



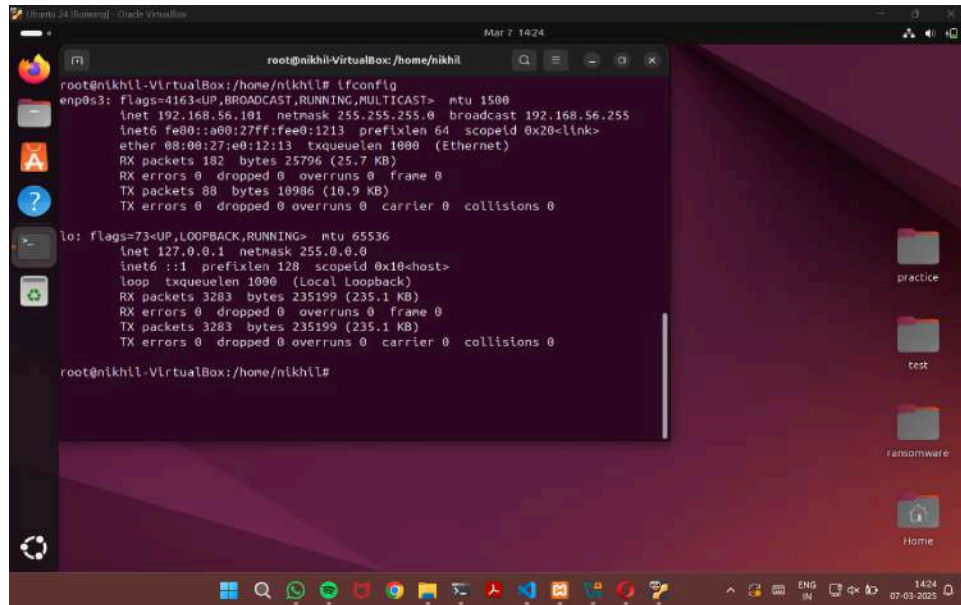
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UFW Demo

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LAB SLOT: L55+L56
SEMESTER: Winter Semester 2024-25
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1. IP addresses of the Kali Linux and Ubuntu virtual machines



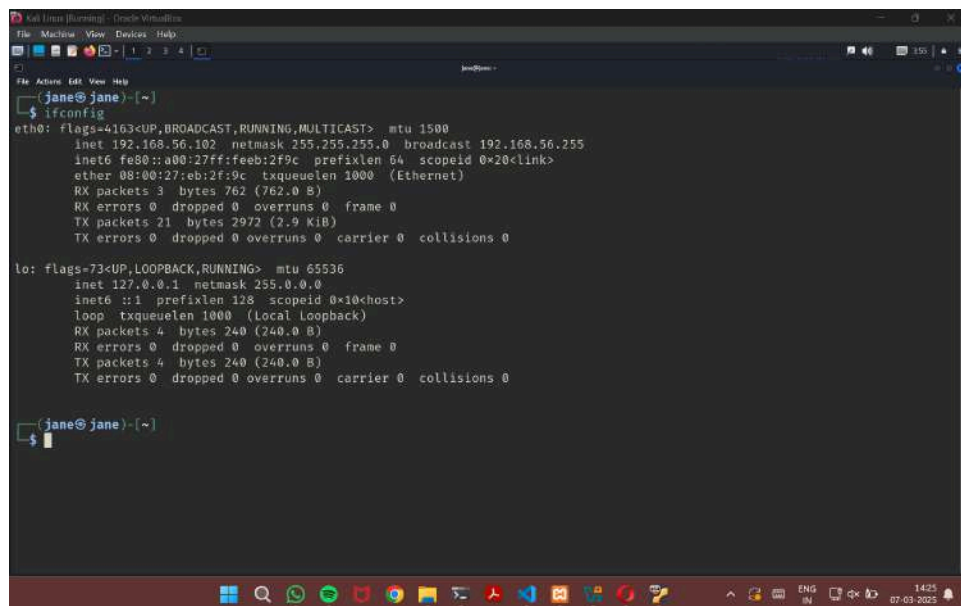
```

root@nikhil-VirtualBox:/home/nikhil# ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.56.101 netmask 255.255.255.0 broadcast 192.168.56.255
    inet6 fe80::a00:27ff:fe0:1213 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:e0:12:13 txqueuelen 1000 (Ethernet)
    RX packets 182 bytes 25796 (25.7 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 88 bytes 10906 (10.9 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 3283 bytes 235199 (235.1 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 3283 bytes 235199 (235.1 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@nikhil-VirtualBox:/home/nikhil#

```



```

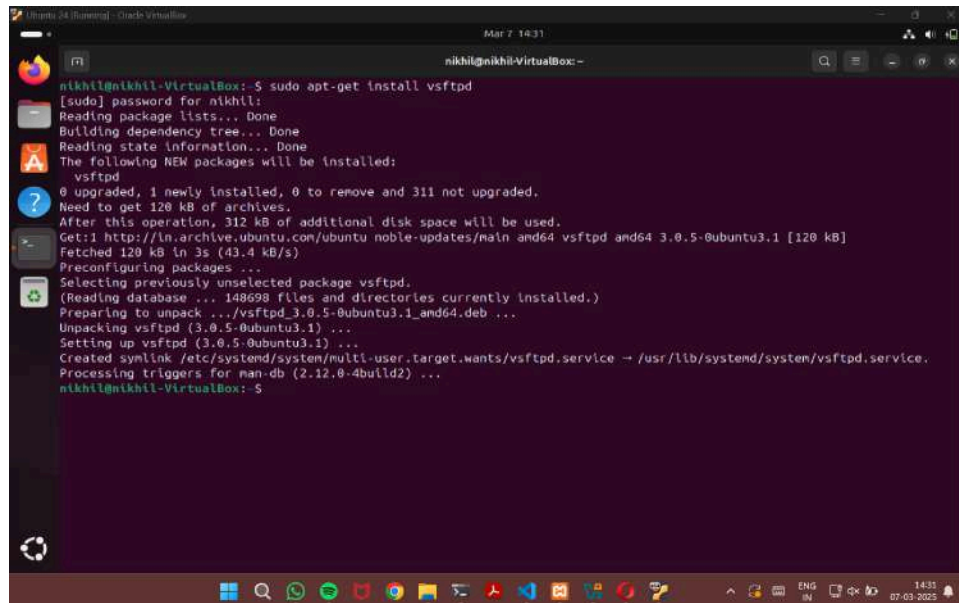
jane@jane:~$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.56.102 netmask 255.255.255.0 broadcast 192.168.56.255
    inet6 fe80::a00:27ff:feb:2f9c prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:eb:2f:9c txqueuelen 1000 (Ethernet)
    RX packets 3 bytes 762 (762.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 21 bytes 2972 (2.9 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 4 bytes 240 (240.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 4 bytes 240 (240.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

jane@jane:~$

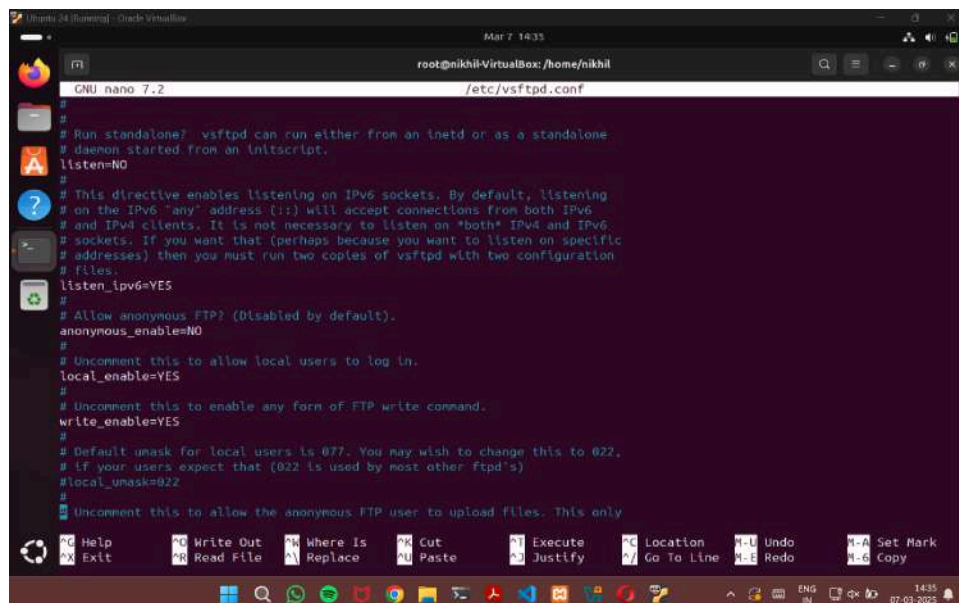
```

