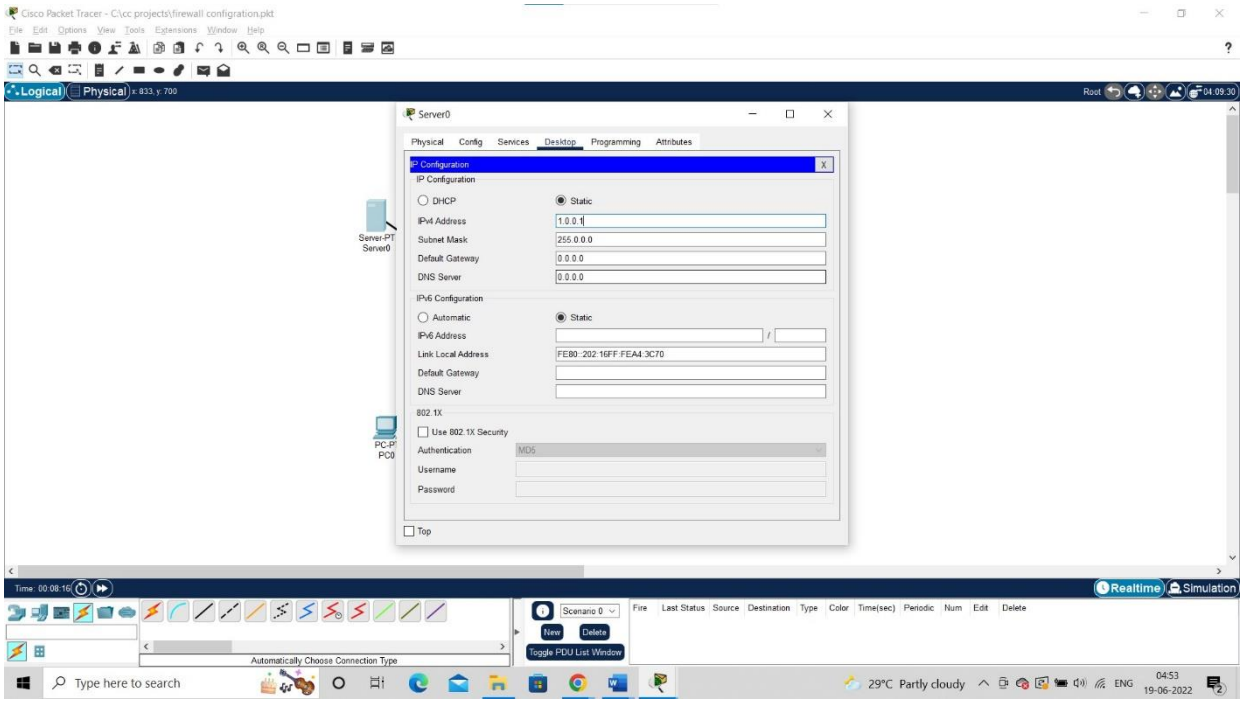
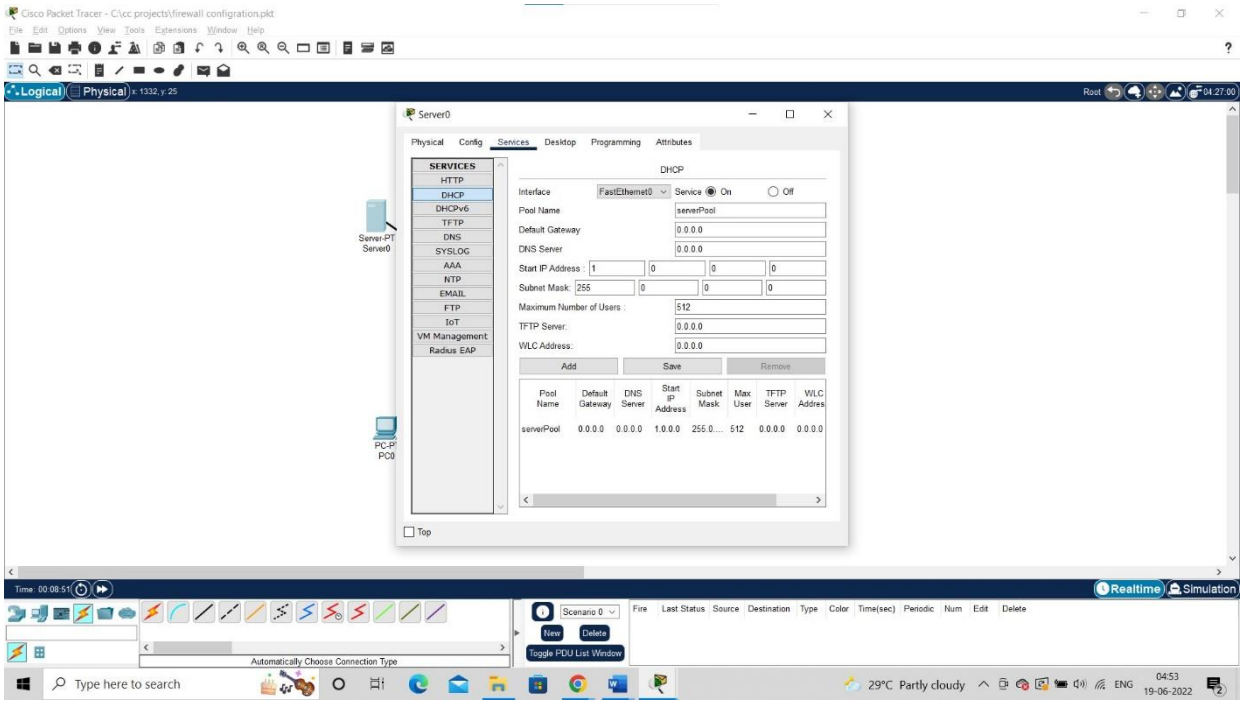
