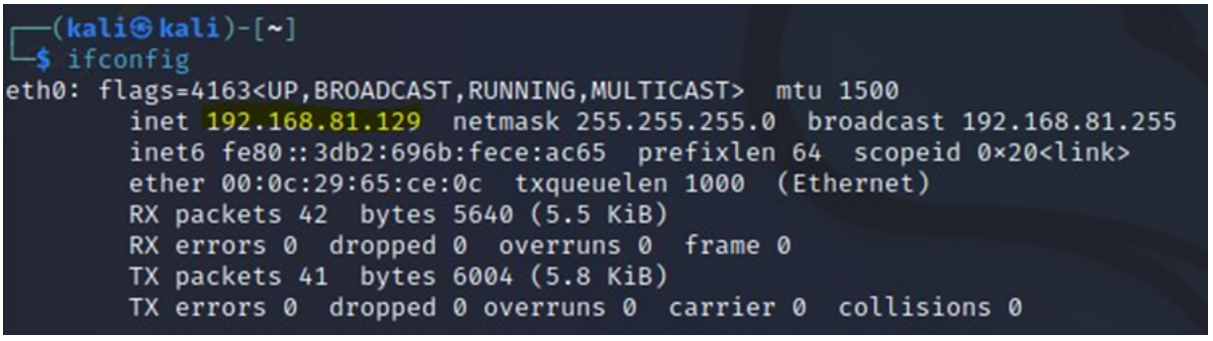
Exploring and Configuring Linux and Windows Firewalls

> I've done this lab to explore Linux firewall iptables and Windows firewall. The objective is to understand the functionality and configuration of both firewalls, aiming to enhance network security.

Task A: Configuring Linux Firewalls

Finding the IP address:

To find the IP address of the eth0 network interface in the Kali VM, you need to start the VM, log in, and open a terminal. Once in the terminal, you can identify and note the IP address associated with the eth0 interface using ifconfig command



We used to the command iptables –L to view the existing firewall rules

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -L
[sudo] password for kali:
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
```

Adding a new rule to the firewall:

To add a new rule to the INPUT chain of the firewall, execute the following command:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A INPUT -i lo -j ACCEPT
```

This command adds an "ACCEPT" rule to the INPUT chain for all packets coming through the loopback interface ("-i lo"). The loopback interface allows communication between different processes on the same machine.

To list the firewall rules with statistics, including the rule added to the INPUT chain, you can use the following command using option -v:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -L -v
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ACCEPT     all  --  lo     any     anywhere             anywhere

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
```

This command displays the firewall rules for all chains, along with the statistics related to each rule. You can refer to the output to identify the statistics specifically

related to the rule added in the INPUT chain.

Now ping the loopback interface:

```
┌──(kali㉿kali)-[~]
└─$ ping 127.0.0.1
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.015 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.069 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.025 ms
^C
── 127.0.0.1 ping statistics ──
3 packets transmitted, 3 received, 0% packet loss, time 2042ms
rtt min/avg/max/mdev = 0.015/0.036/0.069/0.023 ms
```

Show the statistics related to the rule again:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -L -v
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    6   504 ACCEPT     all  --  lo     any     anywhere             anywhere

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
```

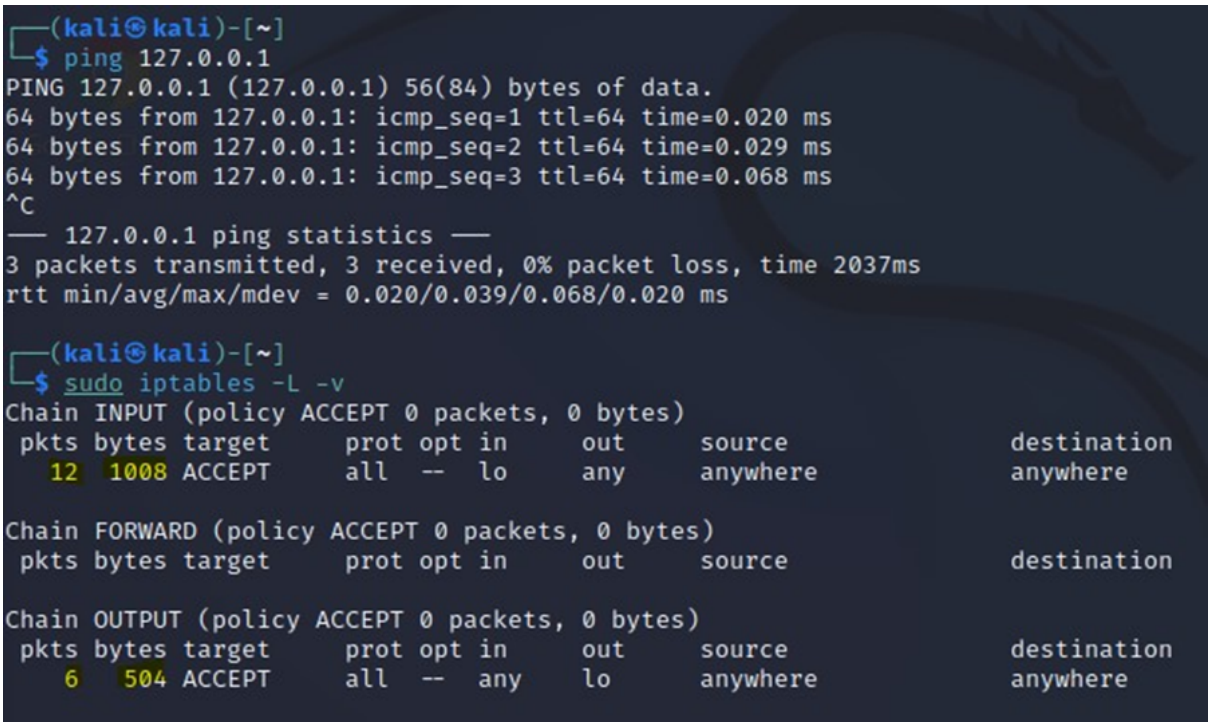
Now add an accept rule for all packets to the OUTPUT chain:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A OUTPUT -o lo -j ACCEPT

