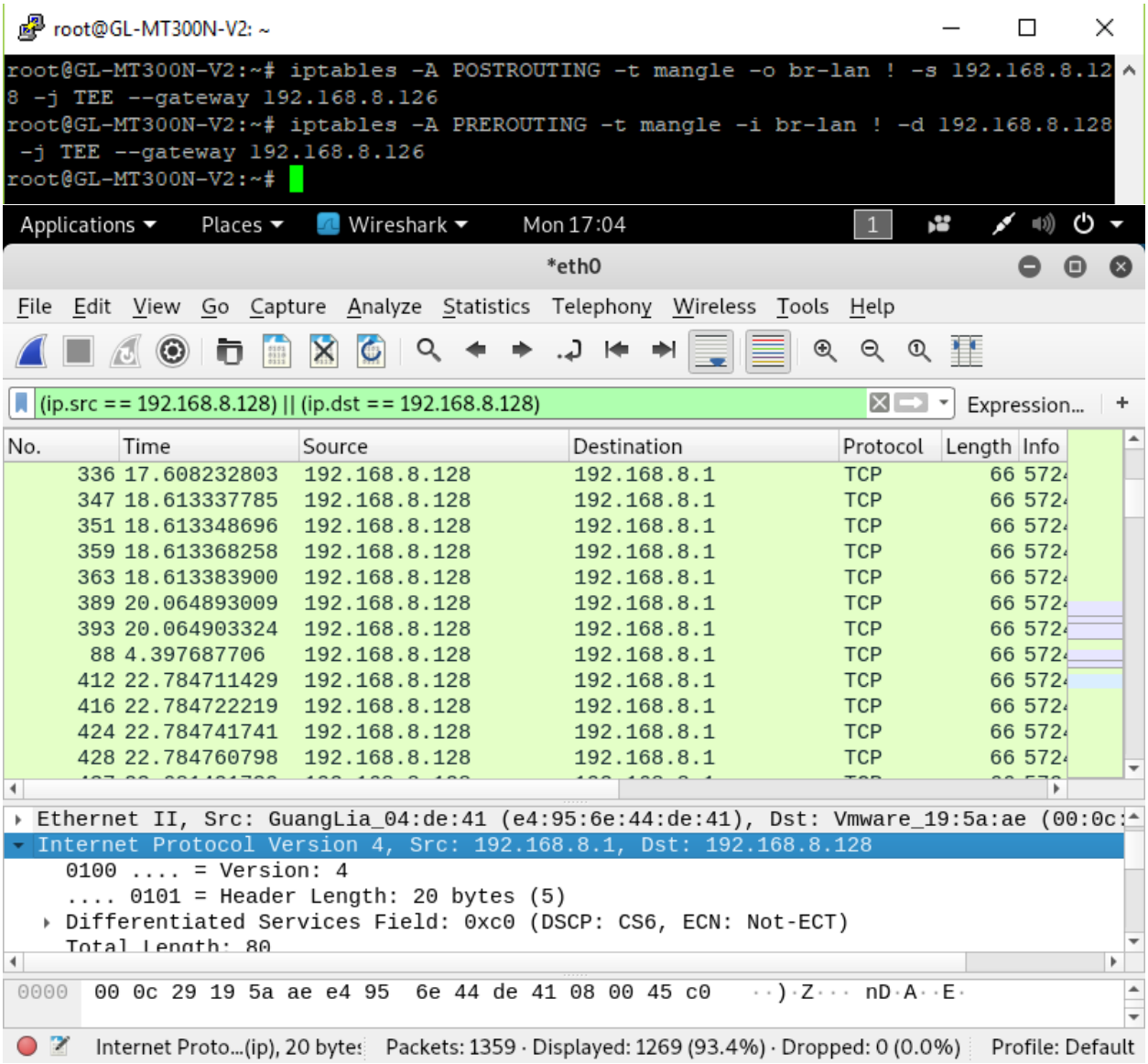
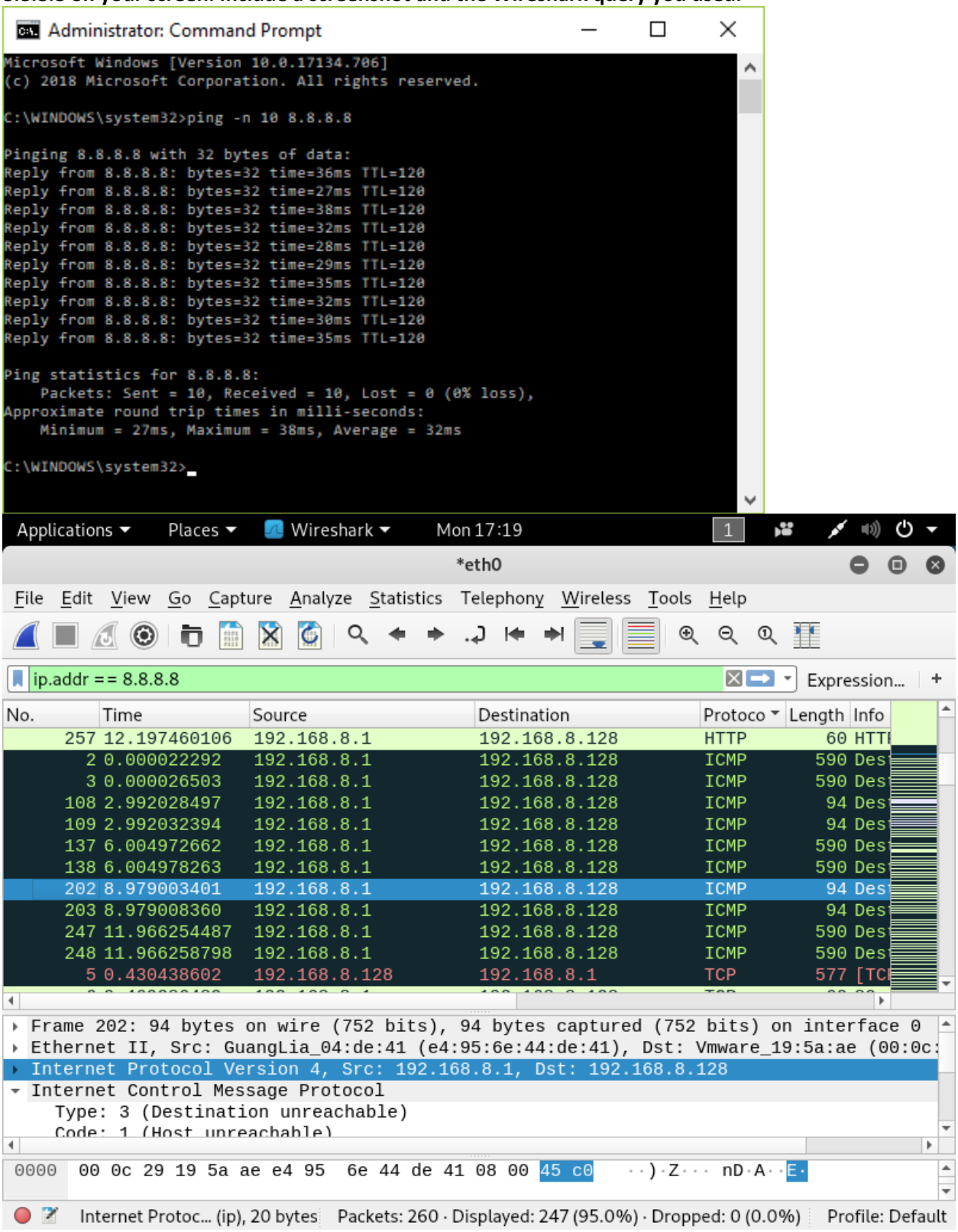
1. Provide a screenshot (like Figure 5) of your running results, highlight the IP addresses of the Router, victim and attacker.



