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Lab 7

CSCI 476 – Comp Security

1 April 2023

Environment Setup

```
Successfully tagged seed-attacker-ns:latest
[04/01/23]seed@VM:~/.../dns$ docker-compose up -d
Creating seed-attacker              ... done
Creating seed-router                ... done
Creating local-dns-server-10.9.0.53 ... done
Creating user-10.9.0.5              ... done
Creating attacker-ns-10.9.0.153     ... done
[04/01/23]seed@VM:~/.../dns$ dockps
b805aedcc6f1  user-10.9.0.5
dca7f632be3f  local-dns-server-10.9.0.53
d40088dfe141  attacker-ns-10.9.0.153
5a3b2b025736  seed-router
baf1c9fc9fa2  seed-attacker
[04/01/23]seed@VM:~/.../dns$
```

```
;; ANSWER SECTION:
www.attacker32.com.     258920  IN      A       10.9.0.180

;; Query time: 0 msec
```

```
;; ANSWER SECTION:
www.example.com.        259200  IN      A       1.2.3.5

;; Query time: 0 msec
```

Task 1

Logged into both the local DNS server and the victim machine.

```
[04/02/23]seed@VM:~$ dockps
b805aedcc6f1  user-10.9.0.5
dca7f632be3f  local-dns-server-10.9.0.53
d40088dfe141  attacker-ns-10.9.0.153
5a3b2b025736  seed-router
baf1c9fc9fa2  seed-attacker
[04/02/23]seed@VM:~$
```

```
        TX errors 0  dropped 0 overruns 0  carrier 0  collisi

root@b805aedcc6f1:/# dig www.hi.com
^X^Z
[2]+  Stopped                 dig www.hi.com
root@b805aedcc6f1:/#
```

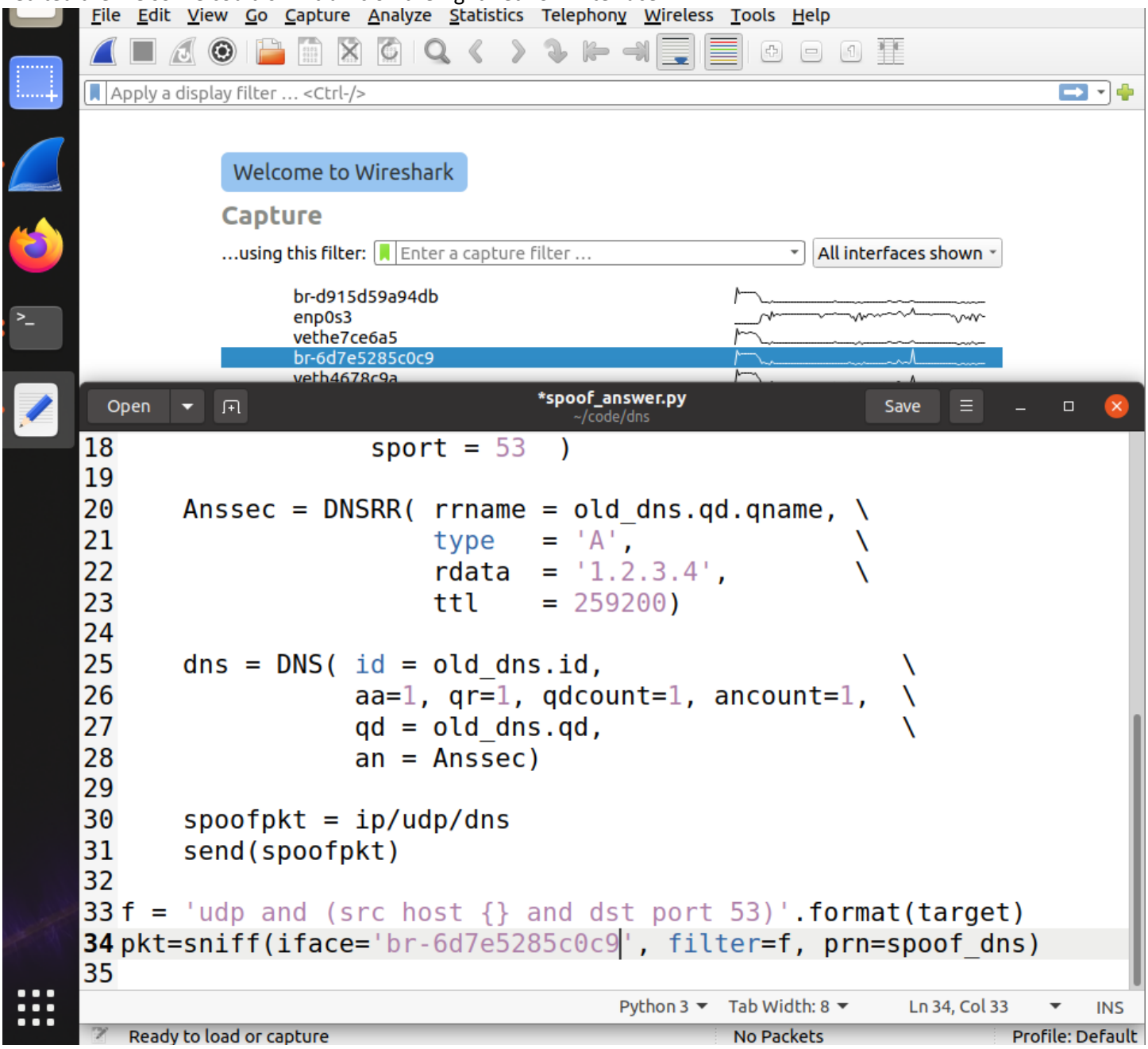
You are running Wireshark 3.2.3 (Git v3.2.3 packaged as 3.2.3-1).

```
[04/02/23]seed@VM:~$ docksh dca
root@dca7f632be3f:/#
```