┌──(kali㉿kali)-[~]
└─$ sudo iptables -L -v
Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    6   504 ACCEPT     all  --  lo     any     anywhere             anywhere

Chain FORWARD (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
    0     0 ACCEPT     all  --  any    lo      anywhere             anywhere
```

Try to ping the localhost then show the statistics of the chains

Note that the packets are passing through the INPUT and OUTPUT chains so the statistics of

the two chains will increase. As shown in the figure below:



We can notice that the packets increased

a) Now from your Host OS, try to ping the Kali VM (IP address in question 1):

```
Select Command Prompt
Microsoft Windows [Version 10.0.19044.2364]
(c) Microsoft Corporation. All rights reserved.

C:\Users\USER>ping 192.168.81.129

Pinging 192.168.81.129 with 32 bytes of data:
Reply from 192.168.81.129: bytes=32 time<1ms TTL=64
Reply from 192.168.81.129: bytes=32 time<1ms TTL=64
Reply from 192.168.81.129: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.81.129:
    Packets: Sent = 3, Received = 3, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
Control-C
^C
```

We can see that there are no packets loss

b) Now configure the firewall to drop all the packets that come to eth0 interface:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A INPUT -d 192.168.81.129 -j DROP
```

Again, try to ping the Kali VM from your Host OS, you get the following output:

Note that the % of lost packets 100%.

```
C:\Users\USER>ping 192.168.81.129

Pinging 192.168.81.129 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.81.129:
    Packets: Sent = 3, Received = 0, Lost = 3 (100% loss),
```

In order to delete the rules added above, enter the following command:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -F
```

Now try to block the traffic coming from your Host OS to the Kali VM (Run first ipconfig to

get the ip address of your HOST OS).

```
   Connection-specific DNS Suffix  . : Home
   Link-local IPv6 Address . . . . . : fe80::bf3d:86cf:f44:93e%20
   IPv4 Address. . . . . . . . . . . : 192.168.1.112
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 192.168.1.1
```

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A INPUT -s 192.168.1.112 -j DROP
```

Again, display the list of rules using the following command:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A INPUT -s 192.168.1.112 -j DROP

┌──(kali㉿kali)-[~]
└─$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       all  --  192.168.1.112        anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
```

Try to ping the Kali VM. What do you see as output?

```
C:\Users\USER>ping 192.168.81.129

Pinging 192.168.81.129 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.81.129:
    Packets: Sent = 3, Received = 0, Lost = 3 (100% loss),
Control-C
^C
```

Now try to ping the following address: www.uj.edu.sa. You get an output similar to the following:

```
┌──(kali㉿kali)-[~]
└─$ ping www.uj.edu.sa
PING www.uj.edu.sa (82.147.204.98) 56(84) bytes of data.
^C
── www.uj.edu.sa ping statistics ──
5 packets transmitted, 0 received, 100% packet loss, time 4087ms


┌──(kali㉿kali)-[~]
└─$ ping 80.147.204.98
PING 80.147.204.98 (80.147.204.98) 56(84) bytes of data.
64 bytes from 80.147.204.98: icmp_seq=1 ttl=128 time=116 ms
64 bytes from 80.147.204.98: icmp_seq=2 ttl=128 time=112 ms
64 bytes from 80.147.204.98: icmp_seq=3 ttl=128 time=110 ms
64 bytes from 80.147.204.98: icmp_seq=4 ttl=128 time=113 ms
^C
── 80.147.204.98 ping statistics ──
4 packets transmitted, 4 received, 0% packet loss, time 3007ms
rtt min/avg/max/mdev = 110.373/112.768/115.806/2.054 ms
```

Now let’s block access to this site, but first enter the following command to list all the firewall rules: iptables –L.

```
└─$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       all  --  192.168.1.112        anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
```

Let’s try to block the ping to this site, enter the following command:

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A OUTPUT -s 0/0 -d 80.147.204.98 -j DROP
```

Use iptables –L again.

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination
DROP       all  --  192.168.1.112        anywhere

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
DROP       all  --  anywhere             mail.scsbit.de
```

Now try to ping www.uj.edu.sa again.