2. Based on packets captured Steps 1-3, apply a filter in Wireshark to display the ten packets sent to 8.8.8.8 on your screen. Include a screenshot and the Wireshark query you used.



3. Based on packets captured in Section 1-3, use the command tcpdump to display the ten packets sent to 8.8.4.4 on your screen. Include a screenshot and the tcpdump query you used.

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.17134.706]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>ping -n 10 8.8.4.4

Pinging 8.8.4.4 with 32 bytes of data:
Reply from 8.8.4.4: bytes=32 time=99ms TTL=120
Reply from 8.8.4.4: bytes=32 time=99ms TTL=120
Reply from 8.8.4.4: bytes=32 time=45ms TTL=120
Reply from 8.8.4.4: bytes=32 time=119ms TTL=120
Reply from 8.8.4.4: bytes=32 time=127ms TTL=120
Reply from 8.8.4.4: bytes=32 time=108ms TTL=120
Reply from 8.8.4.4: bytes=32 time=85ms TTL=120
Reply from 8.8.4.4: bytes=32 time=113ms TTL=120
Reply from 8.8.4.4: bytes=32 time=159ms TTL=120
Reply from 8.8.4.4: bytes=32 time=63ms TTL=120

Ping statistics for 8.8.4.4:
    Packets: Sent = 10, Received = 10, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 45ms, Maximum = 159ms, Average = 101ms