Made sure to flush the DNS in the DNS server

```
SEED (Snapshot 2) [Running] - Oracle VM VirtualBox
Machine  View  Input  Devices  Help
ivities   Terminal   Apr 2  00:55
[SEED Labs] *br-6d7e5285c0c9
File  Edit  View  Go  Capture  Analyze  Statistics  Telephony  Wireless  Tools  Help
root@dca7f632be3f: /
        attacker-ns-10.9.0.153
5a3b2b025736        handsonsecurity/seed-ubuntu:large   "bash -c '
ip route …"   About an hour ago   Up 48 seconds
        seed-router
baf1c9fc9fa2        handsonsecurity/seed-ubuntu:large   "/bin/sh -
/bin/bash"   About an hour ago   Up 49 seconds
        seed-attacker
[04/02/23]seed@VM:~$ docksh dca
root@dca7f632be3f:/# rndc flush
root@dca7f632be3f:/# rndc flush
root@dca7f632be3f:/#
root@b805aedcc6f1:/# dig www.hi.com

; <<>> DiG 9.16.1-Ubuntu <<>> www.hi.com
;; global options: +cmd
;; connection timed out; no servers could be reached

root@b805aedcc6f1:/# dig www.hi.com

; <<>> DiG 9.16.1-Ubuntu <<>> www.hi.com
;; global options: +cmd
;; connection timed out; no servers could be reached

root@b805aedcc6f1:/#
```

I edited the file so we could sniff traffic on the right network interface



```
[04/02/23]seed@VM:~$ cd /code/dns
bash: cd: /code/dns: No such file or directory
[04/02/23]seed@VM:~$ cd code/dns
[04/02/23]seed@VM:~/.../dns$ ls
docker-compose.yml      image_user       volumes
image_attacker_ns       spoof_answer.py
image_local_dns_server  spoof_ns.py
[04/02/23]seed@VM:~/.../dns$ sudo python3 spoof_answer.p
y 10.9.0.5
^Z
[1]+  Stopped                 sudo python3 spoof_answer.
py 10.9.0.5
[04/02/23]seed@VM:~/.../dns$ sudo python3 spoof_answer.p
y 10.9.0.5
.
Sent 1 packets.
```

```
;; global options: +cmd
;; connection timed out; no servers could be reached

root@b805aedcc6f1:/# dig www.example.com

; <<>> DiG 9.16.1-Ubuntu <<>> www.example.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 28058
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available

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

;; ANSWER SECTION:
www.example.com.        259200  IN      A       1.2.3.4

;; Query time: 60 msec
;; SERVER: 10.9.0.53#53(10.9.0.53)
;; WHEN: Sun Apr 02 04:56:50 UTC 2023
;; MSG SIZE  rcvd: 64

root@b805aedcc6f1:/#
```