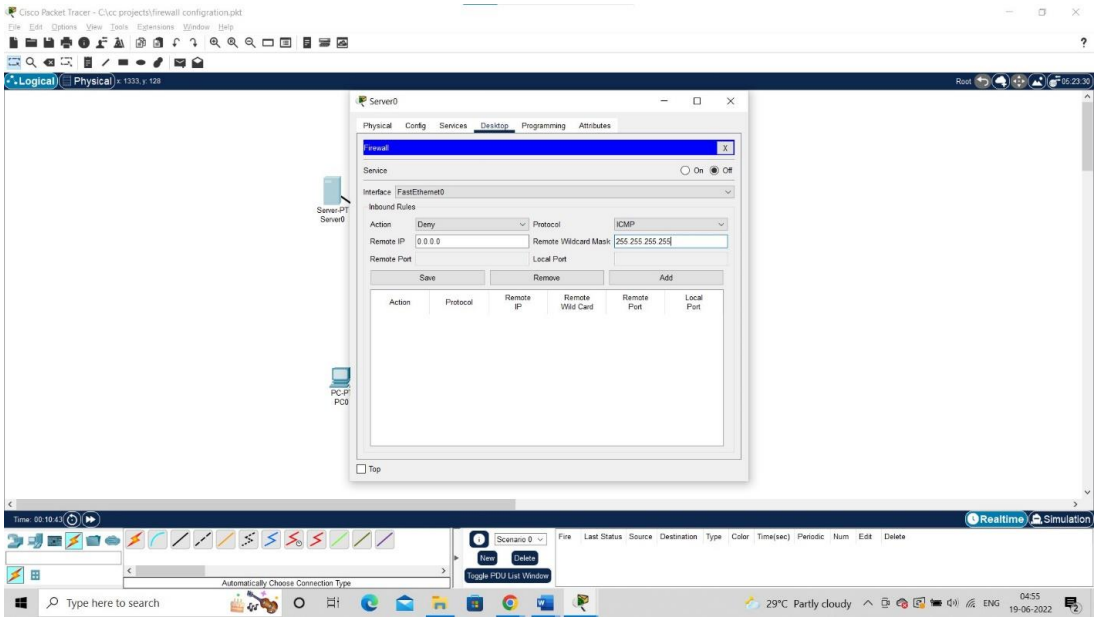
2960-24
Type here to search
29°C Partly cloudy
ENG
04:49
19-06-2022