C:\WINDOWS\system32>
```

```
root@GL-MT300N-V2: ~
root@GL-MT300N-V2:~# tcpdump -i any -v dst 8.8.4.4
tcpdump: listening on any, link-type LINUX_SLL (Linux cooked), capture size 262144 bytes
17:18:29.310856 IP (tos 0x0, ttl 64, id 1194, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 21511, seq 0, length 64
17:18:34.551452 IP (tos 0x0, ttl 64, id 1338, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 50439, seq 0, length 64
17:18:39.716689 IP (tos 0x0, ttl 64, id 1735, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 13064, seq 0, length 64
17:18:45.044254 IP (tos 0x0, ttl 64, id 2081, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 41224, seq 0, length 64
17:18:50.308226 IP (tos 0x0, ttl 64, id 2377, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 3849, seq 0, length 64
17:18:55.484310 IP (tos 0x0, ttl 64, id 2547, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 32009, seq 0, length 64
17:19:00.748846 IP (tos 0x0, ttl 64, id 2568, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 60681, seq 0, length 64
17:19:05.976128 IP (tos 0x0, ttl 64, id 2655, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 23306, seq 0, length 64
17:19:11.145842 IP (tos 0x0, ttl 64, id 3043, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 54026, seq 0, length 64
17:19:16.416265 IP (tos 0x0, ttl 64, id 3176, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 16651, seq 0, length 64
17:19:21.637926 IP (tos 0x0, ttl 64, id 3250, offset 0, flags [DF], proto ICMP (1), length 84)
    192.168.0.22 > google-public-dns-b.google.com: ICMP echo request, id 44811, seq 0, length 64
```

4. Dnsmasq is a lightweight DNS, TFTP, PXE, router advertisement and DHCP server. It is intended to provide coupled DNS and DHCP service to a LAN. Dnsmasq accepts DNS queries and either answers them from a small, local, cache or forwards them to a real, recursive, DNS server. It loads the contents of /etc/hosts so that local hostnames which do not appear in the global DNS can be resolved and also answers DNS queries for DHCP configured hosts. It can also act as the authoritative DNS server for one or more domains, allowing local names to appear in the global DNS. Read the article: "DNS spoofing with Dnsmasq8 " and try to run Dnsmasq on your router. As you are going through with the DNS spoof slides, try to redirect a HTTP website instead of a HTTPS.

I'm not quite sure what the problem was but I could not get dnsmasq configured correctly and working. I tried uninstalling it and removing the associated files a number of times however the results weren't successful. Anyway, here is the following attempt:

Applications Places Terminal Mon 18:46

root@kali: ~

File Edit View Search Terminal Help

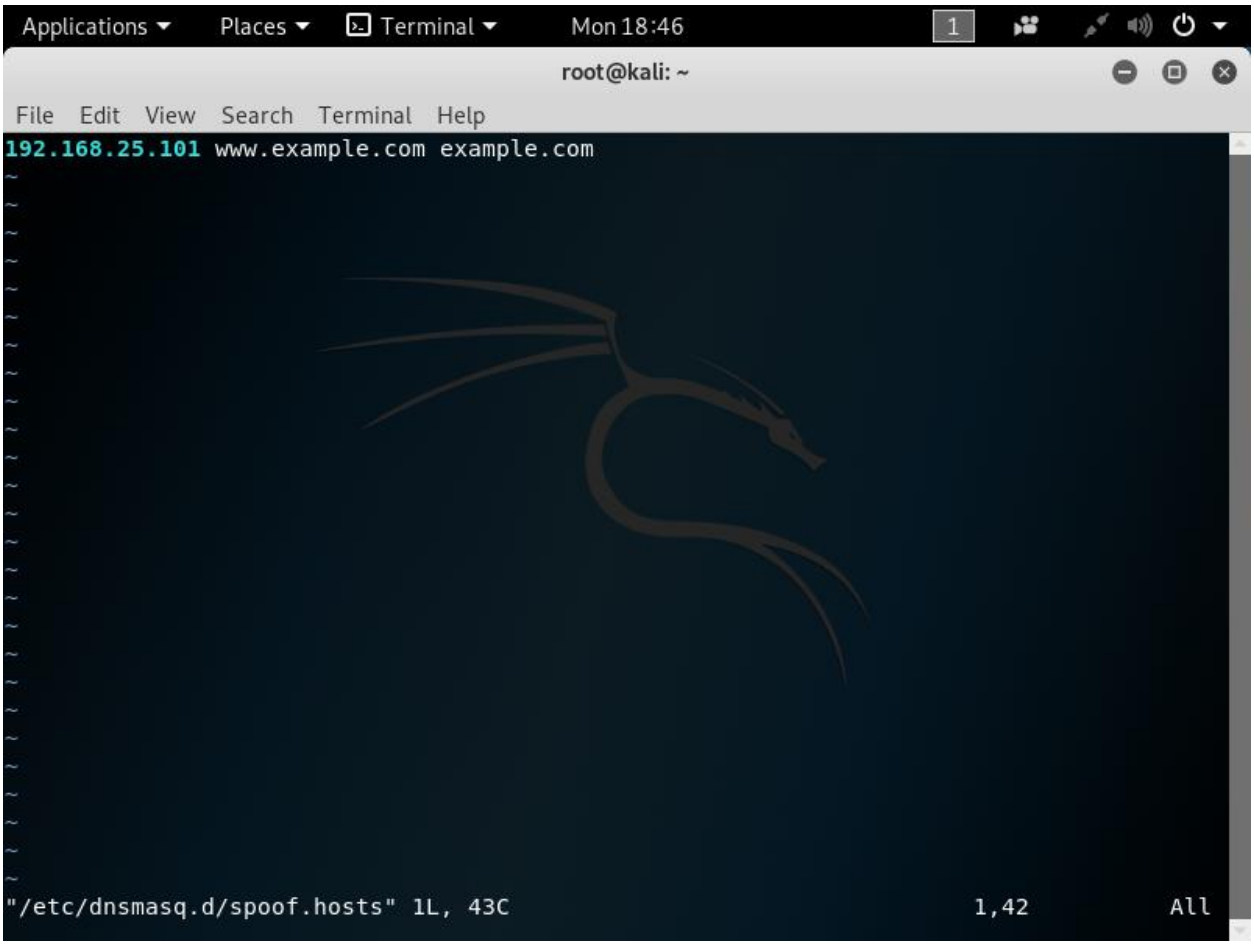
```
server=208.67.222.222
server=208.67.220.220
listen-address=127.0.0.1
listen-address=192.168.8.126
no-dhcp-interface=
no-hosts
addn-hosts=/etc/dnsmasq.d/spoof.hosts