After setting everything up and editing the spoof_answer.py file, I was successfully able to send a spoofed DNS response packet back to victim machine 10.9.0.5

```
[04/02/23]seed@VM:~$ cd /code/dns
bash: cd: /code/dns: No such file or directory
[04/02/23]seed@VM:~$ cd code/dns
[04/02/23]seed@VM:~/.../dns$ ls
docker-compose.yml      image_user       volumes
image_attacker_ns       spoof_answer.py
image_local_dns_server  spoof_ns.py
[04/02/23]seed@VM:~/.../dns$ sudo python3 spoof_answer.p
y 10.9.0.5
^Z
[1]+  Stopped                 sudo python3 spoof_answer.
py 10.9.0.5
[04/02/23]seed@VM:~/.../dns$ sudo python3 spoof_answer.p
y 10.9.0.5
.
Sent 1 packets.
^Z
[2]+  Stopped                 sudo python3 spoof_answer.
py 10.9.0.5
[04/02/23]seed@VM:~/.../dns$
```

```
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 28058
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDI
;; WARNING: recursion requested but not available

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

;; ANSWER SECTION:
www.example.com.        259200  IN      A       1.2.3.4

;; Query time: 60 msec
;; SERVER: 10.9.0.53#53(10.9.0.53)
;; WHEN: Sun Apr 02 04:56:50 UTC 2023
;; MSG SIZE  rcvd: 64

root@b805aedcc6f1:/# dig www.example.com

; <<>> DiG 9.16.1-Ubuntu <<>> www.example.com
;; global options: +cmd
;; connection timed out; no servers could be reached

root@b805aedcc6f1:/#
```

After stopping spoof_answers.py, I did a “dig www.example.com”, it was unable to actually resolve a name from the DNS server this time, proving that we were able to sniff the DNS packets and send a spoofed DNS resolve packet back to 10.9.0.5. The local DNS server doesn’t have www.example.com saved so it tried to reach out to the WWW but I have it blocked, that’s why it cant resolve it unless I spoof it.

