

Instituto Tecnológico de Cancún

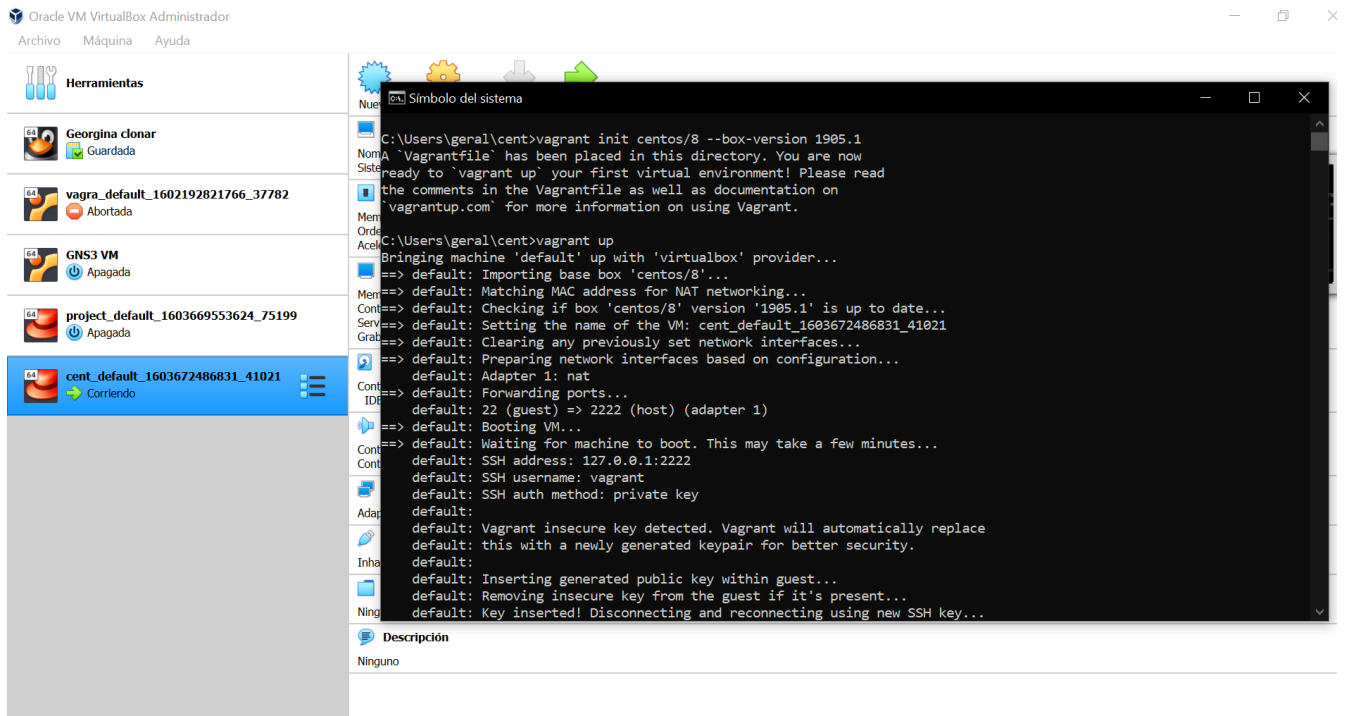
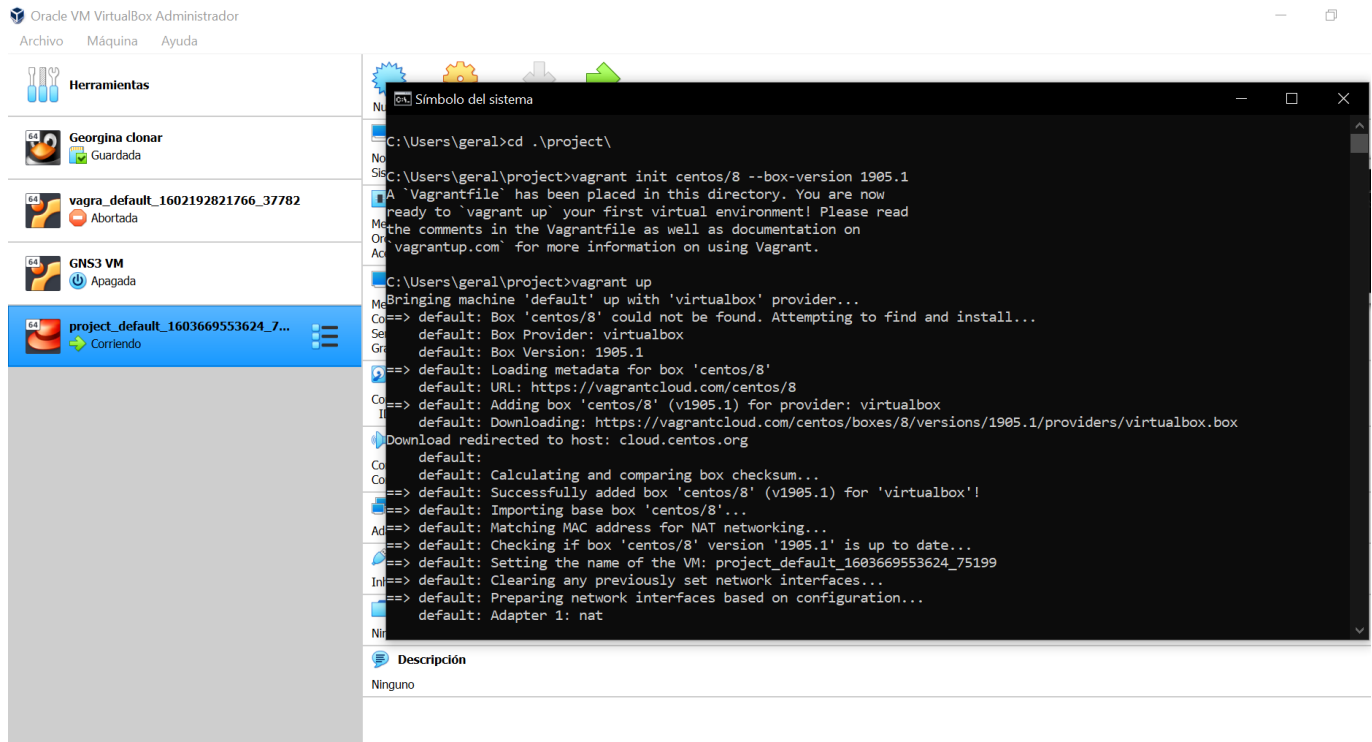
Ingeniería en sistemas computacionales
Fundamentos de telecomunicación