# Configuration file for dnsmasq.
#
# Format is one option per line, legal options are the same
# as the long options legal on the command line. See
# "/usr/sbin/dnsmasq --help" or "man 8 dnsmasq" for details.

# Listen on this specific port instead of the standard DNS port
# (53). Setting this to zero completely disables DNS function,
# leaving only DHCP and/or TFTP.
#port=5353

# The following two options make you a better netizen, since they
# tell dnsmasq to filter out queries which the public DNS cannot
# answer, and which load the servers (especially the root servers)
# unnecessarily. If you have a dial-on-demand link they also stop
# these requests from bringing up the link unnecessarily.

# Never forward plain names (without a dot or domain part)
#domain-needed
"/etc/dnsmasq.conf" 687L, 27546C                                  8,0-1         Top
```


Applications
Places
Terminal
Mon 18:46
root@kali: ~
File Edit View Search Terminal Help
192.168.25.101 www.example.com example.com
"/etc/dnsmasq.d/spoof.hosts" 1L, 43C
1,42
All

```
root@GL-MT300N-V2: ~
root@GL-MT300N-V2:~# killall -9 dnsmasq
[2]+  Killed                     dnsmasq --no-daemon --log-queries
root@GL-MT300N-V2:~# dnsmasq --no-daemon --log-queries
dnsmasq: started, version 2.78 cachesize 150
dnsmasq: compile time options: IPv6 GNU-getopt no-DBus no-i18n no-IDN DHCP no-DHCPv6 no-Lua TFTP n
o-conntrack no-ipset no-auth no-DNSSEC no-ID loop-detect inotify
dnsmasq: reading /etc/resolv.conf
dnsmasq: ignoring nameserver 127.0.0.1 - local interface
dnsmasq: read /etc/hosts - 4 addresses
dnsmasq: query[A] example.com from fd84:a065:bf15::c460:e7f1:5d87:8ea0
```

```
Applications ▾   Places ▾   Terminal ▾   Mon 18:45   1
root@kali: ~
File  Edit  View  Search  Terminal  Help
root@kali:~# dig example.com

; <<>> DiG 9.11.4-P2-3-Debian <<>> example.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 39546
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;example.com.                   IN      A

;; Query time: 1 msec
;; SERVER: 127.0.0.1#53(127.0.0.1)
;; WHEN: Mon May 13 18:44:43 CDT 2019
;; MSG SIZE  rcvd: 29

root@kali:~#
```

5. Open-ended question: In this lab, we introduce two basic packages which helps you start learning OpenWrt system. Search online and the official website, provide at least 3 packages which you think are interesting such as security tools, guest hotspot and so on. Explain what these packages are mainly do and install at least one package which interests you the most in your router. Provide some screenshots.

Adblock – blocks ads from blacklisted sites. I find it convenient to limit unwanted advertisements from appearing.

Snort – open source network intrusion detection / prevention system. Valuable in maintaining security by analyzing IP traffic.

Vpnc – virtual private network client compatible with Cisco's EasyVPN equipment. Important for creating secure connections and protecting privacy.