2. Installing, configuring and starting VSFTPD in Ubuntu



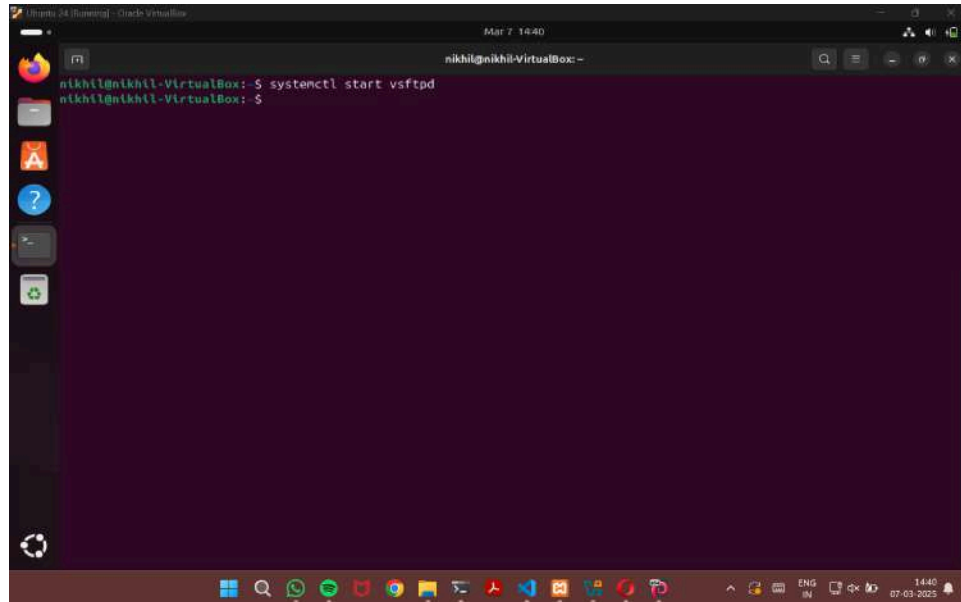
A terminal window titled 'nikhil@nikhil-VirtualBox: ~' showing the installation of vsftpd. The user runs 'sudo apt-get install vsftpd'. The terminal output shows the package lists, dependency tree, and the installation of vsftpd (3.0.5-0ubuntu3.1). It also shows the creation of a symlink for the service file.

```
nikhil@nikhil-VirtualBox: ~$ sudo apt-get install vsftpd
[sudo] password for nikhil:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  vsftpd
0 upgraded, 1 newly installed, 0 to remove and 311 not upgraded.
Need to get 120 kB of archives.
After this operation, 312 kB of additional disk space will be used.
Get:1 http://ln.archive.ubuntu.com/ubuntu noble-updates/main amd64 vsftpd amd64 3.0.5-0ubuntu3.1 [120 kB]
Fetched 120 kB in 3s (43.4 kB/s)
Preconfiguring packages ...
Selecting previously unselected package vsftpd.
(Reading database ... 148698 files and directories currently installed.)
Preparing to unpack .../vsftpd_3.0.5-0ubuntu3.1_and64.deb ...
Unpacking vsftpd (3.0.5-0ubuntu3.1) ...
Setting up vsftpd (3.0.5-0ubuntu3.1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/vsftpd.service -> /usr/lib/systemd/system/vsftpd.service.
Processing triggers for man-db (2.12.0-4build2) ...
nikhil@nikhil-VirtualBox: ~$
```

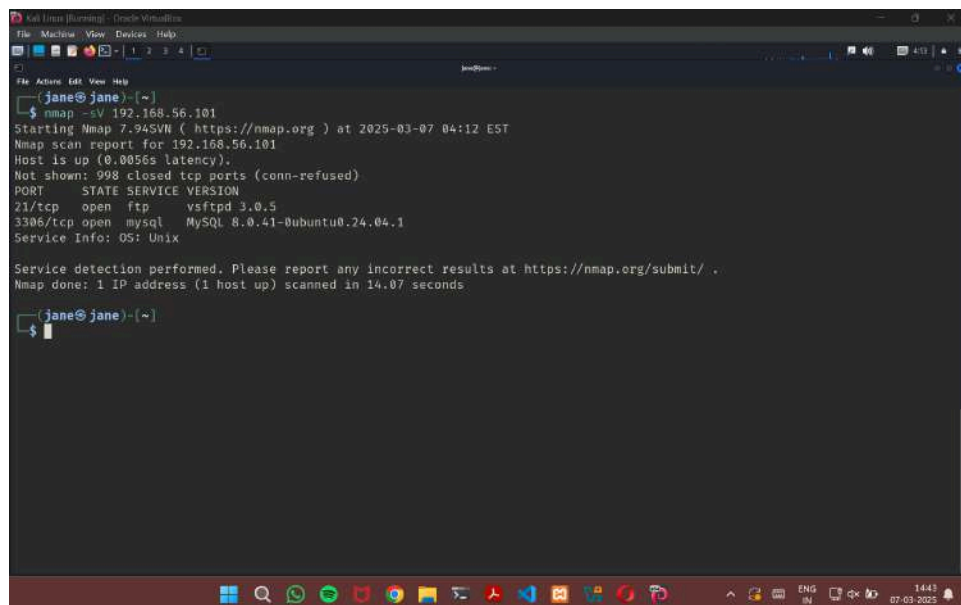


A terminal window titled 'root@nikhil-VirtualBox: /home/nikhil' showing the configuration of vsftpd. The user is editing the file '/etc/vsftpd.conf' using nano. The configuration file content is displayed, showing various settings like 'listen=NO', 'listen_ipv6=YES', 'anonymous_enable=NO', 'local_enable=YES', 'write_enable=YES', and 'local_umask=022'.