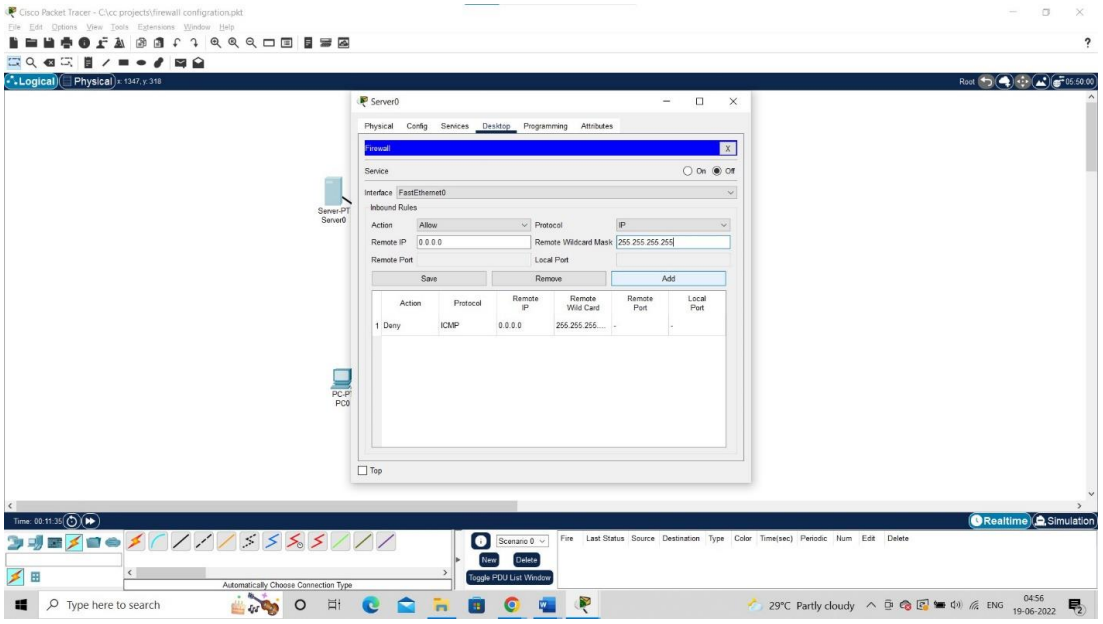

Cisco Packet Tracer - C:\cc projects\firewall configration.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical
Root
Server-PT Server0
PC-PT PC2
2960-24 Switch0
PC-PT PC0
PC-PT PC1
Realtime Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Server-PT
Type here to search
29°C Partly cloudy
ENG
04:50
19-06-2022

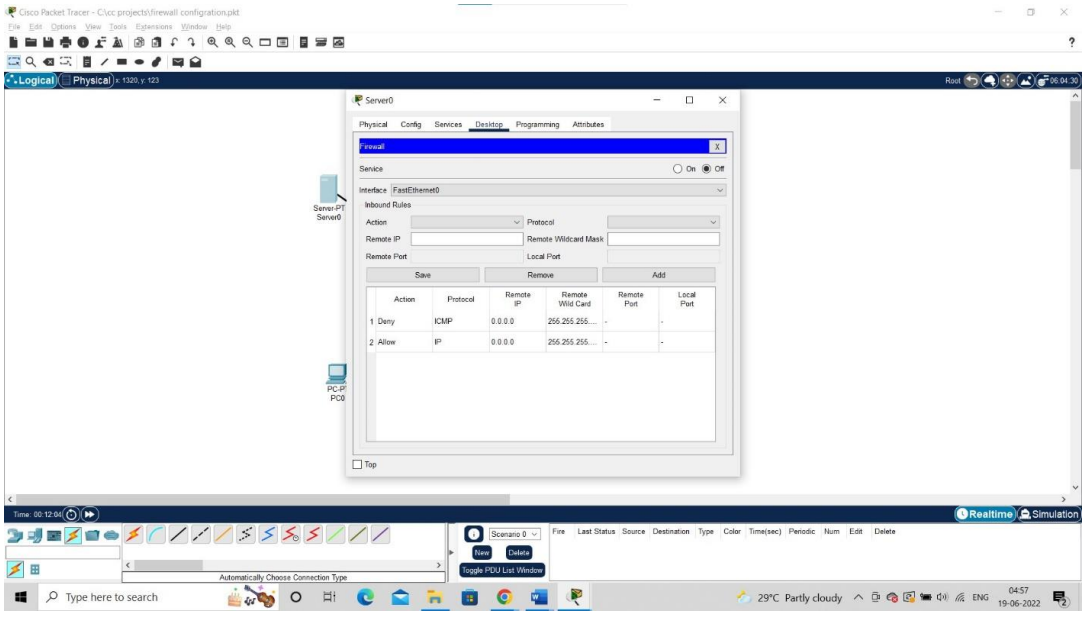

Cisco Packet Tracer - C:\cc projects\firewall configration.pkt
File Edit Options View Tools Extensions Window Help
Logical Physical
Root
Server-PT Server0
PC-PT PC2
2960-24 Switch0
PC-PT PC0
PC-PT PC1
Realtime Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
(Select a Device to Drag and Drop to the Workspace)
Type here to search
31°C
ENG
19:59
16-06-2022


Cisco Packet Tracer - C:\cc projects\firewall configration.pkt
Server0
Physical
Config
Services
Desktop
Programming
Attributes
IP Configuration
DHCP
Static
IPv4 Address
1.0.0.1
Subnet Mask
255.0.0.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::202:16FF:FEA4:3C70
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Server-PT
Server0
PC-PT
PC0
Logical
Physical
Root
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Automatically Choose Connection Type
Type here to search
29°C Partly cloudy
ENG
04:53
19-06-2022