```
┌──(kali㉿kali)-[~]
└─$ ping www.uj.edu.sa
PING www.uj.edu.sa (82.147.204.98) 56(84) bytes of data.
^C
── www.uj.edu.sa ping statistics ──
6 packets transmitted, 0 received, 100% packet loss, time 5105ms
```

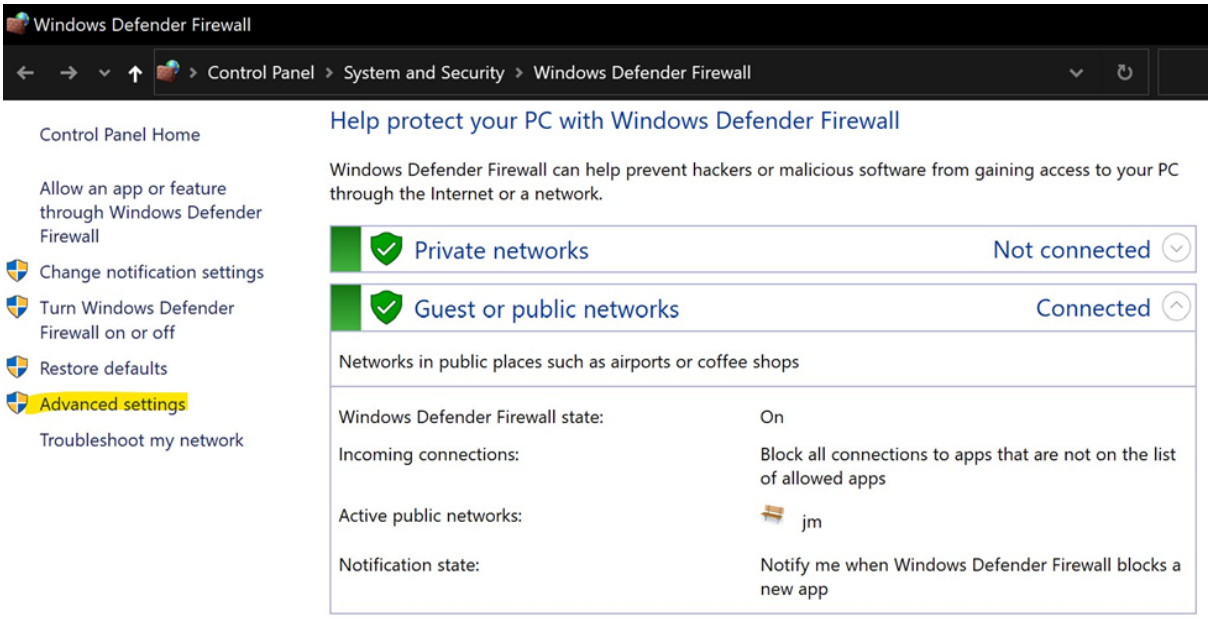
To remove all the previously added rules enter: iptables –F.

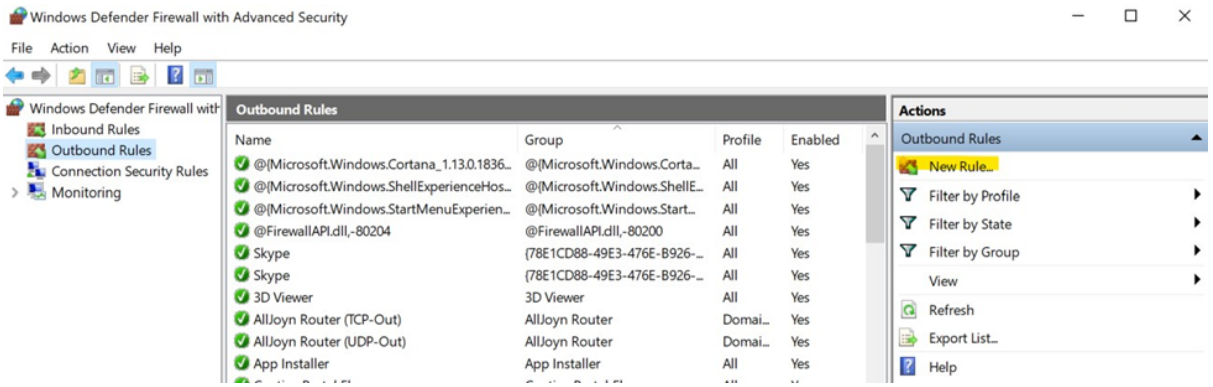
(use iptables –L to make sure that the rules are removed)

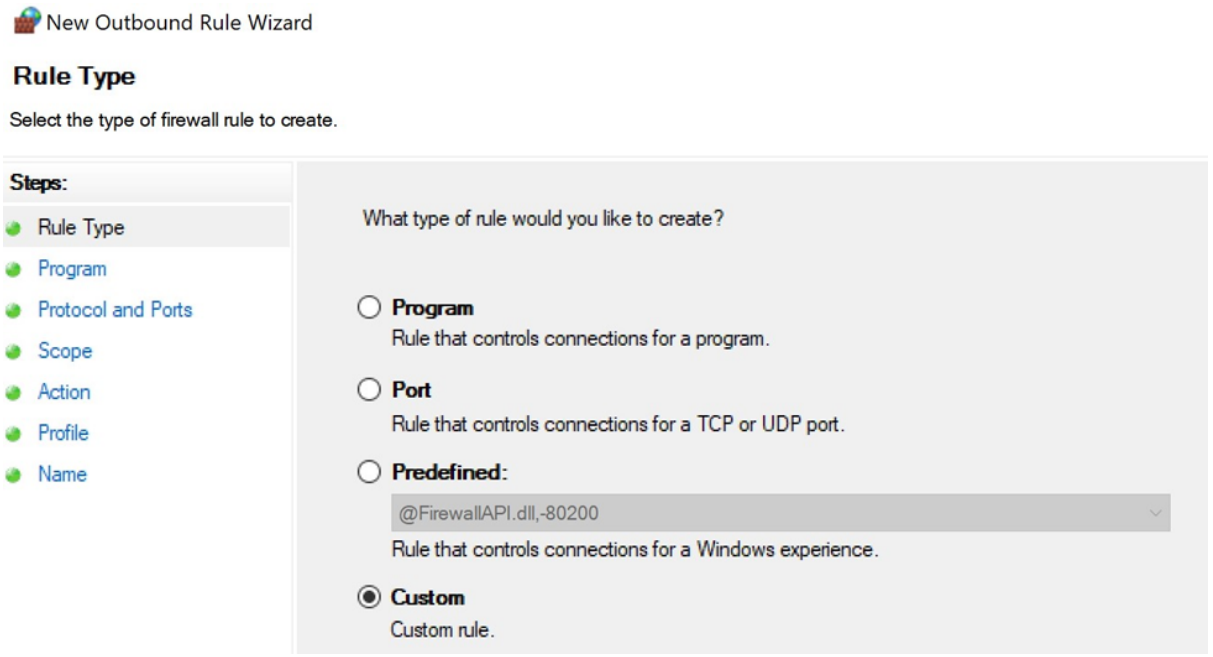
```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -F