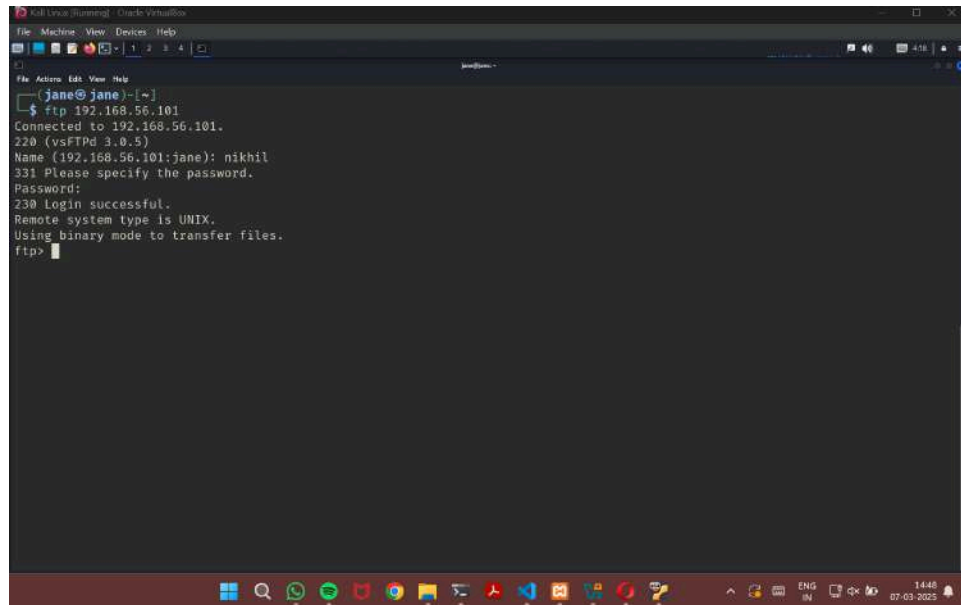
```
GNU nano 7.2 /etc/vsftpd.conf
#
# Run standalone? vsftpd can run either from an inetd or as a standalone
# daemon started from an initscript.
listen=NO
#
# This directive enables listening on IPv6 sockets. By default, listening
# on the IPv6 "any" address (:::) will accept connections from both IPv6
# and IPv4 clients. It is not necessary to listen on "both" IPv4 and IPv6
# sockets. If you want that (perhaps because you want to listen on specific
# addresses) then you must run two copies of vsftpd with two configuration
# files.
listen_ipv6=YES
#
# Allow anonymous FTP? (Disabled by default).
anonymous_enable=NO
#
# Uncomment this to allow local users to log in.
local_enable=YES
#
# Uncomment this to enable any form of FTP write command.
write_enable=YES
#
# Default umask for local users is 077. You may wish to change this to 022.
# If your users expect that (022 is used by most other ftpd's)
local_umask=022
#
# Uncomment this to allow the anonymous FTP user to upload files. This only
```



3. Scanning for port 21 of Ubuntu from Kali Linux



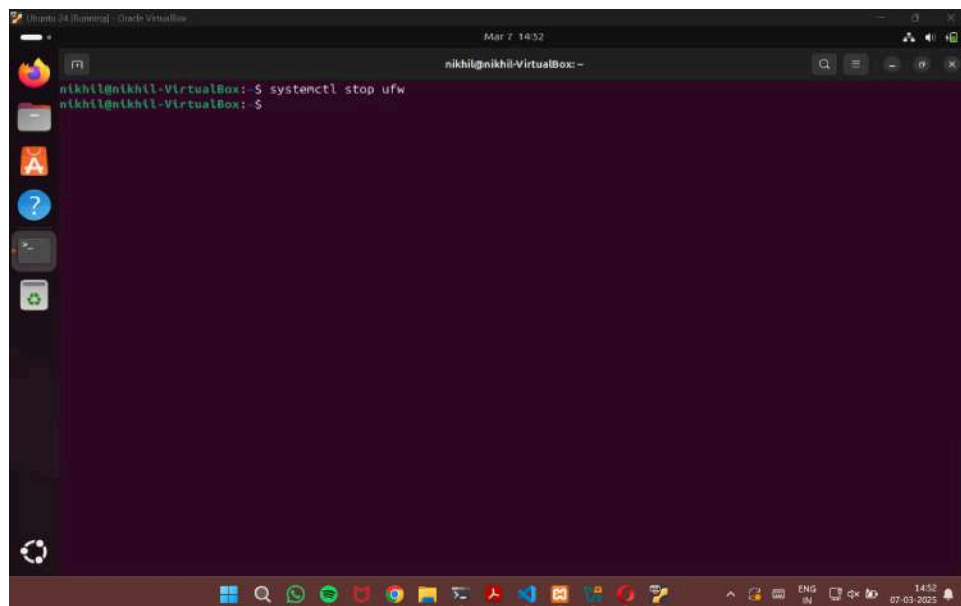
4. FTP service from Kali to Ubuntu



The screenshot shows a Kali Linux terminal window with the following output:

```
jane@jane:~$ ftp 192.168.56.101
Connected to 192.168.56.101.
220 (vsFTPD 3.0.5)
Name (192.168.56.101:jane): nikhil
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```

5. Disable UFW in Ubuntu



The screenshot shows an Ubuntu terminal window with the following output:

```
nikhil@nikhil-VirtualBox:~$ systemctl stop ufw
nikhil@nikhil-VirtualBox:~$
```

6. Updating UFW rules in ubuntu