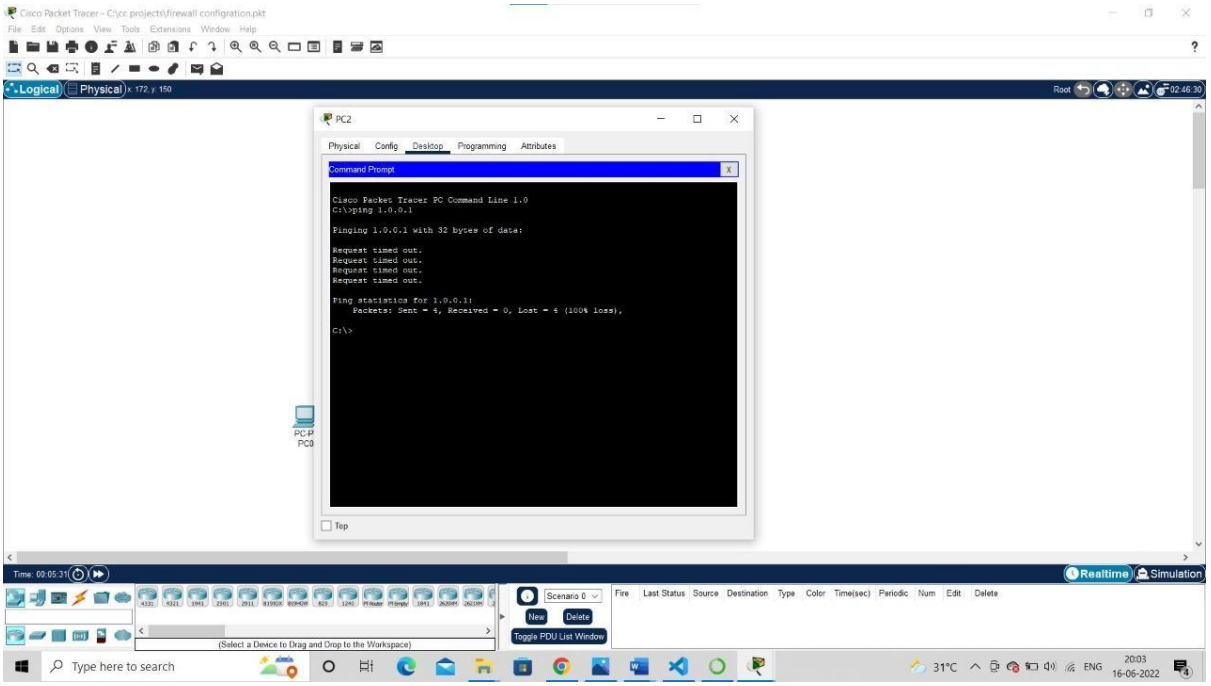

Cisco Packet Tracer - C:\cc projects\firewall configration.pkt
Server0
Physical
Config
Services
Desktop
Programming
Attributes
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
IoT
VM Management
Radius EAP
DHCP
Interface
FastEthernet0
Service
On
Off
Pool Name
serverPool
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
Start IP Address :
Subnet Mask:
Maximum Number of Users :
512
TFTP Server:
WLC Address:
Add
Save
Remove
Pool Name
Default Gateway
DNS Server
Start IP Address
Subnet Mask
Max User
TFTP Server
WLC Addres
serverPool
1.0.0.0
255.0....
Top
Server-PT
Server0
PC-PT
PC0
Logical
Physical
Root
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Automatically Choose Connection Type
Type here to search
29°C Partly cloudy
ENG
04:53
19-06-2022