┌──(kali㉿kali)-[~]
└─$ sudo iptables -L
Chain INPUT (policy ACCEPT)
target     prot opt source               destination

Chain FORWARD (policy ACCEPT)
target     prot opt source               destination

Chain OUTPUT (policy ACCEPT)
target     prot opt source               destination
```

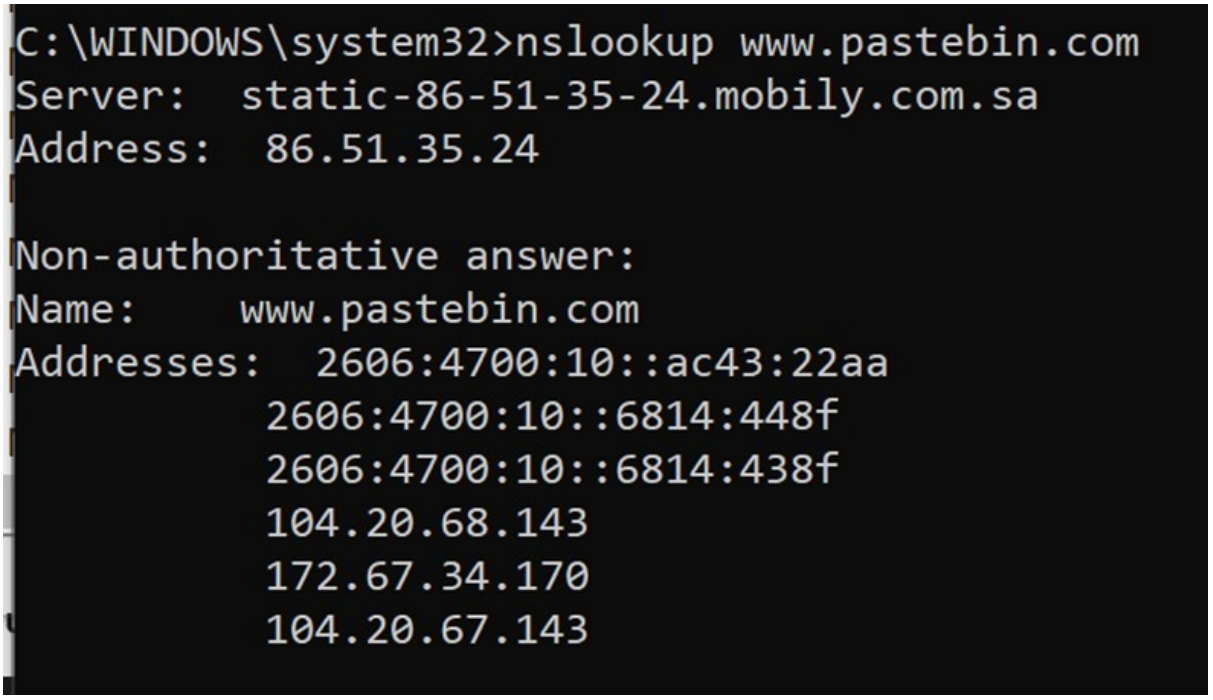
Task B: Configuring Windows Firewall

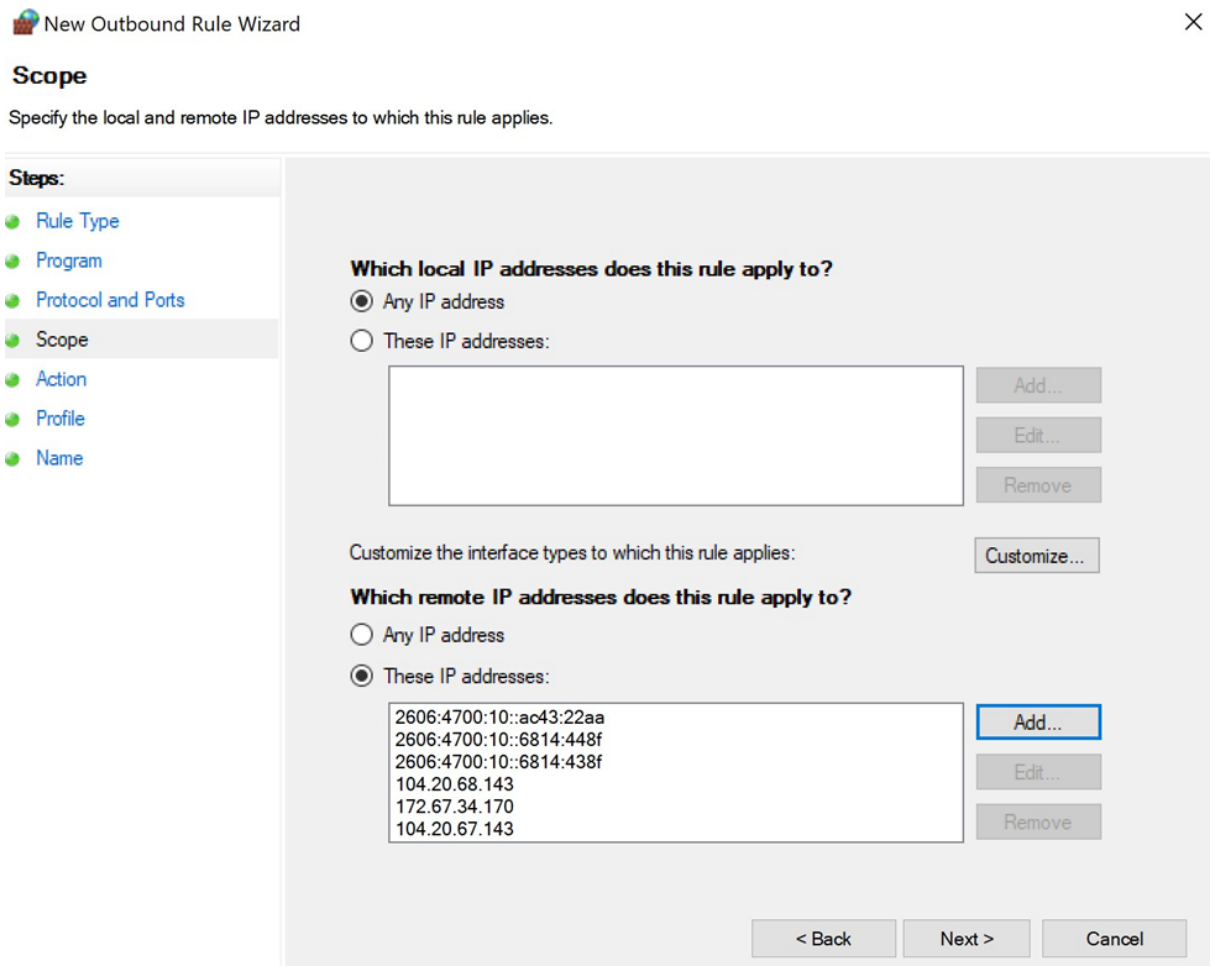
- Block access to this URL: https://pastebin.com

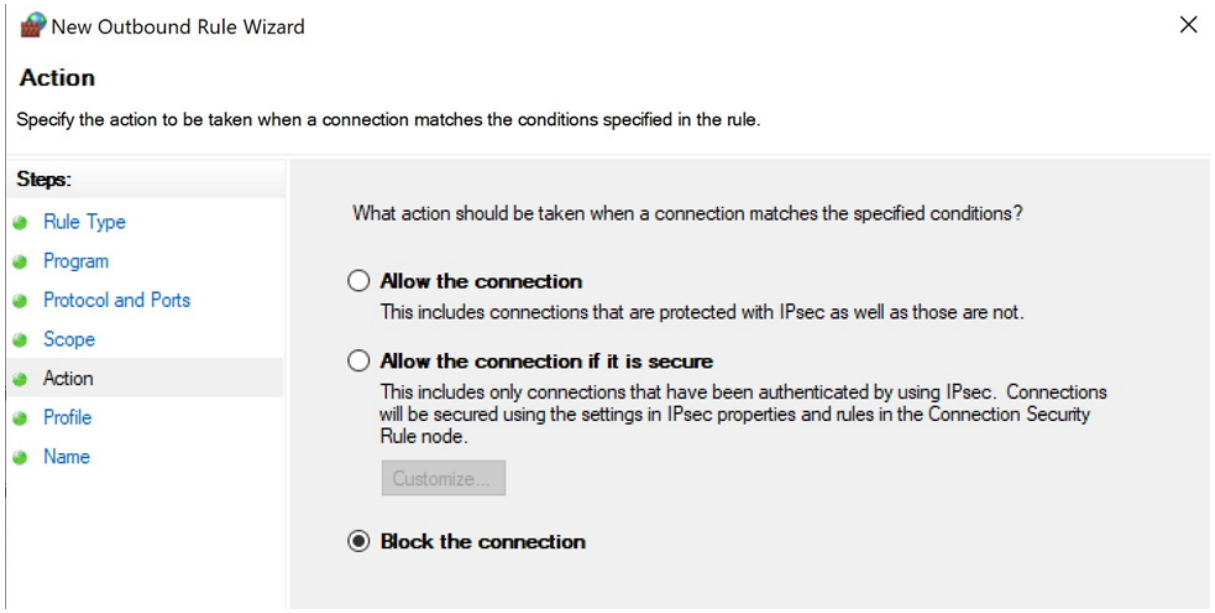


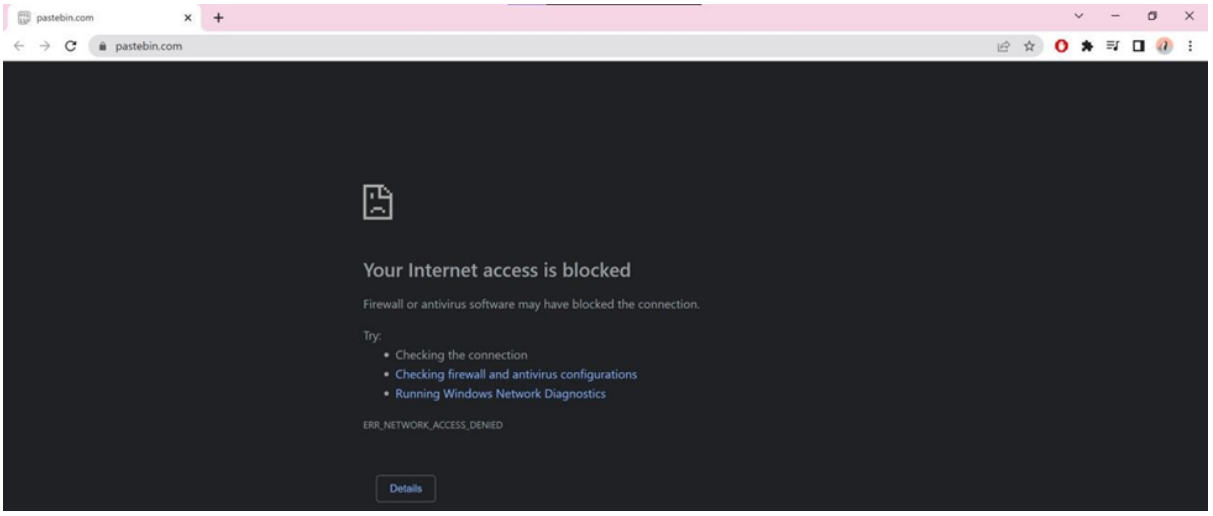

Windows Defender Firewall with Advanced Security
File Action View Help
Windows Defender Firewall with
Inbound Rules
Outbound Rules
Connection Security Rules
Monitoring
Outbound Rules
Name
Group
Profile
Enabled
@{Microsoft.Windows.Cortana_1.13.0.1836...