Unidad 1

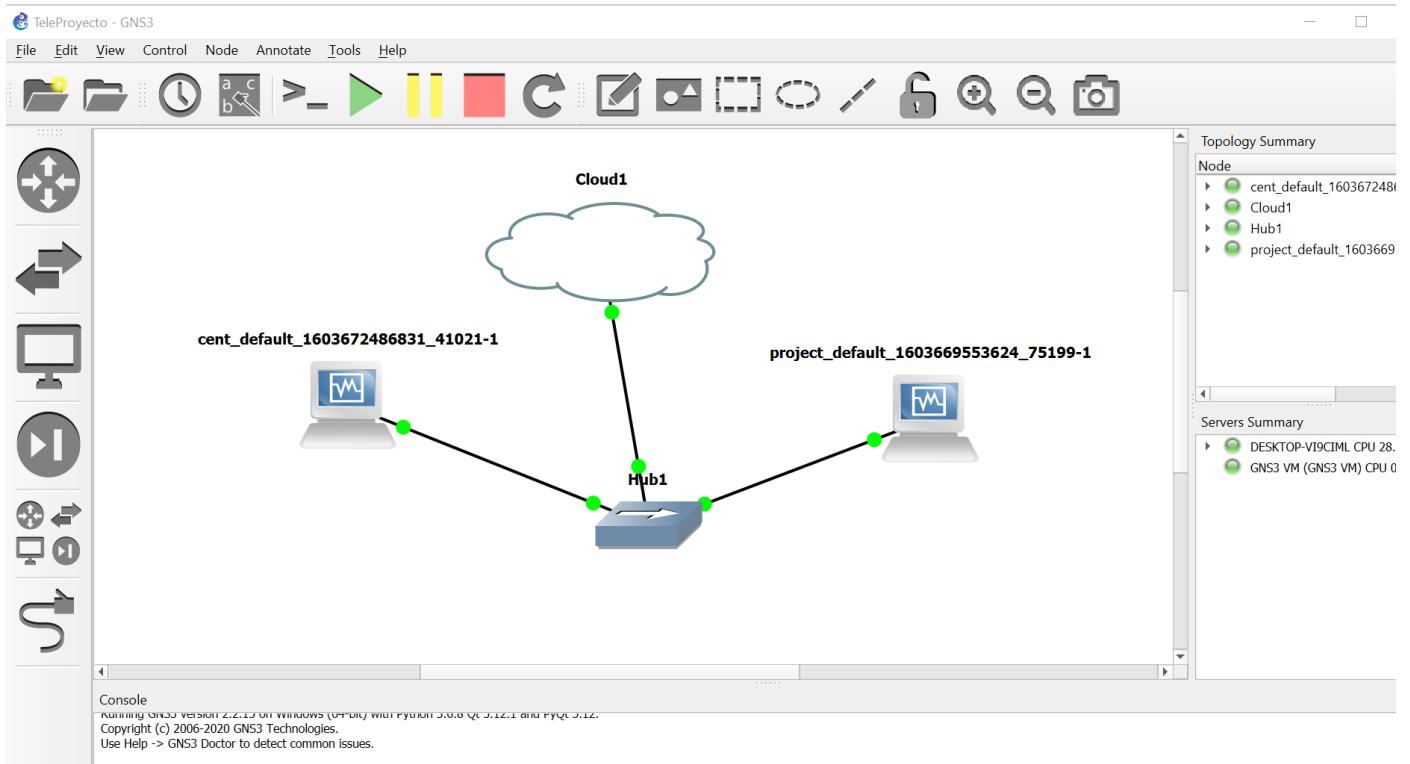
“5 Fases”