```
root@nikhil-VirtualBox: /home/nikhil# ufw default deny incoming
Default incoming policy changed to 'deny'
(be sure to update your rules accordingly)
root@nikhil-VirtualBox: /home/nikhil# ufw default allow outgoing
Default outgoing policy changed to 'allow'
(be sure to update your rules accordingly)
root@nikhil-VirtualBox: /home/nikhil# ufw allow 21/tcp
Rules updated
Rules updated (v6)
root@nikhil-VirtualBox: /home/nikhil# ufw allow 22
Rules updated
Rules updated (v6)
root@nikhil-VirtualBox: /home/nikhil# ufw allow http
Rules updated
Rules updated (v6)
root@nikhil-VirtualBox: /home/nikhil# ufw allow 3306
Rules updated
Rules updated (v6)
root@nikhil-VirtualBox: /home/nikhil#
```

```
root@nikhil-VirtualBox: /home/nikhil# ufw status
Status: active

To Action From
--
21/tcp ALLOW Anywhere
22 ALLOW Anywhere
80/tcp ALLOW Anywhere
3306 ALLOW Anywhere
21/tcp (v6) ALLOW Anywhere (v6)
22 (v6) ALLOW Anywhere (v6)
80/tcp (v6) ALLOW Anywhere (v6)
3306 (v6) ALLOW Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil#
```

```

root@nikhil-VirtualBox: /home/nikhil
Status: active

To          Action      From
-----
[ 1] 21/tcp      ALLOW IN    Anywhere
[ 2] 80/tcp      ALLOW IN    Anywhere
[ 3] 3306         ALLOW IN    Anywhere
[ 4] 22          ALLOW IN    Anywhere
[ 5] 21/tcp (v6)  ALLOW IN    Anywhere (v6)
[ 6] 22 (v6)     ALLOW IN    Anywhere (v6)
[ 7] 80/tcp (v6) ALLOW IN    Anywhere (v6)
[ 8] 3306 (v6)   ALLOW IN    Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil# ufw delete 2
Deleting:
allow 80/tcp
Proceed with operation (y/n)? y
Rule deleted
root@nikhil-VirtualBox: /home/nikhil# ufw status numbered
Status: active

To          Action      From
-----
[ 1] 21/tcp      ALLOW IN    Anywhere
[ 2] 3306         ALLOW IN    Anywhere
[ 3] 22          ALLOW IN    Anywhere
[ 4] 21/tcp (v6) ALLOW IN    Anywhere (v6)
[ 5] 22 (v6)     ALLOW IN    Anywhere (v6)
[ 6] 80/tcp (v6) ALLOW IN    Anywhere (v6)
[ 7] 3306 (v6)   ALLOW IN    Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil#

```

```

root@nikhil-VirtualBox: /home/nikhil# ufw status numbered
Status: active

To          Action      From
-----
[ 1] 21/tcp      ALLOW IN    Anywhere
[ 2] 3306         ALLOW IN    Anywhere
[ 3] 443/tcp      ALLOW IN    Anywhere
[ 4] 21/tcp (v6) ALLOW IN    Anywhere (v6)
[ 5] 80/tcp (v6) ALLOW IN    Anywhere (v6)
[ 6] 3306 (v6)   ALLOW IN    Anywhere (v6)
[ 7] 443/tcp (v6) ALLOW IN    Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil# ufw delete 1
Deleting:
allow 21/tcp
Proceed with operation (y/n)? y
Rule deleted
root@nikhil-VirtualBox: /home/nikhil# ufw status numbered
Status: active

To          Action      From
-----
[ 1] 3306         ALLOW IN    Anywhere
[ 2] 443/tcp      ALLOW IN    Anywhere
[ 3] 21/tcp (v6) ALLOW IN    Anywhere (v6)
[ 4] 80/tcp (v6) ALLOW IN    Anywhere (v6)
[ 5] 3306 (v6)   ALLOW IN    Anywhere (v6)
[ 6] 443/tcp (v6) ALLOW IN    Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil#

```



```

root@nikhil-VirtualBox: /home/nikhil# ufw delete 3
Deleting:
allow 21/tcp
Proceed with operation (y/n)? y
Rule deleted (v6)
root@nikhil-VirtualBox: /home/nikhil# ufw status numbered
Status: active

      To      Action      From
      --      -
[ 1] 3306      ALLOW IN   Anywhere
[ 2] 443/tcp    ALLOW IN   Anywhere
[ 3] 80/tcp (v6) ALLOW IN   Anywhere (v6)
[ 4] 3306 (v6)  ALLOW IN   Anywhere (v6)
[ 5] 443/tcp (v6) ALLOW IN   Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#
root@nikhil-VirtualBox: /home/nikhil#

```

7. Updating traffic in ports in Ubuntu and checking it in Kali Linux

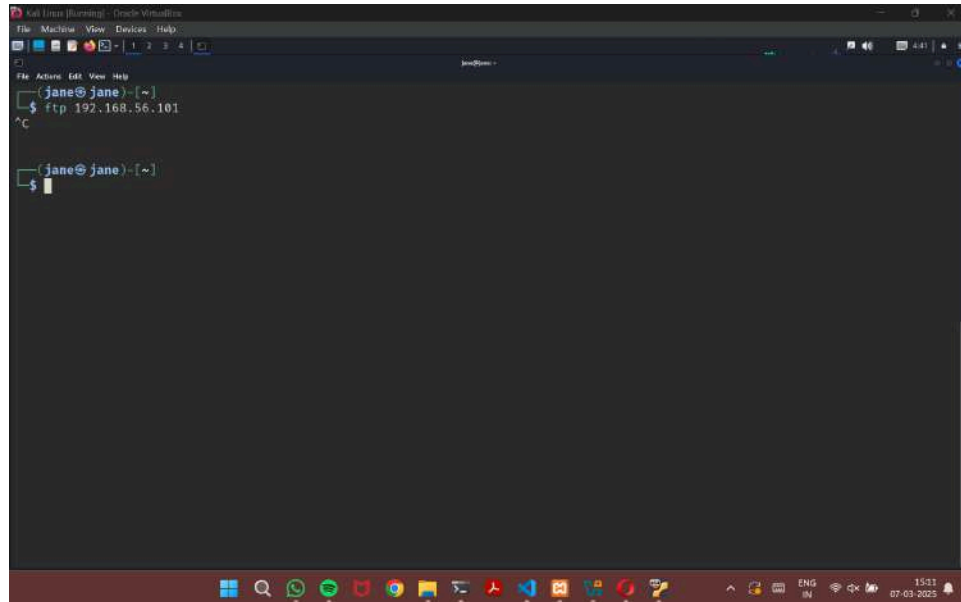
```

root@nikhil-VirtualBox: /home/nikhil# ufw deny 21
Rule added
Rule added (v6)
root@nikhil-VirtualBox: /home/nikhil# ufw status numbered
Status: active