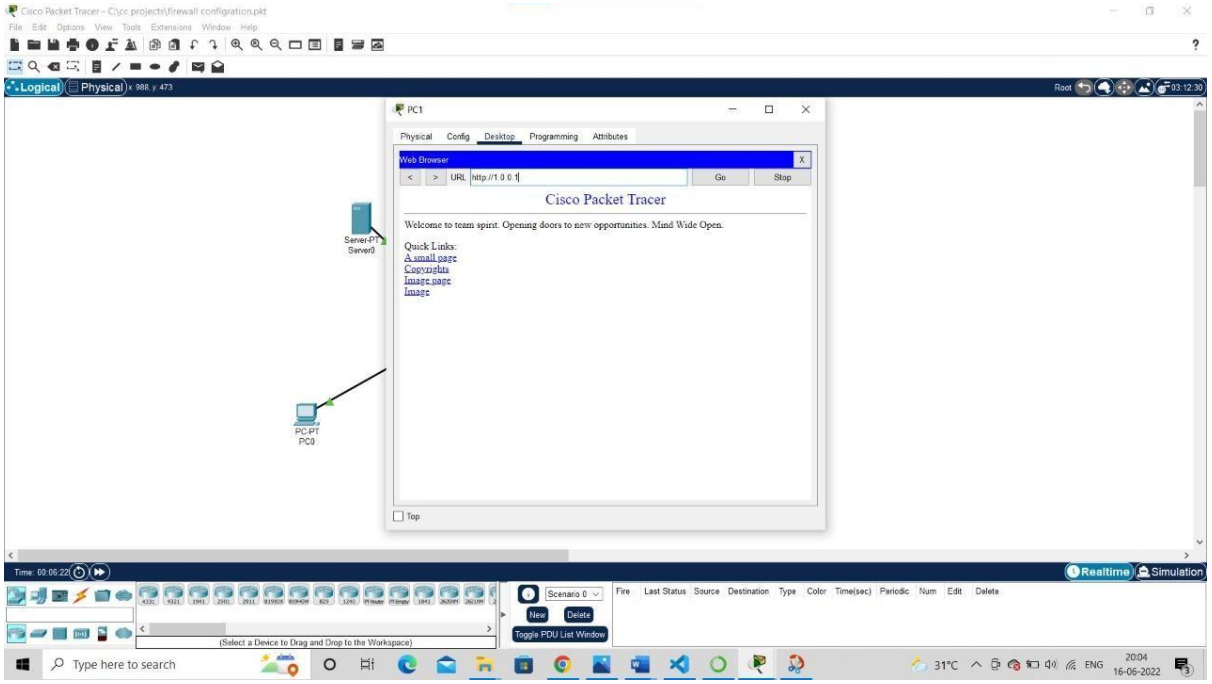

Cisco Packet Tracer - C:\cc projects\firewall configration.pkt
Server0
Physical Config Services Desktop Programming Attributes
Firewall
Service On Off
Interface FastEthernet0
Inbound Rules
Action Deny
Protocol ICMP
Remote IP 0.0.0.0
Remote Wildcard Mask 255.255.255.255
Remote Port
Local Port
Save Remove Add
Action Protocol Remote IP Remote Wild Card Remote Port Local Port
Top
Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Automatically Choose Connection Type
Type here to search
29°C Partly cloudy
ENG
04:55
19-06-2022


Cisco Packet Tracer - C:\cc projects\firewall configration.pkt
Server0
Physical Config Services Desktop Programming Attributes
Firewall
Service On Off
Interface FastEthernet0
Inbound Rules
Action Allow
Protocol IP
Remote IP 0.0.0.0
Remote Wildcard Mask 255.255.255.255
Remote Port
Local Port
Save Remove Add
Action Protocol Remote IP Remote Wild Card Remote Port Local Port
1 Deny ICMP 0.0.0.0 255.255.255.... - -
Top
Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Automatically Choose Connection Type
Type here to search
29°C Partly cloudy
ENG
04:56
19-06-2022


Cisco Packet Tracer - C:\cc projects\firewall configration.pkt
Server0
Physical Config Services Desktop Programming Attributes
Firewall
Service On Off
Interface FastEthernet0
Inbound Rules
Action
Protocol
Remote IP
Remote Wildcard Mask
Remote Port
Local Port
Save Remove Add
Action Protocol Remote IP Remote Wild Card Remote Port Local Port
1 Deny ICMP 0.0.0.0 255.255.255.... - -
2 Allow IP 0.0.0.0 255.255.255.... - -
Top
Realtime Simulation
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num Edit Delete
Automatically Choose Connection Type
Type here to search
29°C Partly cloudy
ENG
04:57
19-06-2022

## OUTPUT:-

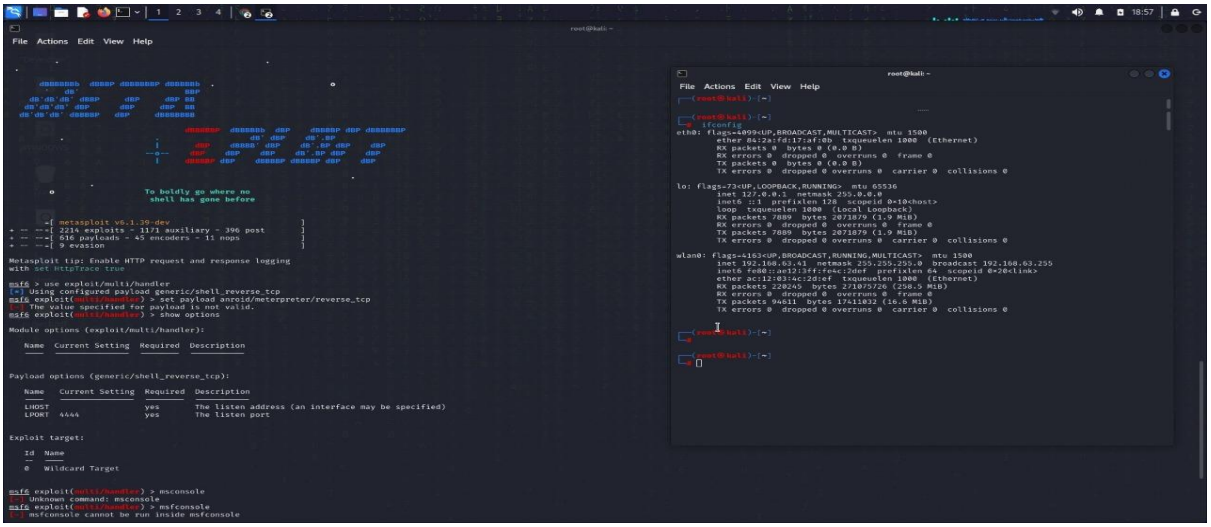

PC2
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 1.0.0.1
Pinging 1.0.0.1 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 1.0.0.1:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
Top
PC-PT PC0
Realtime Simulation
(Select a Device to Drag and Drop to the Workspace)
Type here to search
31°C
ENG
20:03
16-06-2022

