Generation and Analysing Network Attacks using Scapy

Project of the Secure Network Management course by DECAMP

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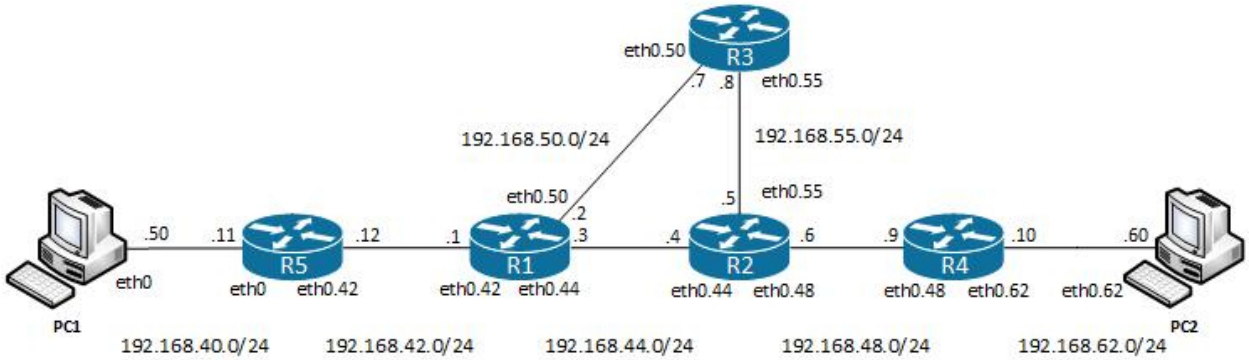
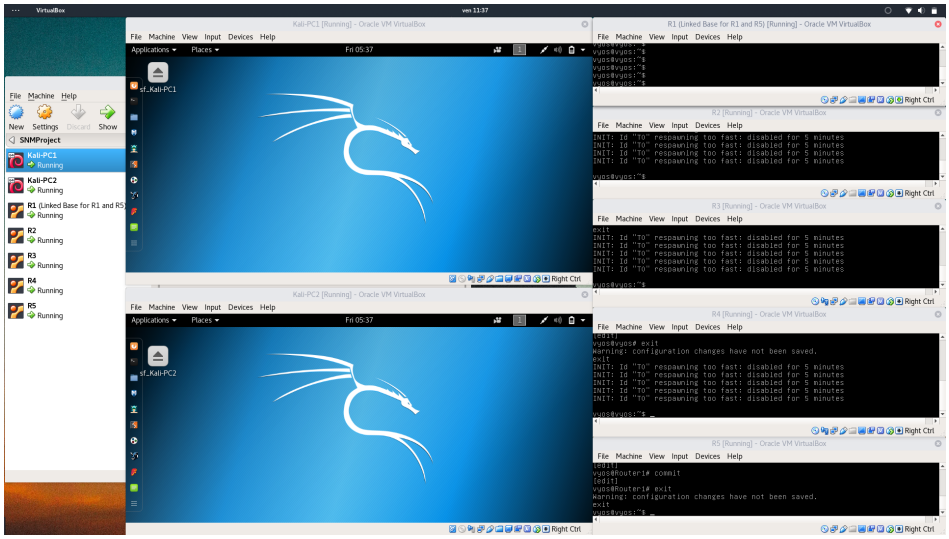
1 The configuration used





1.1 Devices Configuration

R5

The Router5 is a clone of the Router1. The network of this router is composed by two enabled adapters:

- Adapter 1: Internal Network (Name: intnet);
- Adapter 2: NAT Network (Name: NatNetwork).

After the start of the machine it is setted with this commands:

```
# Configuring the router 5 (R5)
## Basic configuration
configure
load /live/image/R1/lab16
commit

## Setting the new ethernet eth0 address
delete interfaces ethernet eth0 address 192.168.40.1/24
set interfaces ethernet eth0 address 192.168.40.11/24
commit

## Setting the new ethernet eth0.42 address
delete interfaces ethernet eth0 vif 44
delete interfaces ethernet eth0 vif 50
set interfaces ethernet eth0 vif 42 address 192.168.42.12/24
commit

## Enablig RIP
set protocols rip interface eth0.42
set protocols rip interface eth0
set protocols rip network 192.168.40.0/24
set protocols rip network 192.168.42.0/24
set protocols rip redistribute connected
set protocols rip timers timeout 35
commit

exit
```

R1

```
# Configuring the router 1 (R1)
## Basic configuration
configure
load /live/image/R1/lab16
commit

## Considering the new router R5
delete interfaces ethernet eth0 address 192.168.40.1/24
commit
set interfaces ethernet eth0 vif 42 address 192.168.42.1/24
commit

## Enablig the RIP protocol
set protocols rip interface eth0.42
set protocols rip interface eth0.44
set protocols rip interface eth0.50
commit
exit
```