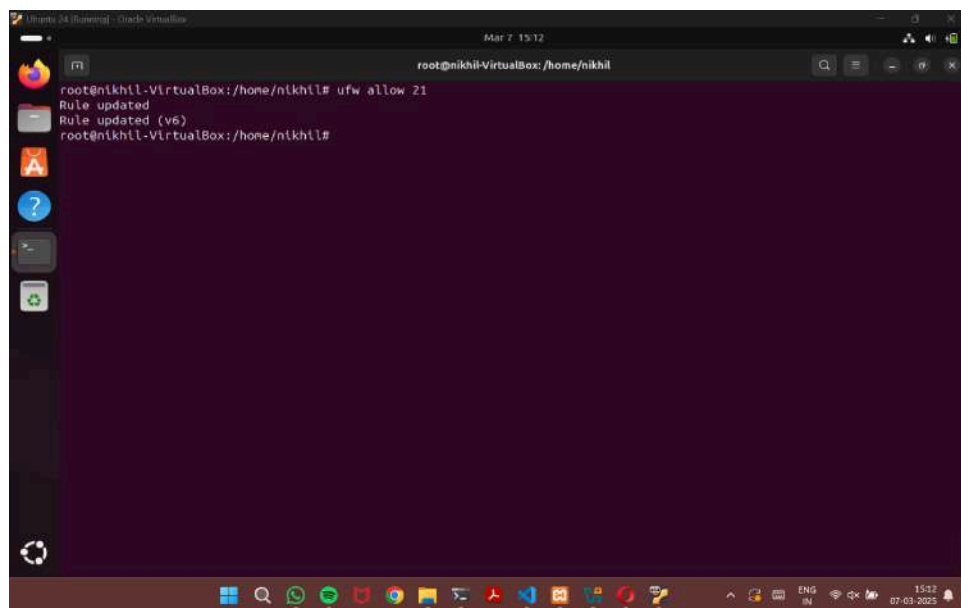
      To      Action      From
      --      -
[ 1] 3306      ALLOW IN   Anywhere
[ 2] 443/tcp    ALLOW IN   Anywhere
[ 3] 21        DENY IN    Anywhere
[ 4] 80/tcp (v6) ALLOW IN   Anywhere (v6)
[ 5] 3306 (v6)  ALLOW IN   Anywhere (v6)
[ 6] 443/tcp (v6) ALLOW IN   Anywhere (v6)
[ 7] 21 (v6)    DENY IN    Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil#

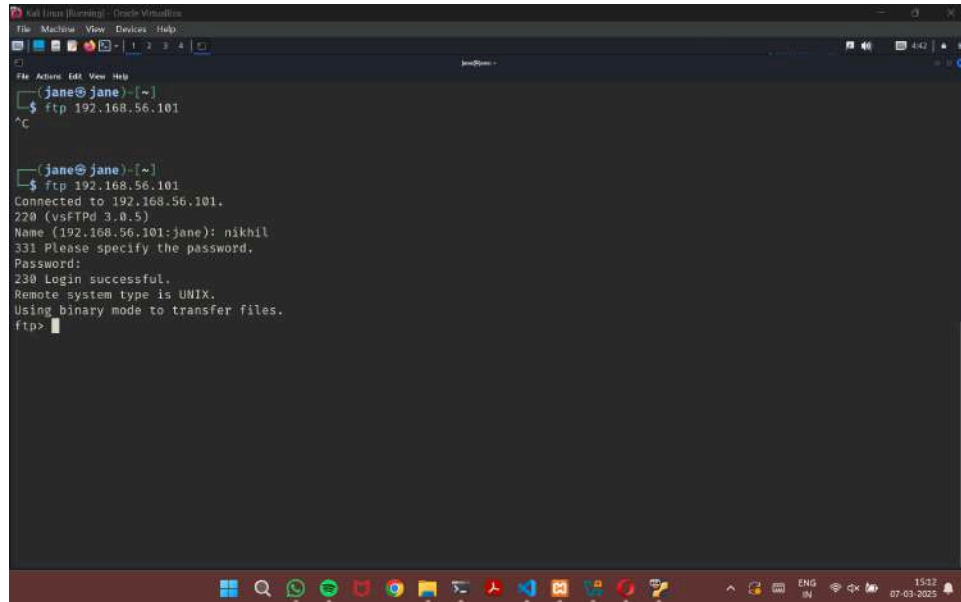
```

```
Kali Linux [Running] - Oracle VM VirtualBox
File Machine View Devices Help
jane@jane:~
$ ftp 192.168.56.101
^C
jane@jane:~
$
```

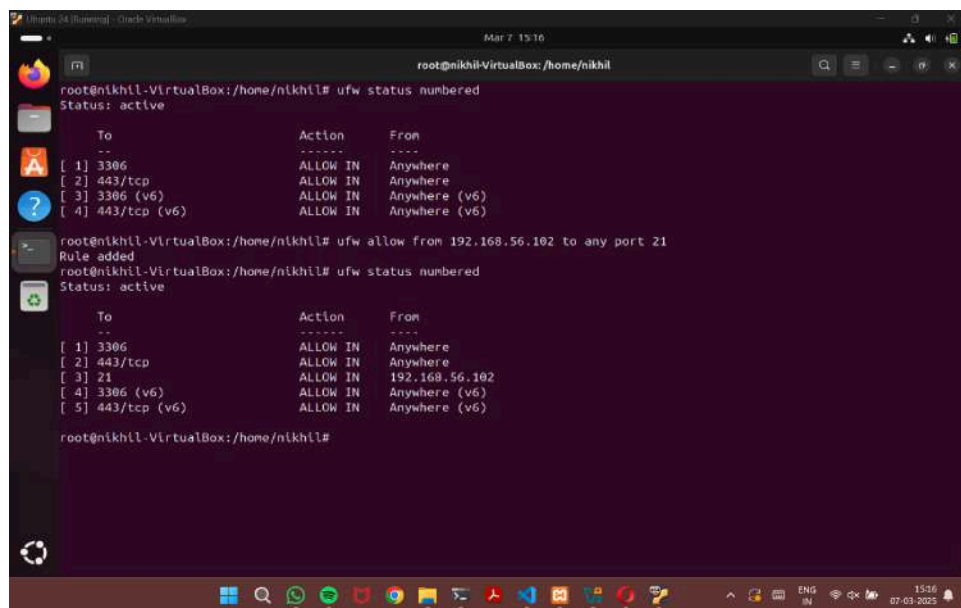


```
Mar 7 15:12
root@nikhil-VirtualBox:/home/nikhil# ufw allow 21
Rule updated
Rule updated (v6)
root@nikhil-VirtualBox:/home/nikhil#
```



```
Kali Linux [Running] - Oracle VM VirtualBox
File Machine View Devices Help
jane@jane:~$ ftp 192.168.56.101
^C

jane@jane:~$ ftp 192.168.56.101
Connected to 192.168.56.101.
220 (vsFTPd 3.0.5)
Name (192.168.56.101:jane): nikhil
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```