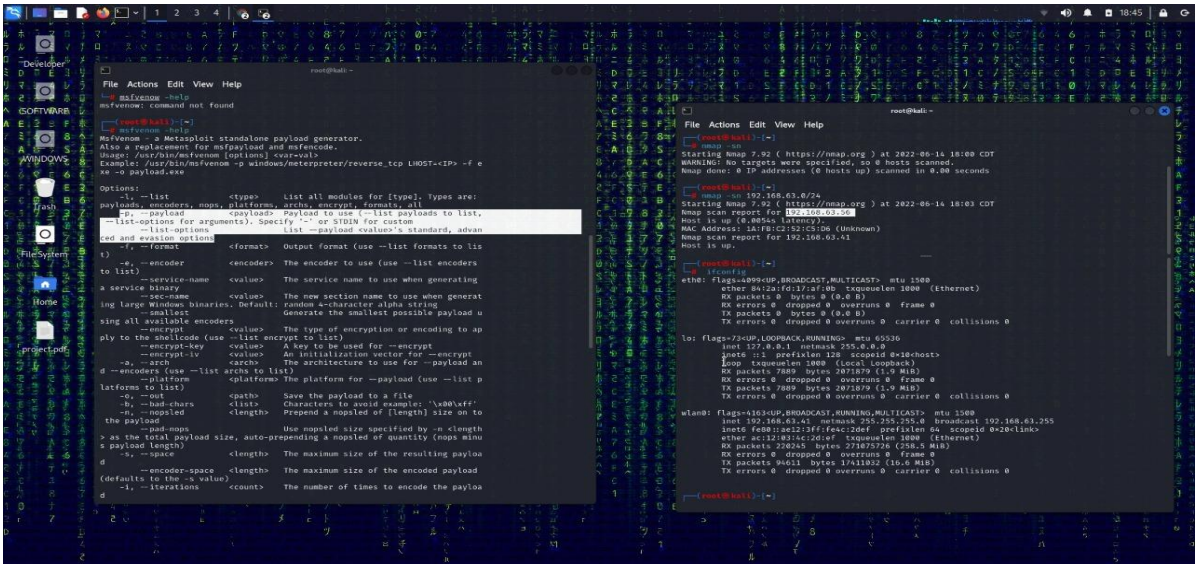

PC1
Physical Config Desktop Programming Attributes
Web Browser
URL http://1.0.0.1
Go Stop
Cisco Packet Tracer
Welcome to team spirit. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image
Server-PT Server0
PC-PT PC0
Top
Realtime Simulation
(Select a Device to Drag and Drop to the Workspace)
Type here to search
31°C
ENG
20:04
16-06-2022

**CISCOPACKET TRACER:-** we will first take four pcs namely pc0,pc1,pc2 and switch0 2950-24 and a sever. We will change the mode of the server to DCPH protocol which provides the ip addresses for all the pcs connected to it. We will make use of the same server as a DHCP server and as a firewall and as well as web hosting. We will assign the ip address to the server as 1.0.0.1, and the IP address for the pc0 is 1.0.0.2 and the IP address for the pc1 is 1.0.0.3 and the IP address for the pc3 is 1.0.0.4 which will be automatically assigned by the server(DHCP/firewall/webhost). We will note down the all the IP addresses of the pc's. Our is to block the ICMP protocol(The ICMP stands for Internet Control Message Protocol. It is a network layer protocol. It is used for error handling in the network layer, and it is primarily used on network devices such as routers. As different types of errors can exist in the network layer, so ICMP can be used to report these errors and to debug those errors.) so that no pc can access the server using ping command. And we will allow the IP address for all the pc's. so that they can access the information through the website. And we will go to the server there we will check for the DHCP address, and we will go the index.html there will change some default things in the server. Now we will go to the main theme of our project, go to the firewall of IPv4(IPv4 stands for Internet Protocol version 4. It is the underlying technology that makes it possible for us to connect our devices to the web. Whenever a device accesses the Internet, it is assigned a unique, numerical IP address such as 99.48.227.227. To send data from one computer to another through the web, a data packet must be transferred across the network containing the IP addresses of both devices.) switch on the firewall and there, we will keep remote IP(Computers that connect to a TCP/IP network such as the Internet are assigned an IP address, a label consisting of 32-bits and represented in dotted-decimal notation, such as 192.168.0.1. PCs also have a host name, or computer name, comprised of alphanumeric characters, which makes identification of a machine easier for users. If you need to perform maintenance on a workstation in your office but you don't remember the IP address of the PC, you can use the ping command to convert the PC's host name to an IP address.) as and we keep the action as **DENY** and the protocol you need to deny is **ICMP**, keep the remote subnet musk or remote wild card mask (A **wildcard mask** is a mask of bits that indicates which parts of an IP address are available for examination. In the