R2

```
# Configuring the router 2 (R2)
## Basic configuration
configure
load /live/image/R2/lab16_rip
commit
exit
```

R3

```
# Configuring the router 3 (R3)
## Basic configuration
configure
load /live/image/R3/lab16_rip
commit
exit
```

R4

```
# Configuring the router 4 (R4)
## Basic configuration
configure
load /live/image/R4/lab16_rip
commit
exit
```

Kali-PC1

```
# Contents of /etc/network/interfaces
###############################################################################
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

auto eth0
iface eth0 inet static
        address 192.168.40.50
        netmask 255.255.255.0
        gateway 192.168.40.11
```

Kali-PC2

```
# Contents of /etc/network/interfaces
###############################################################################
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

auto eth0
iface eth0 inet manual
up ifconfig eth0 up

auto eth0.62
iface eth0.62 inet static
        address 192.168.62.60
        netmask 255.255.255.0
```

```
        gateway 192.168.62.10
        vLAN-raw-device eth0
```

1.2 Testing the configuration

Bash version of a test.

```
#!/usr/bin/env bash

# Availability of each device

echo "
-------------------------------------------------------------------------------
ping to 192.168.40.11 (R5)"
ping -c 3 192.168.40.11

echo "
-------------------------------------------------------------------------------
ping to 192.168.42.12 (R5)"
ping -c 3 192.168.42.12

echo "
-------------------------------------------------------------------------------
ping to 192.168.42.1 (R1)"
ping -c 3 192.168.42.1

echo "
-------------------------------------------------------------------------------
ping to 192.168.50.2 (R1)"
ping -c 3 192.168.50.2

echo "
-------------------------------------------------------------------------------
ping to 192.168.44.3 (R1)"
ping -c 3 192.168.44.3

echo "
-------------------------------------------------------------------------------
ping to 192.168.44.4 (R2)"
ping -c 3 192.168.44.4

echo "
-------------------------------------------------------------------------------
ping to 192.168.55.5 (R2)"
ping -c 3 192.168.55.5

echo "
-------------------------------------------------------------------------------
ping to 192.168.48.6 (R2)"
ping -c 3 192.168.48.6

echo "
-------------------------------------------------------------------------------
ping to 192.168.50.7 (R3)"
ping -c 3 192.168.50.7

echo "
-------------------------------------------------------------------------------
ping to 192.168.55.8 (R3)"
ping -c 3 192.168.55.8
```

```
echo "
-------------------------------------------------------------------------------
ping to 192.168.48.9 (R4)"
ping -c 3 192.168.48.9

echo "
-------------------------------------------------------------------------------
ping to 192.168.62.10 (R4)"
ping -c 3 192.168.62.10

echo "
-------------------------------------------------------------------------------
ping to 192.168.40.50 (PC1)"
ping -c 3 192.168.40.50

echo "
-------------------------------------------------------------------------------
ping to 192.168.62.60 (PC2)"
ping -c 3 192.168.62.60
```

Now it's presented a scapy program used to test if the network was working properly before the attacks.

```
#! /usr/bin/env python
from scapy.all import *

def check_availability(target, label):
    print("\n--> ping to \"" + target + "\" (" + label + ")")
    ans,unans = sr(IP(dst=target)/ICMP())
    if ans:
        print(target + ' is reachable, summary:')
        ans.summary()
        return ans,unans
    else:
        print(target + ' is not reachable, summary:')
        unans.summary()
        return ans,unans

# Availability of each device
target = "192.168.40.11"
label = "R5"
check_availability(target, label)

target = "192.168.42.12"
label = "R5"
check_availability(target, label)

target = "192.168.42.1"
label = "R1"
check_availability(target, label)

target = "192.168.50.2"
label = "R1"
check_availability(target, label)

target = "192.168.44.3"
label = "R1"
check_availability(target, label)

target = "192.168.44.4"
label = "R2"
check_availability(target, label)
```

```
target = "192.168.55.5"
label = "R2"
check_availability(target, label)

target = "192.168.48.6"
label = "R2"
check_availability(target, label)

target = "192.168.50.7"
label = "R3"
check_availability(target, label)

target = "192.168.55.8"
label = "R3"
check_availability(target, label)

target = "192.168.48.9"
label = "R4"
check_availability(target, label)

target = "192.168.62.10"
label = "R4"
check_availability(target, label)

target = "192.168.40.50"
label = "PC1"
check_availability(target, label)

target = "192.168.62.60"
label = "PC2"
check_availability(target, label)
```

2 Reconnaissance Attacks

2.1 IP Spoofing

2.2 Introduction

In order to hide the IP address of a sender machine and at the same time identifying a station active on the network, an attacker could be use a method named *IP spoofing*.