Moen Ake Geraldty María

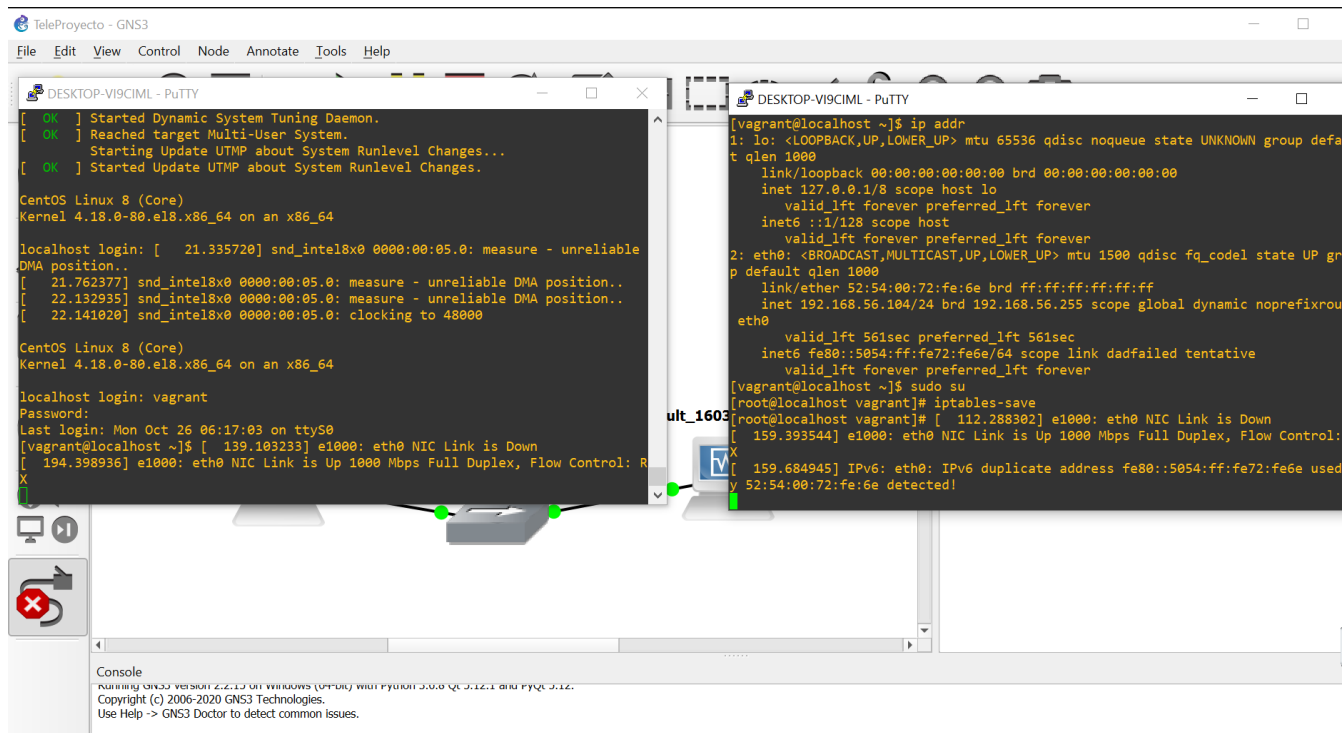
Fase 1: Instalar 2 centos8 en Virtualbox usando Vagrant