@{Microsoft.Windows.Corta...
All
Yes
@{Microsoft.Windows.ShellExperienceHos...
@{Microsoft.Windows.ShellE...
All
Yes
@{Microsoft.Windows.StartMenuExperien...
@{Microsoft.Windows.Start...
All
Yes
@FirewallAPI.dll,-80204
@FirewallAPI.dll,-80200
All
Yes
Skype
{78E1CD88-49E3-476E-B926-...
All
Yes
Skype
{78E1CD88-49E3-476E-B926-...
All
Yes
3D Viewer
3D Viewer
All
Yes
AllJoyn Router (TCP-Out)
AllJoyn Router
Domai...
Yes
AllJoyn Router (UDP-Out)
AllJoyn Router
Domai...
Yes
App Installer
App Installer
All
Yes
Actions
Outbound Rules
New Rule...
Filter by Profile
Filter by State
Filter by Group
View
Refresh
Export List...
Help


New Outbound Rule Wizard
Rule Type
Select the type of firewall rule to create.
Steps:
Rule Type
Program
Protocol and Ports
Scope
Action
Profile
Name
What type of rule would you like to create?
Program
Rule that controls connections for a program.
Port
Rule that controls connections for a TCP or UDP port.
Predefined:
@FirewallAPI.dll,-80200
Rule that controls connections for a Windows experience.
Custom
Custom rule.

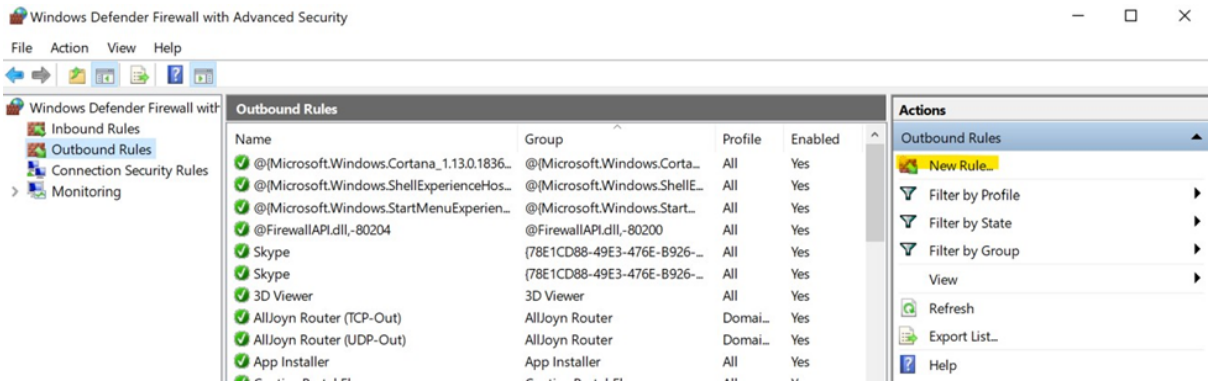

C:\WINDOWS\system32>nslookup www.pastebin.com
Server: static-86-51-35-24.mobily.com.sa
Address: 86.51.35.24
Non-authoritative answer:
Name: www.pastebin.com
Addresses: 2606:4700:10::ac43:22aa
2606:4700:10::6814:448f
2606:4700:10::6814:438f
104.20.68.143
172.67.34.170
104.20.67.143

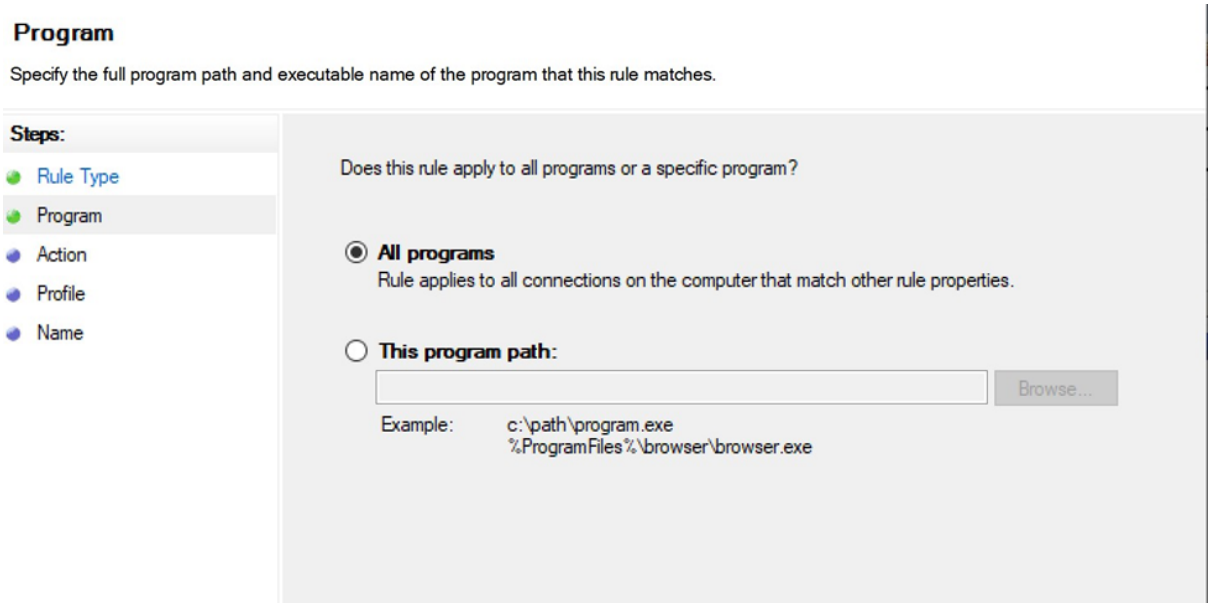

New Outbound Rule Wizard
Scope
Specify the local and remote IP addresses to which this rule applies.
Steps:
Rule Type
Program
Protocol and Ports
Scope
Action
Profile
Name