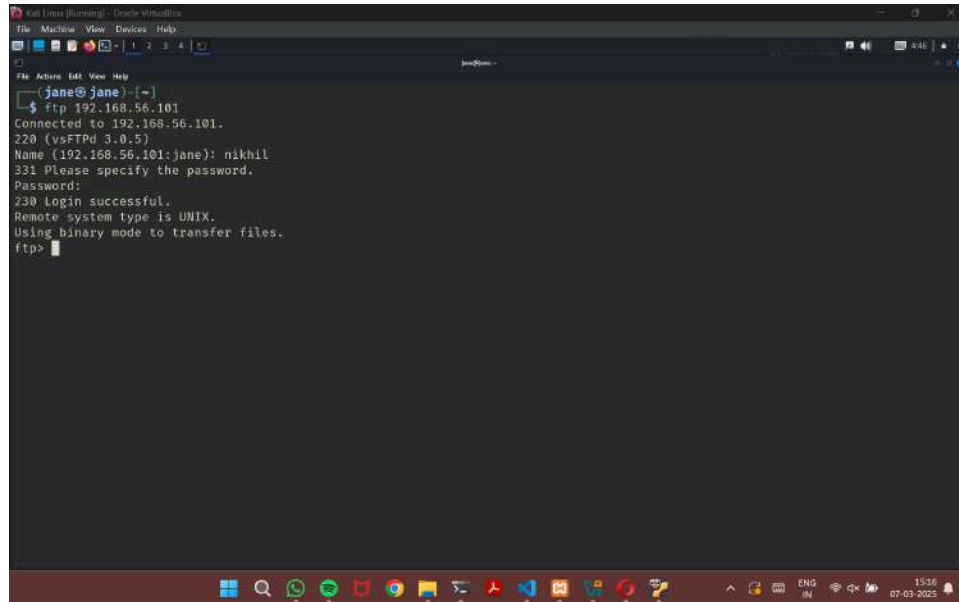
```
root@nikhil-VirtualBox: /home/nikhil# ufw status numbered
Status: active

To Action From
-----
[ 1] 3306 ALLOW IN Anywhere
[ 2] 443/tcp ALLOW IN Anywhere
[ 3] 3306 (v6) ALLOW IN Anywhere (v6)
[ 4] 443/tcp (v6) ALLOW IN Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil# ufw allow from 192.168.56.102 to any port 21
Rule added
root@nikhil-VirtualBox: /home/nikhil# ufw status numbered
Status: active

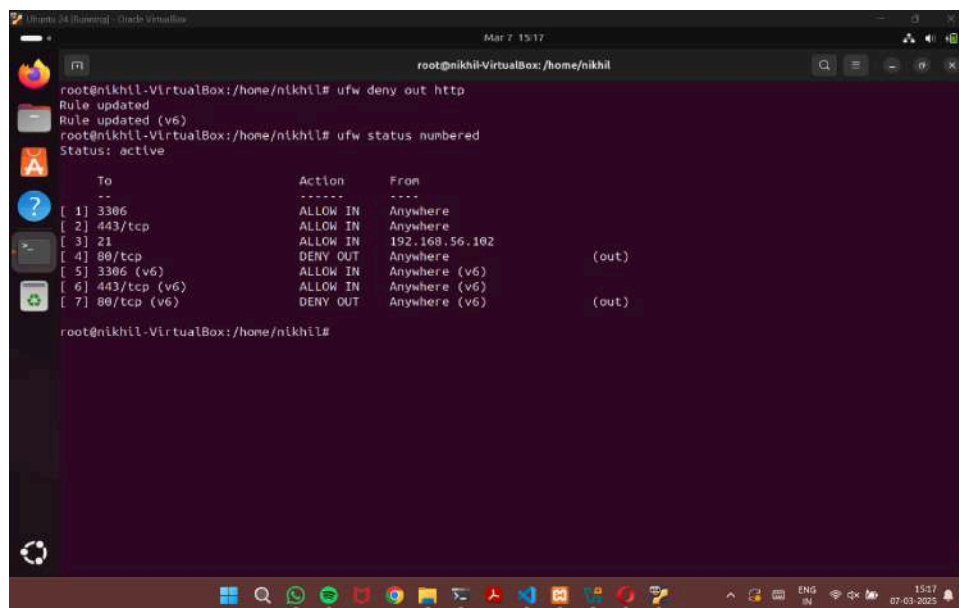
To Action From
-----
[ 1] 3306 ALLOW IN Anywhere
[ 2] 443/tcp ALLOW IN Anywhere
[ 3] 21 ALLOW IN 192.168.56.102
[ 4] 3306 (v6) ALLOW IN Anywhere (v6)
[ 5] 443/tcp (v6) ALLOW IN Anywhere (v6)

root@nikhil-VirtualBox: /home/nikhil#
```



A screenshot of a Windows terminal window titled "Kali Linux [Running] - Oracle VM VirtualBox". The terminal shows an FTP session initiated from a user named "jane". The user connects to the IP address 192.168.56.101. The server responds with "220 (vsFTPD 3.0.5)". The user provides the name "nikhil" and a password. The server responds with "230 Login successful. Remote system type is UNIX. Using binary mode to transfer files." The prompt "ftp>" is visible at the bottom of the terminal.

```
jane@jane:~$ ftp 192.168.56.101
Connected to 192.168.56.101.
220 (vsFTPD 3.0.5)
Name (192.168.56.101:jane): nikhil
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>
```



A screenshot of a Linux terminal window titled "Ubuntu 24 [Running] - Oracle VM VirtualBox". The terminal shows a user named "root" at the prompt "root@nikhil-VirtualBox: /home/nikhil". The user runs the command "ufw deny out http". The terminal output shows "Rule updated" and "Rule updated (v6)". The user then runs "ufw status numbered", which shows the status as "active". A table of firewall rules is displayed, showing the rule number, action, and source/destination. The rules are:

To	Action	From
--	-----	----
[1] 3306	ALLOW IN	Anywhere
[2] 443/tcp	ALLOW IN	Anywhere
[3] 21	ALLOW IN	192.168.56.102
[4] 80/tcp	DENY OUT	Anywhere (out)
[5] 3306 (v6)	ALLOW IN	Anywhere (v6)
[6] 443/tcp (v6)	ALLOW IN	Anywhere (v6)
[7] 80/tcp (v6)	DENY OUT	Anywhere (v6) (out)

The prompt "root@nikhil-VirtualBox: /home/nikhil#" is visible at the bottom of the terminal.