Fase 2: Conectar en GNS3 las dos VMs de CentOS con un switch ethernet



Fase 3: Usar los scripts de python para conectar las dos VMs usando sockets



```
DESKTOP-VI9C1ML - PuTTY
[ OK ] Started Dynamic System Tuning Daemon.
[ OK ] Reached target Multi-User System.
Starting Update UTMP about System Runlevel Changes...
[ OK ] Started Update UTMP about System Runlevel Changes.

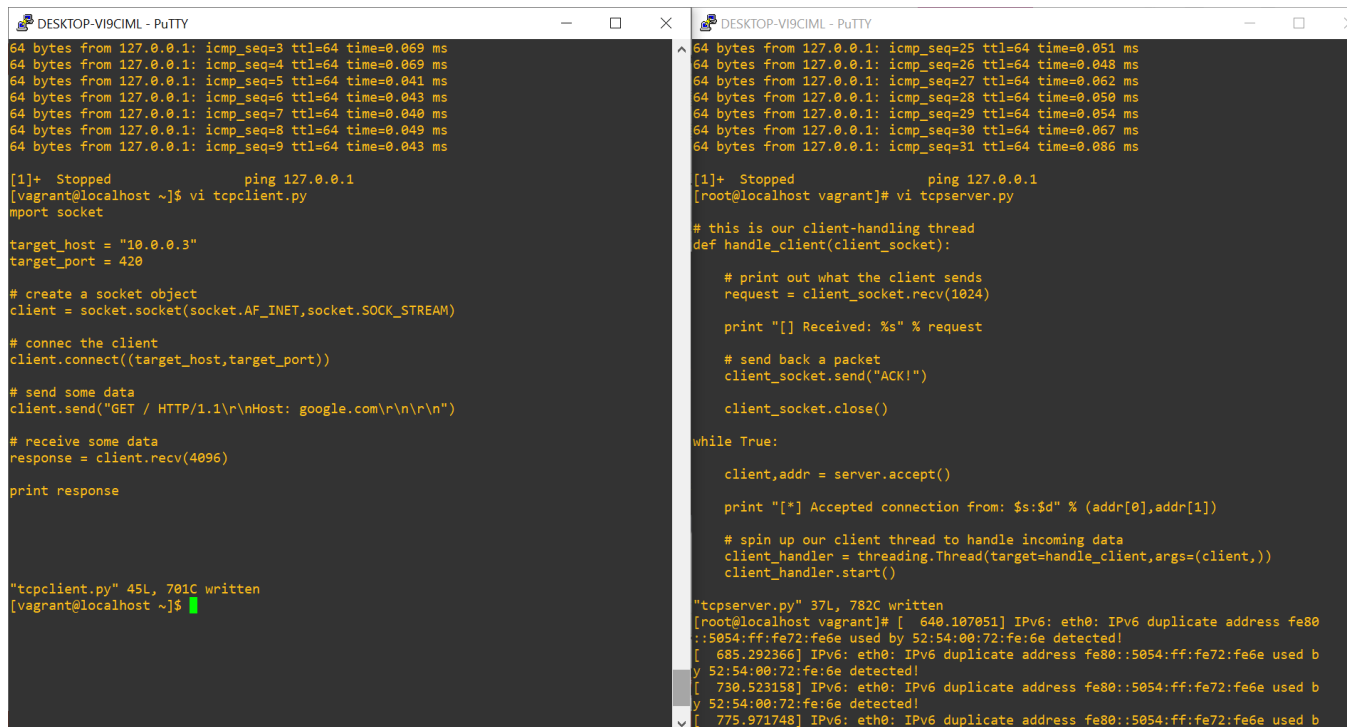
CentOS Linux 8 (Core)
Kernel 4.18.0-80.el8.x86_64 on an x86_64

localhost login: [ 21.335720] snd_intel8x0 0000:00:05.0: measure - unreliable DMA position..
[ 21.762377] snd_intel8x0 0000:00:05.0: measure - unreliable DMA position..
[ 22.132935] snd_intel8x0 0000:00:05.0: measure - unreliable DMA position..
[ 22.141020] snd_intel8x0 0000:00:05.0: clocking to 48000

CentOS Linux 8 (Core)
Kernel 4.18.0-80.el8.x86_64 on an x86_64

localhost login: vagrant
Password:
Last login: Mon Oct 26 06:17:03 on tty50
[vagrant@localhost ~]$ [ 139.103233] e1000: eth0 NIC Link is Down
[ 194.398936] e1000: eth0 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: RX

DESKTOP-VI9C1ML - PuTTY
[vagrant@localhost ~]$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 52:54:00:72:fe:6e brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.104/24 brd 192.168.56.255 scope global dynamic noprefixroute eth0
        valid_lft 561sec preferred_lft 561sec
    inet6 fe80::5054:ff:fe72:fe6e/64 scope link dadfailed tentative
        valid_lft forever preferred_lft forever
[vagrant@localhost ~]$ sudo su
[root@localhost vagrant]# iptables-save
[vagrant@localhost ~]$ [ 112.288302] e1000: eth0 NIC Link is Down
[ 159.393544] e1000: eth0 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: RX
[ 159.684945] IPv6: eth0: IPv6 duplicate address fe80::5054:ff:fe72:fe6e used by 52:54:00:72:fe:6e detected!
```



```
DESKTOP-VI9C1ML - PuTTY
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.069 ms
64 bytes from 127.0.0.1: icmp_seq=4 ttl=64 time=0.069 ms
64 bytes from 127.0.0.1: icmp_seq=5 ttl=64 time=0.041 ms
64 bytes from 127.0.0.1: icmp_seq=6 ttl=64 time=0.043 ms
64 bytes from 127.0.0.1: icmp_seq=7 ttl=64 time=0.040 ms