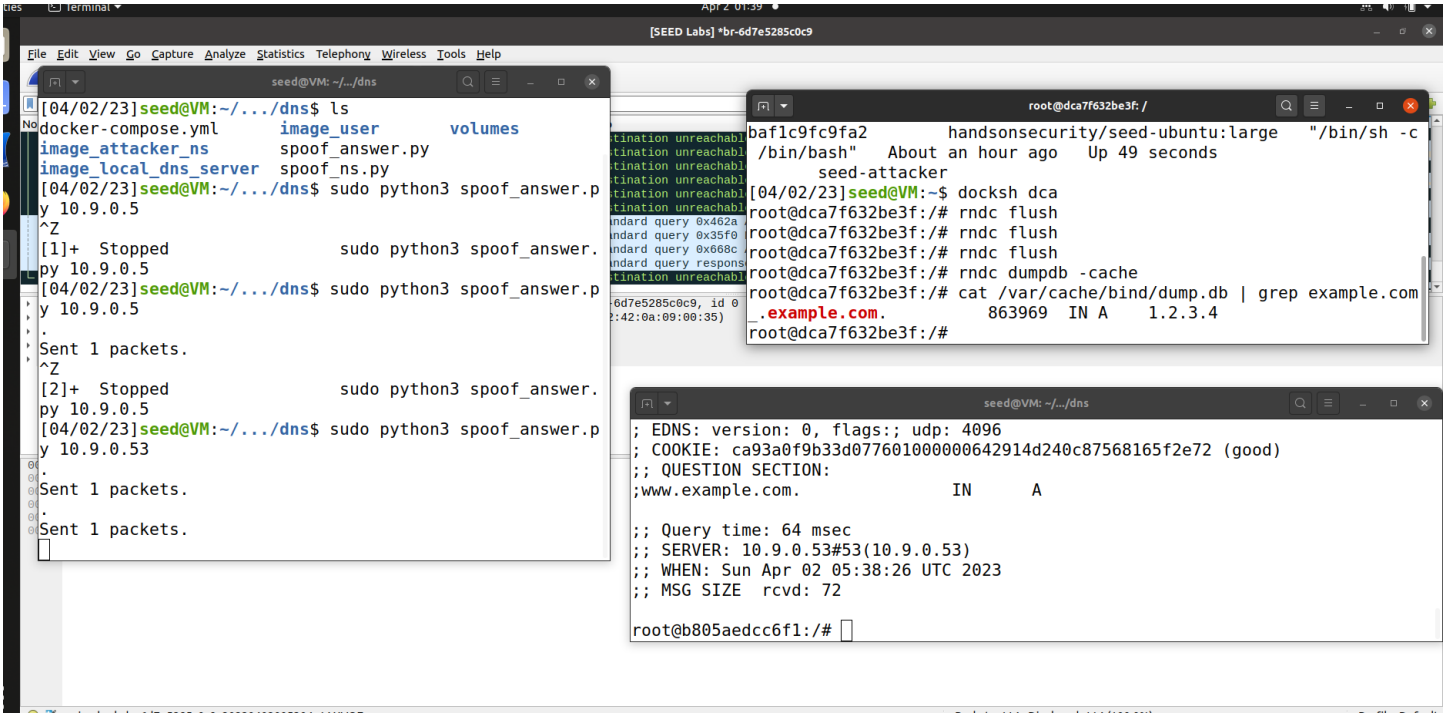
Task 2

I started spoof_answers.py to listen for traffic going to 10.9.0.53, or the local DNS server.

Made sure to run a flush

```
root@dca7f632be3f:/# rndc flush
root@dca7f632be3f:/# rndc flush
root@dca7f632be3f:/# rndc flush
root@dca7f632be3f:/#
```

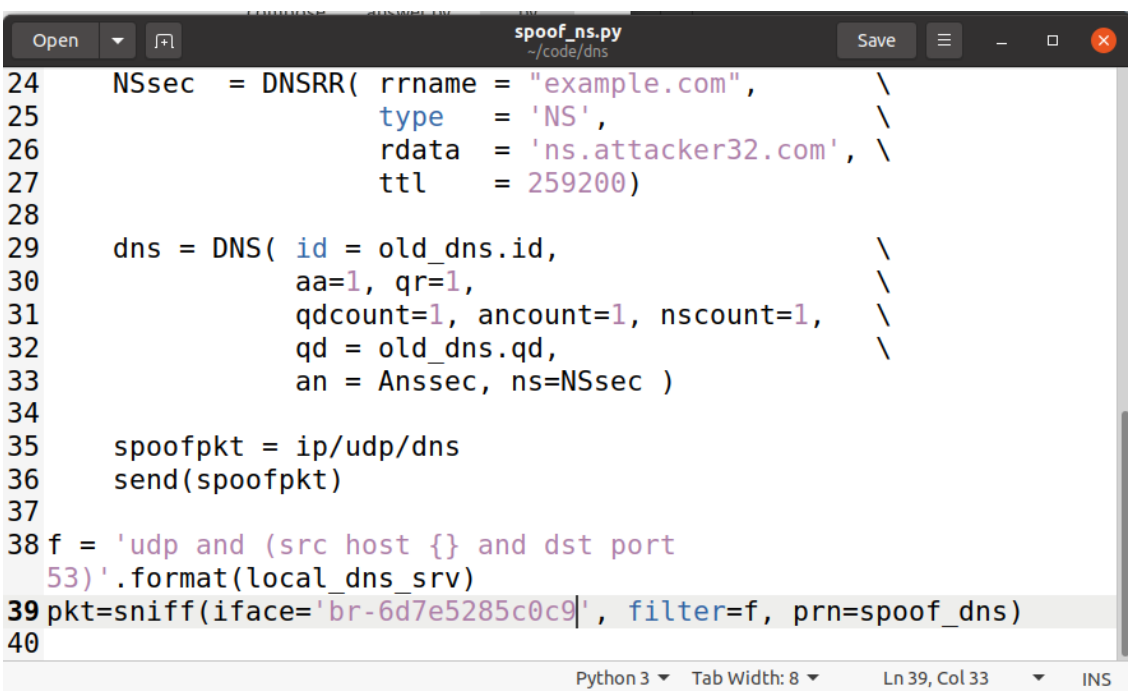
Ran the attack, and it works.