Which local IP addresses does this rule apply to?
Any IP address
These IP addresses:
Add...
Edit...
Remove
Customize the interface types to which this rule applies:
Customize...
Which remote IP addresses does this rule apply to?
Any IP address
These IP addresses:
2606:4700:10::ac43:22aa
2606:4700:10::6814:448f
2606:4700:10::6814:438f
104.20.68.143
172.67.34.170
104.20.67.143
Add...
Edit...
Remove
< Back
Next >
Cancel

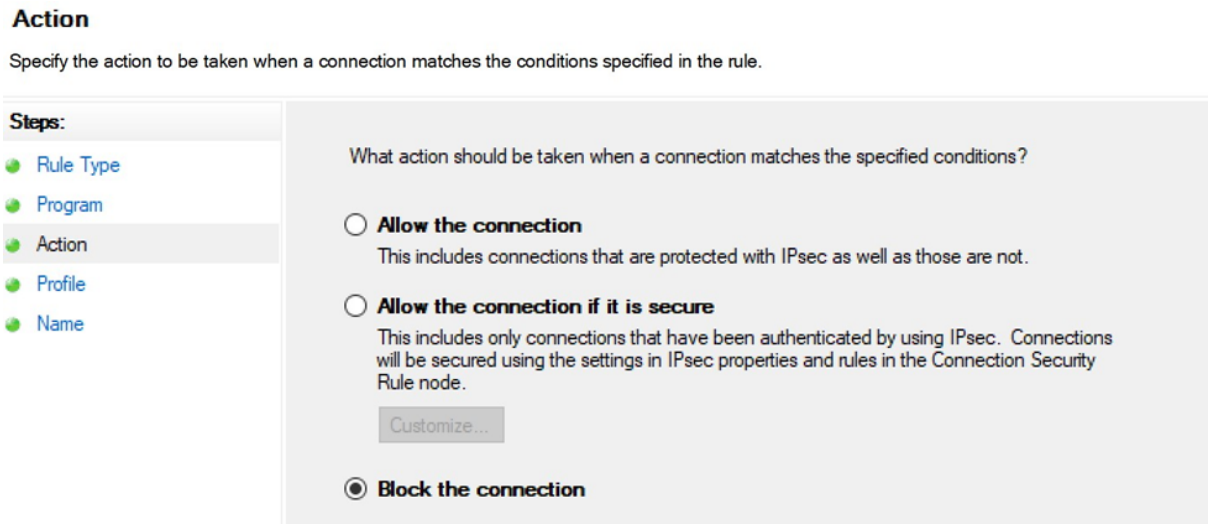

New Outbound Rule Wizard
Action
Specify the action to be taken when a connection matches the conditions specified in the rule.
Steps:
Rule Type
Program
Protocol and Ports
Scope
Action
Profile
Name
What action should be taken when a connection matches the specified conditions?
Allow the connection
This includes connections that are protected with IPsec as well as those are not.