64 bytes from 127.0.0.1: icmp_seq=8 ttl=64 time=0.049 ms
64 bytes from 127.0.0.1: icmp_seq=9 ttl=64 time=0.043 ms

[1]+ Stopped ping 127.0.0.1
[vagrant@localhost ~]$ vi tcpclient.py
import socket

target_host = "10.0.0.3"
target_port = 420

# create a socket object
client = socket.socket(socket.AF_INET,socket.SOCK_STREAM)

# connect the client
client.connect((target_host,target_port))

# send some data
client.send("GET / HTTP/1.1\r\nHost: google.com\r\n\r\n")

# receive some data
response = client.recv(4096)

print response

"tcpclient.py" 45L, 701C written
[vagrant@localhost ~]$

DESKTOP-VI9C1ML - PuTTY
64 bytes from 127.0.0.1: icmp_seq=25 ttl=64 time=0.051 ms
64 bytes from 127.0.0.1: icmp_seq=26 ttl=64 time=0.048 ms
64 bytes from 127.0.0.1: icmp_seq=27 ttl=64 time=0.062 ms
64 bytes from 127.0.0.1: icmp_seq=28 ttl=64 time=0.050 ms
64 bytes from 127.0.0.1: icmp_seq=29 ttl=64 time=0.054 ms
64 bytes from 127.0.0.1: icmp_seq=30 ttl=64 time=0.067 ms
64 bytes from 127.0.0.1: icmp_seq=31 ttl=64 time=0.086 ms

[1]+ Stopped ping 127.0.0.1
[root@localhost vagrant]# vi tcpserver.py

# this is our client-handling thread
def handle_client(client_socket):

    # print out what the client sends
    request = client_socket.recv(1024)

    print "[*] Received: %s" % request

    # send back a packet
    client_socket.send("ACK!")

    client_socket.close()

while True:

    client,addr = server.accept()

    print "[*] Accepted connection from: %s:%d" % (addr[0],addr[1])

    # spin up our client thread to handle incoming data
    client_handler = threading.Thread(target=handle_client,args=(client,))
    client_handler.start()

"tcpserver.py" 37L, 782C written
[root@localhost vagrant]# [ 640.107051] IPv6: eth0: IPv6 duplicate address fe80::5054:ff:fe72:fe6e used by 52:54:00:72:fe:6e detected!
[ 685.292366] IPv6: eth0: IPv6 duplicate address fe80::5054:ff:fe72:fe6e used by 52:54:00:72:fe:6e detected!
[ 730.523158] IPv6: eth0: IPv6 duplicate address fe80::5054:ff:fe72:fe6e used by 52:54:00:72:fe:6e detected!
[ 775.971748] IPv6: eth0: IPv6 duplicate address fe80::5054:ff:fe72:fe6e used by
```