8. Logging VSFTPD

```

root@nikhil-VirtualBox:/home/nikhil# ufw logging on
Logging enabled
root@nikhil-VirtualBox:/home/nikhil# cd /var/log
root@nikhil-VirtualBox:/var/log# ls
alternatives.log  cloud-init.log      dmesg.1.gz      gdm3            mysql            syslog
apport.log        cloud-init-output.log dmesg.2.gz      gpu-manager.log openvpn          systemd
apt              cups-browsed        dmesg.3.gz      hp              private          ubuntu-advantage.log
auth.log          cups-browsed        dmesg.4.gz      installer       README          unattended-upgrades
boot.log          dist-upgrade        dpkg.log         journal         snort            vsftpd.log
bootstrap.log     dmesg               faillog          kern.log        speech-dispatcher wtmp
btmnp             dmesg.0             fontconfig.log   lastlog         sssd
root@nikhil-VirtualBox:/var/log# nano ufw.log1
root@nikhil-VirtualBox:/var/log# nano ufw.log1

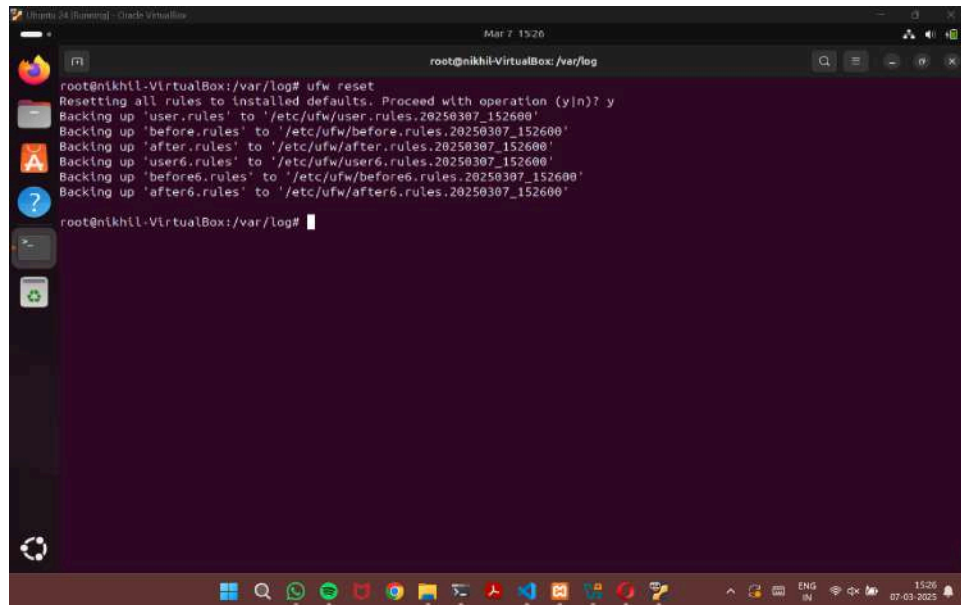
```

```

GNU nano 7.2 vsftpd.log
Fri Mar 7 14:42:32 2025 [pId 4004] CONNECT: Client "::ffff:192.168.56.102"
Fri Mar 7 14:43:08 2025 [pId 4011] CONNECT: Client "::ffff:192.168.56.102"
Fri Mar 7 14:48:23 2025 [pId 4038] CONNECT: Client "::ffff:192.168.56.102"
Fri Mar 7 14:48:38 2025 [pId 4037] [nikhil] OK LOGIN: Client "::ffff:192.168.56.102"
Fri Mar 7 15:12:46 2025 [pId 3858] CONNECT: Client "::ffff:192.168.56.102"
Fri Mar 7 15:12:52 2025 [pId 3857] [nikhil] OK LOGIN: Client "::ffff:192.168.56.102"
Fri Mar 7 15:16:24 2025 [pId 4038] CONNECT: Client "::ffff:192.168.56.102"
Fri Mar 7 15:16:28 2025 [pId 4037] [nikhil] OK LOGIN: Client "::ffff:192.168.56.102"
Fri Mar 7 15:23:02 2025 [pId 4297] CONNECT: Client "::ffff:192.168.56.102"
Fri Mar 7 15:23:07 2025 [pId 4296] [nikhil] OK LOGIN: Client "::ffff:192.168.56.102"

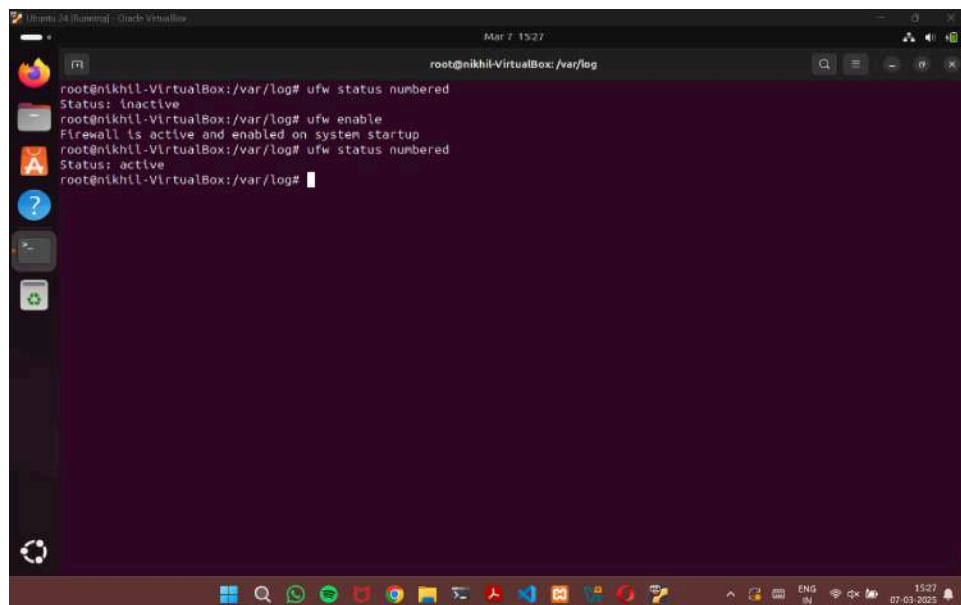
```