The IP spoofing consists to send packets IP with a fake source IP that isn't mapped on the network.

2.2.1 SCAPY program

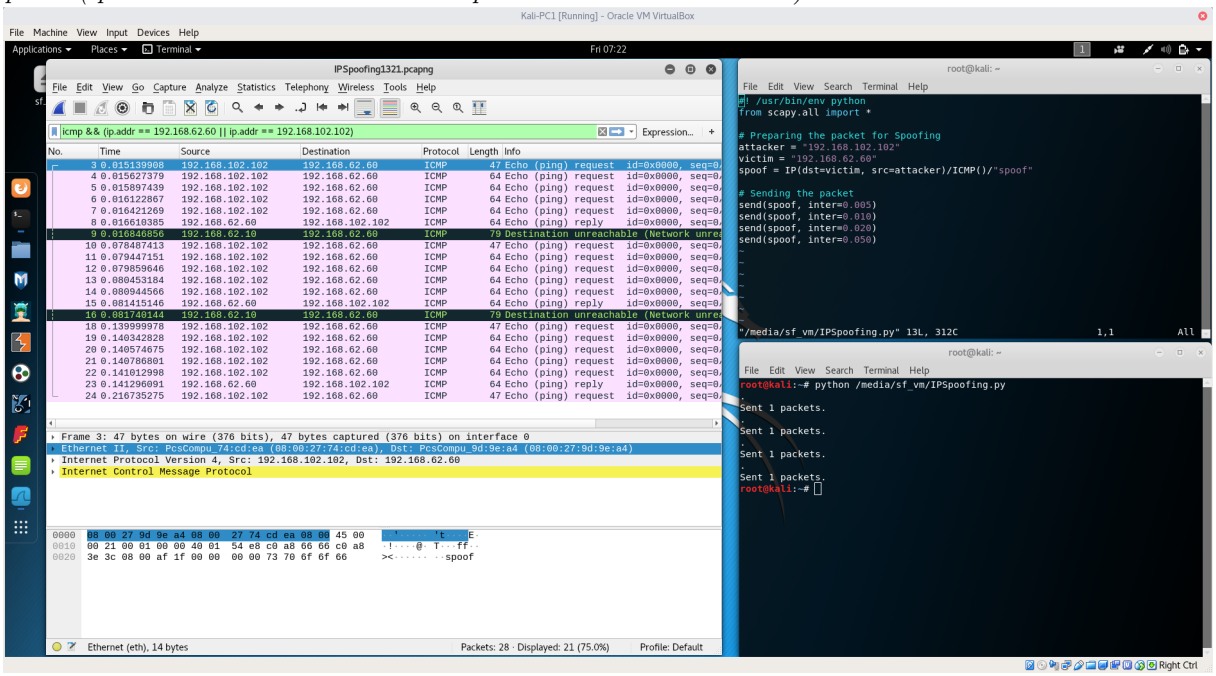
```
#! /usr/bin/env python
from scapy.all import *

# Preparing the packet for Spoofing
attacker = "192.168.102.102"
victim = "192.168.62.60"
spoof = IP(dst=victim, src=attacker)/ICMP()/"spoof"

# Sending the packets
send(spoof, inter=0.005)
send(spoof, inter=0.010)
send(spoof, inter=0.020)
send(spoof, inter=0.050)
```

2.2.2 Attacker's messages

Wireshark filter:
icmp && (ip.addr == 192.168.62.60 —— ip.addr == 192.168.102.102)



2.2.3 Attack's result

2.2.4 How to protect the network

2.3 No Flags Set

2.4 Introduction

2.4.1 SCAPY program

```
#! /usr/bin/env python
from scapy.all import *
```

2.4.2 Attacker's messages

2.4.3 Attack's result

2.4.4 How to protect the network

3 DoS Attacks

3.1 ICMP Redirect

3.2 Introduction

3.2.1 SCAPY program

```
#! /usr/bin/env python
from scapy.all import *
```

3.2.2 Attacker's messages

3.2.3 Attack's result

3.2.4 How to protect the network

3.3 Ping of Death

3.4 Introduction

3.4.1 SCAPY program

```
#! /usr/bin/env python
from scapy.all import *
```

3.4.2 Attacker's messages

3.4.3 Attack's result

3.4.4 How to protect the network