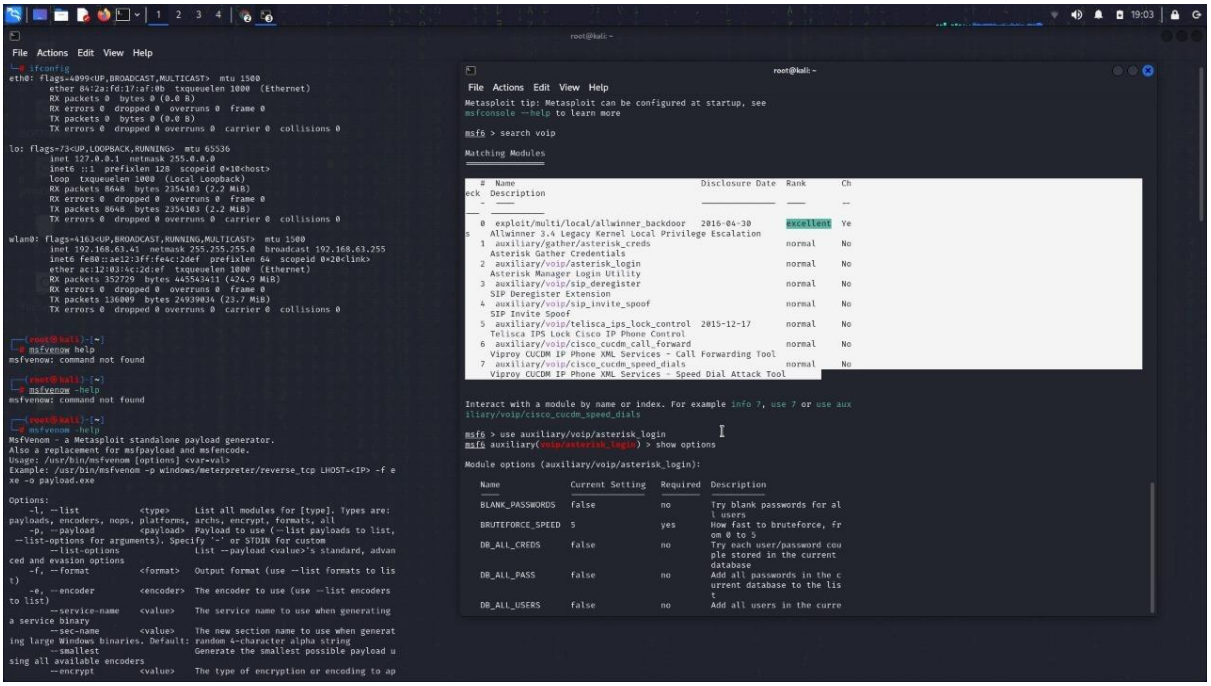
CISCO IOS they are used in several places) 255.255.255.255 . This is our first rule and the second rule is that we have to allow the IP address for the IP address 0.0.0.0 . actually 0.0.0.0 is to allow the IP address for all the pcs. Now all the things have been completed and now lets go and test it. Click on any pc[pc0,pc1,pc2] go to desktop and click on command prompt and try to ping to the server using ping command 1.0.0.0.1 and check the output. We would be not able to ping to the server because ICMP protocol is blocked which doesn't allow any pc to ping to the sever. Now go to another pc and try ping to the server using the same technique yet you will not be able to ping to the server because of firewall and blocking of ICMP protocol. Now try connecting to the server using web browser, open any pc[PC1,PC2,PC0]. And open web browser and type in search bar the address of the browser 1.0.0.1 you can able to see the outlay of the website which means that you can access to the server through the website as only the IP address is required to access the website, and as we have blocked the ping command so that we are not able to access the server directly.

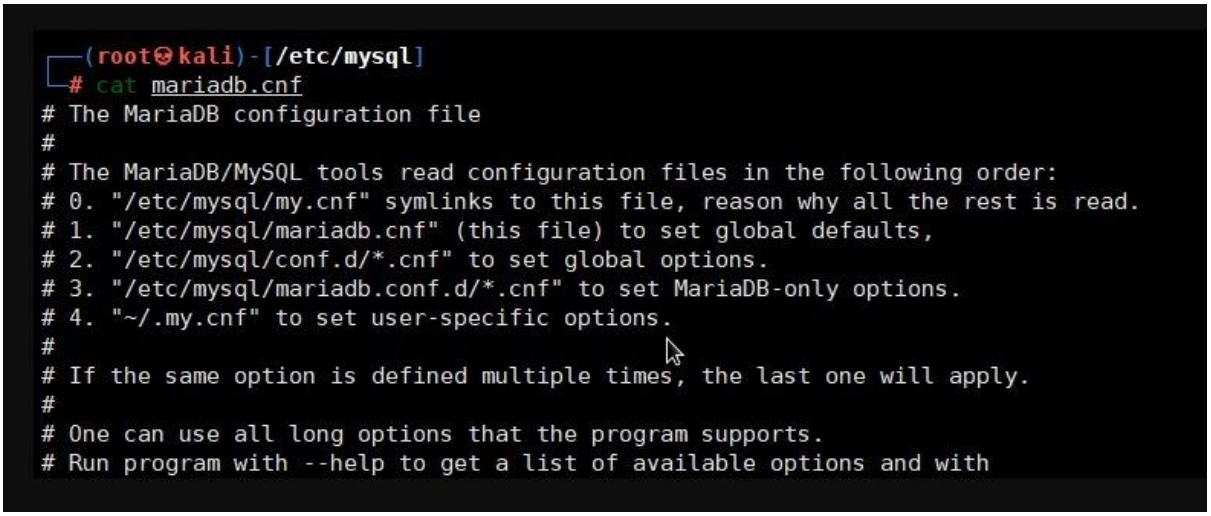
## CODING IN KALI(LINUX):