9. Resetting the rules



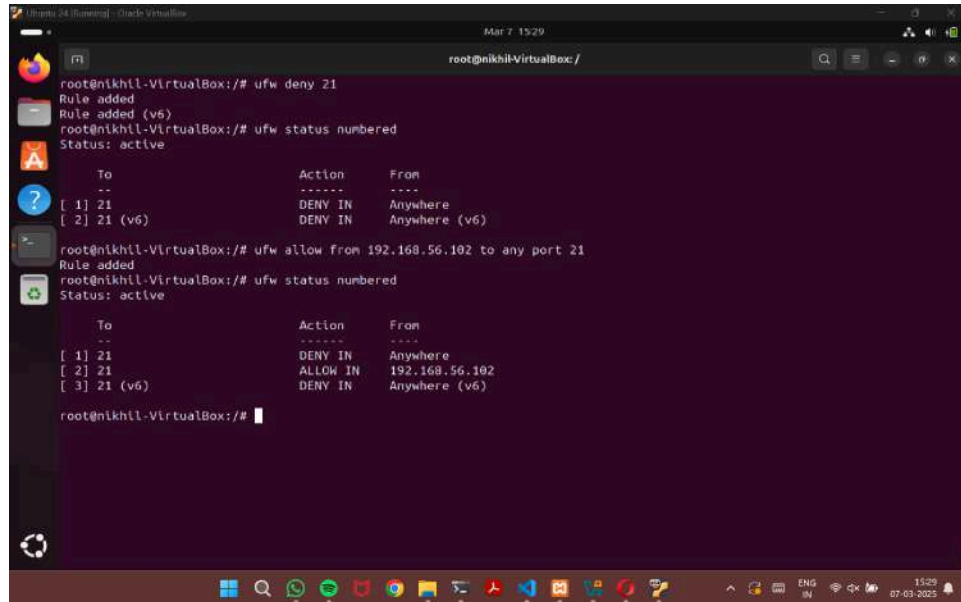
A terminal window titled 'root@nikhil-VirtualBox: /var/log' showing the execution of the 'ufw reset' command. The output indicates that all rules are being reset to defaults and several rule files are being backed up. The prompt returns to the root user at the same location.

```
root@nikhil-VirtualBox:/var/log# ufw reset
Resetting all rules to installed defaults. Proceed with operation (y/n)? y
Backing up 'user.rules' to '/etc/ufw/user.rules.20250307_152600'
Backing up 'before.rules' to '/etc/ufw/before.rules.20250307_152600'
Backing up 'after.rules' to '/etc/ufw/after.rules.20250307_152600'
Backing up 'user6.rules' to '/etc/ufw/user6.rules.20250307_152600'
Backing up 'before6.rules' to '/etc/ufw/before6.rules.20250307_152600'
Backing up 'after6.rules' to '/etc/ufw/after6.rules.20250307_152600'
root@nikhil-VirtualBox:/var/log#
```



A terminal window titled 'root@nikhil-VirtualBox: /var/log' showing the status of UFW and the process of enabling it. The status is initially 'inactive', then 'enable' is run, resulting in 'active' status.

```
root@nikhil-VirtualBox:/var/log# ufw status numbered
Status: inactive
root@nikhil-VirtualBox:/var/log# ufw enable
Firewall is active and enabled on system startup
root@nikhil-VirtualBox:/var/log# ufw status numbered
Status: active
root@nikhil-VirtualBox:/var/log#
```



The screenshot shows a terminal window titled 'root@nikhil-VirtualBox/' with the following commands and output:

```
root@nikhil-VirtualBox:~# ufw deny 21
Rule added
Rule added (v6)
root@nikhil-VirtualBox:~# ufw status numbered
Status: active

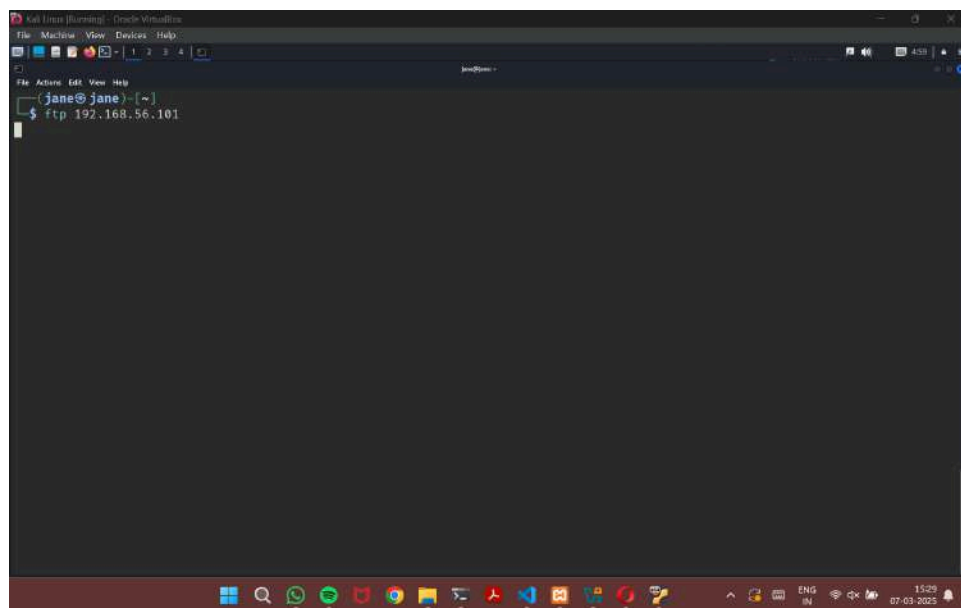
To Action From
--
[ 1] 21 DENY IN Anywhere
[ 2] 21 (v6) DENY IN Anywhere (v6)

root@nikhil-VirtualBox:~# ufw allow from 192.168.56.102 to any port 21
Rule added
root@nikhil-VirtualBox:~# ufw status numbered
Status: active

To Action From
--
[ 1] 21 DENY IN Anywhere
[ 2] 21 ALLOW IN 192.168.56.102
[ 3] 21 (v6) DENY IN Anywhere (v6)

root@nikhil-VirtualBox:~#
```

The terminal window is part of an Oracle VM VirtualBox environment, as indicated by the title bar. The desktop background is dark purple, and the taskbar at the bottom shows various application icons and system status information.



The screenshot shows a terminal window titled 'jane@jane:~' with the following commands and output:

```
jane@jane:~$ ftp 192.168.56.101
```

The terminal window is part of an Oracle VM VirtualBox environment, as indicated by the title bar. The desktop background is dark grey, and the taskbar at the bottom shows various application icons and system status information.

```

root@nikhil-VirtualBox:/

To          Action      From
--          -
[ 1] 21      DENY IN     Anywhere
[ 2] 21      ALLOW IN    192.168.56.102
[ 3] 21 (v6) DENY IN     Anywhere (v6)

root@nikhil-VirtualBox:/# ufw delete 1
Deleting:
deny 21
Proceed with operation (y/n)? y
Rule deleted
root@nikhil-VirtualBox:/# ufw status numbered
Status: active

To          Action      From
--          -
[ 1] 21      ALLOW IN    192.168.56.102
[ 2] 21      DENY IN     Anywhere (v6)

root@nikhil-VirtualBox:/# ufw deny 21
Rule added
Skipping adding existing rule (v6)
root@nikhil-VirtualBox:/# ufw status numbered
Status: active

To          Action      From
--          -
[ 1] 21      ALLOW IN    192.168.56.102
[ 2] 21      DENY IN     Anywhere
[ 3] 21 (v6) DENY IN     Anywhere (v6)

root@nikhil-VirtualBox:/#

```

```

jane@jane:~$ ftp 192.168.56.101
Connected to 192.168.56.101.
220 (vsFTPD 3.0.5)
Name (192.168.56.101:jane): nikhil
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp>

```