Allow the connection if it is secure
This includes only connections that have been authenticated by using IPsec. Connections will be secured using the settings in IPsec properties and rules in the Connection Security Rule node.
Customize...
Block the connection



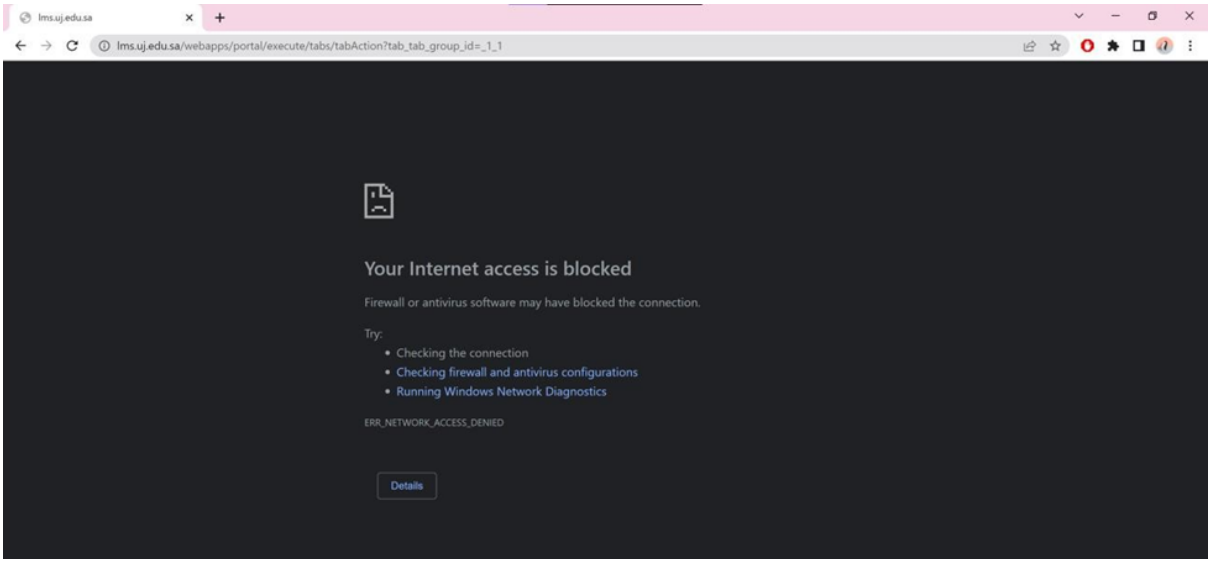
- Prevent any application inside windows from accessing the Internet.



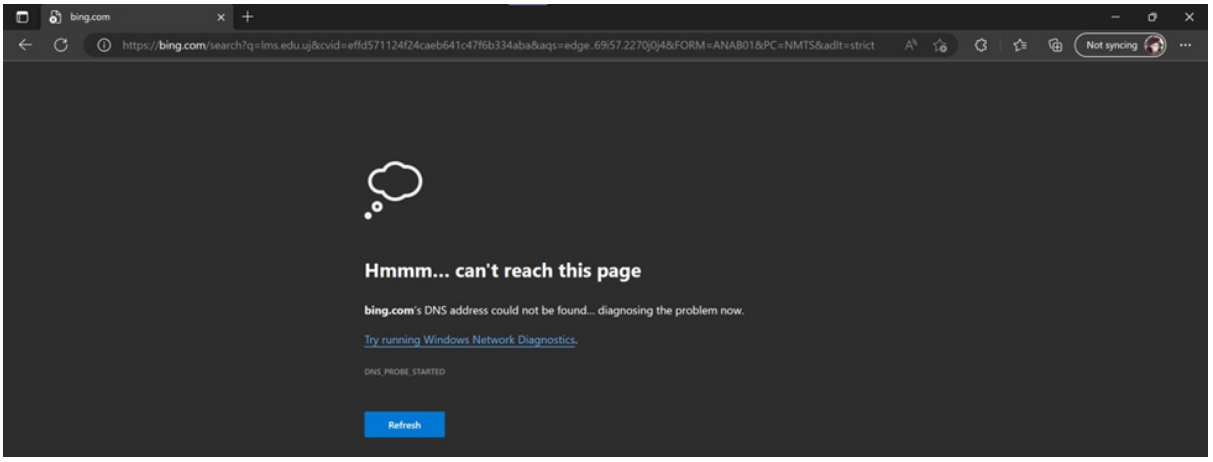




Google Chrome



Microsoft edge


bing.com
https://bing.com/search?q=lms.edu.uj&cvid=effd571124f24caeb641c47f6b334aba&aqs=edge..69i57.2270j0j4&FORM=ANAB01&PC=NMTS&adlt=strict
Not syncing
Hmmm... can't reach this page
bing.com's DNS address could not be found... diagnosing the problem now.
Try running Windows Network Diagnostics.
DNS_PROBE_STARTED
Refresh