Fase 4: Capturar el tráfico de la comunicación entre las dos VMs al momento de utilizar los scripts

Capturing from - [Cliente Ethernet0 to Hub1 Ethernet0]

Archivo Edición Visualización Ir Captura Analizar Estadísticas Telefonía Wireless Herramientas Ayuda

Aplique un filtro de visualización ... <Ctrl-/>

| No. | Time | Source | Destination | Protocol | Length | Info |
|-----|------------|-------------------------|-------------------|----------|--------|--|
| 2 | 16.998882 | 0.0.0.0 | 255.255.255.255 | DHCP | 324 | DHCP Discover - Transaction ID 0xa40368ad |
| 3 | 212.890545 | fe80::5054:ff:fe72::... | ff02::2 | ICMPv6 | 70 | Router Solicitation from 52:54:00:72:fe:6e |
| 4 | 326.634673 | :: | ff02::16 | ICMPv6 | 90 | Multicast Listener Report Message v2 |
| 5 | 326.635650 | 0.0.0.0 | 255.255.255.255 | DHCP | 324 | DHCP Request - Transaction ID 0x33d66254 |
| 6 | 327.037596 | :: | ff02::1:ff72:fe6e | ICMPv6 | 86 | Neighbor Solicitation for fe80::5054:ff:fe72:fe6e |
| 7 | 327.039551 | fe80::5054:ff:fe72::... | ff02::1 | ICMPv6 | 86 | Neighbor Advertisement fe80::5054:ff:fe72:fe6e (ovr) is at 52:54:00:72:fe:6e |
| 8 | 327.473820 | :: | ff02::16 | ICMPv6 | 90 | Multicast Listener Report Message v2 |
| 9 | 328.254348 | 0.0.0.0 | 255.255.255.255 | DHCP | 324 | DHCP Discover - Transaction ID 0xf89015f9 |
| 10 | 330.674340 | 0.0.0.0 | 255.255.255.255 | DHCP | 324 | DHCP Discover - Transaction ID 0xf89015f9 |
| 11 | 332.171688 | 0.0.0.0 | 255.255.255.255 | DHCP | 324 | DHCP Discover - Transaction ID 0xf89015f9 |
| 12 | 336.466604 | 0.0.0.0 | 255.255.255.255 | DHCP | 324 | DHCP Discover - Transaction ID 0xf89015f9 |

> Frame 1: 324 bytes on wire (2592 bits), 324 bytes captured (2592 bits) on interface -, id 0
> Ethernet II, Src: RealtekU_72:fe:6e (52:54:00:72:fe:6e), Dst: Broadcast (ff:ff:ff:ff:ff:ff)
> Internet Protocol Version 4, Src: 0.0.0.0, Dst: 255.255.255.255
> User Datagram Protocol, Src Port: 68, Dst Port: 67
> Dynamic Host Configuration Protocol (Discover)

```
0000  ff ff ff ff ff ff 52 54 00 72 fe 6e 08 00 45 c0  ....RT..n..E
0010  01 36 00 00 00 00 40 11 78 f8 00 00 00 00 ff ff  -6...@..x.....
0020  ff ff 00 44 00 43 01 22 a1 52 01 01 06 00 a4 03  ...D.C..."..R.....
0030  68 ad 00 12 00 00 00 00 00 00 00 00 00 00 00 00  h.....
0040  00 00 00 00 00 00 52 54 00 72 fe 6e 00 00 00 00  ....RT..n....
0050  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
0060  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
0070  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
0080  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
0090  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
00a0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  .....
```

Fase 5: Reporte de conclusiones

En conclusión, pudimos ver como descargar dos computadoras virtuales de CentOS directamente en virtual box las cuales conectamos entre ellas usando scripts de Python siendo una el cliente y otra el servidor, con ayuda del Wireshark pudimos capturar el tráfico de comunicación que tienen entre las dos.

Como conclusión personal puedo decir que al principio resulta ser una práctica un poco difícil ya que suelen haber muchos errores, pero es cuestión de encontrar alguna solución y aunque llevó tiempo si pude llegar al resultado final, espero practicar un poco mas con respecto a estos temas para así tener mas conocimiento.