tengxun - 连接属性
常规
高级
SSL
SSH
HTTP
连接名:
yuntengxun
主机名或 IP 地址:
67.172
端口:
3366
用户名:
root
密码:
保存密码
注释
1045 - Access denied for user 'root'@'117. 01.227' (using password: YES)
确定
连接测试
确定
取消


File Actions Edit View Help
msfvenom help
msfvenom: command not found
msfvenom -help
msfvenom: command not found
msfvenom -help
MsfVenom - a Metasploit standalone payload generator.
Also a replacement for msfpayload and msfencode.
Usage: /usr/bin/msfvenom [options] <var=val>
Example: /usr/bin/msfvenom -p windows/meterpreter/reverse_tcp LHOST=<IP> -f exe -o payload.exe
Options:
-l, --list <type> List all modules for [type]. Types are: payloads, encoders, nops, platforms, archs, encrypt, formats, all
-p, --payload <payload> Payload to use (--list payloads to list, --list-options for arguments). Specify '-' or STDIN for custom
--list-options List --payload <value>'s standard, advanced and evasion options
-f, --format <format> Output format (use --list formats to list)
-e, --encoder <encoder> The encoder to use (use --list encoders to list)
--service-name <value> The service name to use when generating a service binary
--sec-name <value> The new section name to use when generating large Windows binaries. Default: random 4-character alpha string
--smallest Generate the smallest possible payload using all available encoders
--encrypt <value> The type of encryption or encoding to ap
root@kali: ~
File Actions Edit View Help
Metasploit tip: Metasploit can be configured at startup, see msfconsole --help to learn more
msf6 > search voip
Matching Modules
# Name Disclosure Date Rank Check Description
0 exploit/multi/local/allwinner_backdoor 2016-04-30 excellent Yes Allwinner 3.4 Legacy Kernel Local Privilege Escalation
1 auxiliary/gather/asterisk_creds normal No Asterisk Gather Credentials
2 auxiliary/voip/asterisk_login normal No Asterisk Manager Login Utility
3 auxiliary/voip/sip_deregister normal No SIP Deregister Extension
4 auxiliary/voip/sip_invite_spoof normal No SIP Invite Spoof
5 auxiliary/voip/telisca_ips_lock_control 2015-12-17 normal No Telisca IPS Lock Cisco IP Phone Control
6 auxiliary/voip/cisco_cucdm_call_forward normal No Viproy CUCDM IP Phone XML Services - Call Forwarding Tool
7 auxiliary/voip/cisco_cucdm_speed_dials normal No Viproy CUCDM IP Phone XML Services - Speed Dial Attack Tool
Interact with a module by name or index. For example info 7, use 7 or use auxiliary/voip/cisco_cucdm_speed_dials
msf6 > use auxiliary/voip/asterisk_login
msf6 auxiliary(voip/asterisk_login) > show options
Module options (auxiliary/voip/asterisk_login):
Name Current Setting Required Description
BLANK_PASSWORDS false no Try blank passwords for all users
BRUTEFORCE_SPEED 5 yes How fast to bruteforce, from 0 to 5
DB_ALL_CREDS false no Try each user/password couple stored in the current database
DB_ALL_PASS false no Add all passwords in the current database to the list
DB_ALL_USERS false no Add all users in the curre




**INFERANCE:-** thus we have a created server for whose firewall have been constructed by https://www.techtarget.com/searchsecurity/definition/firewallblocking ICMP protocol which doesn't allow the user or client or the customer to enter into the server and access the information but IP address is allowed in so we can able to access the information present inside the server.

**REFERANCE:-**

1) https://www.checkpoint.com/cyber-hub/network-security/what-is-firewall/#:~:text=A%20Firewall%20is%20a%20network,network%20and%20the%20public%20Internet.
2) https://www.kaspersky.co.in/resource-center/definitions/firewall
3) https://www.techtarget.com/searchsecurity/definition/firewall
4) https://www.routerfreak.com/basic-configuration-tutorial-cisco-asa-5505-firewall/
5) https://www.routerfreak.com/basic-configuration-tutorial-cisco-asa-5505-firewall/