Now the DNS server thinks that www.example.com resolves to 1.2.3.4

Task 3

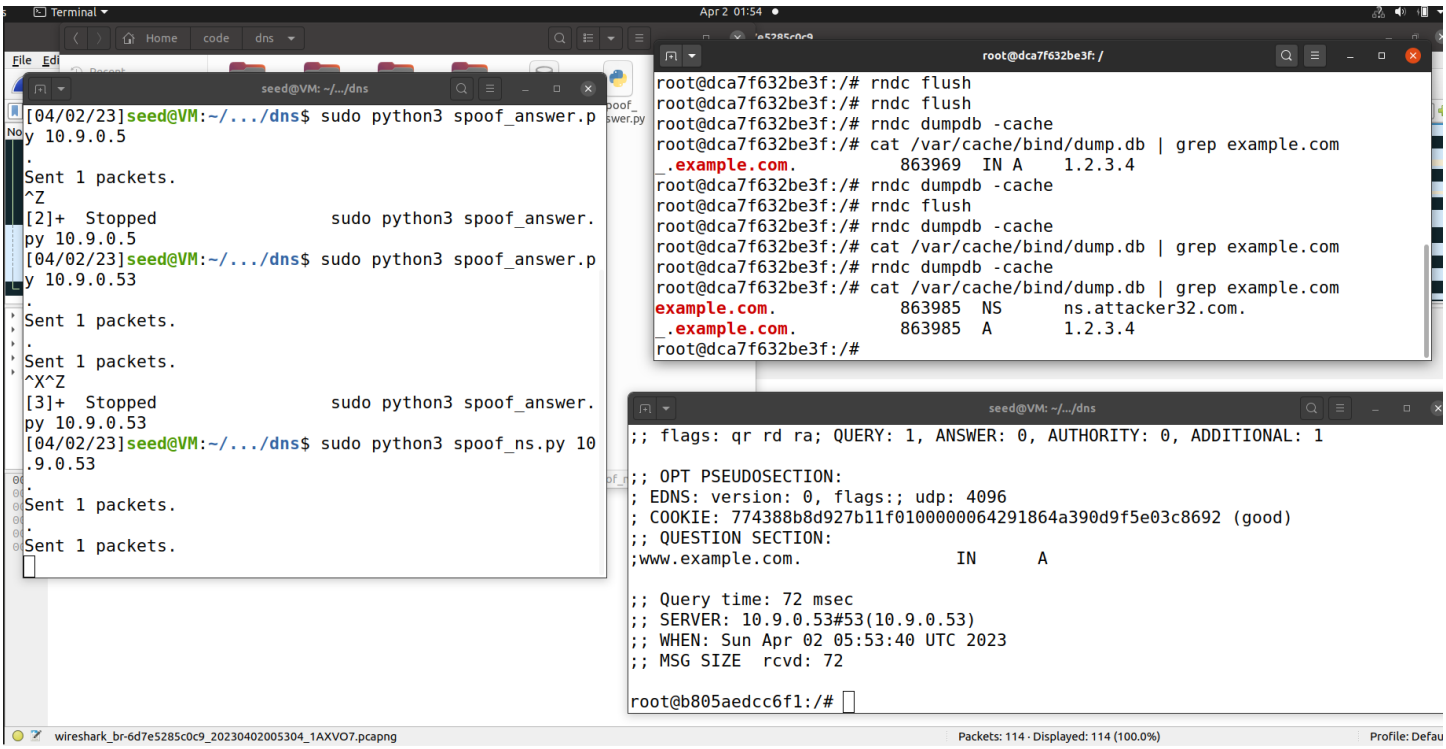
I first made sure that when spoof_ns.py runs it is sniffing on the right network interface.



Flushed DNS entries in the local DNS server.

```
root@dca7f632be3f:/# rndc flush
root@dca7f632be3f:/# rndc dumpdb -cache
root@dca7f632be3f:/# cat /var/cache/bind/dump.db | grep example.com
root@dca7f632be3f:/#
```

I then ran the attack, listening to traffic from the DNS server, so when the local DNS server sends a DNS query, we can send a spoofed packet with a DNS packet back to the DNS server with our NS poisoning packet.



And as we can now see, the attack was a success and we now have completed spoofing an NS record on the local DNS server.

On the victim machine, I sent a dig request for mail.example.com, and got back this reply,

```
seed@VM: ~/.../dns
; EDNS: version: 0, flags:; udp: 4096
; COOKIE: 9fa134f8990eb46901000000642918faa27f5162da849197 (good)
;; QUESTION SECTION:
;mail.example.com.              IN      A

;; ANSWER SECTION:
mail.example.com.       259200  IN      A       1.2.3.6

;; Query time: 4 msec
;; SERVER: 10.9.0.53#53(10.9.0.53)
;; WHEN: Sun Apr 02 05:56:10 UTC 2023
;; MSG SIZE  rcvd: 89

root@b805aedcc6f1:/#
```

Task 4

I ran sudo su root

Went to the /etc folder

Nanoed into hosts.

Added 9.9.9.9 www.csci476.com to the end of hosts file

```
root@VM: /etc
[04/02/23]seed@VM:~$ sudo su root
root@VM:/home/seed# cd /etc
root@VM:/etc# nano hosts


Use "fg" to return to nano.

[1]+  Stopped                 nano hosts
root@VM:/etc# nano hosts
root@VM:/etc# fg
nano hosts
root@VM:/etc#
```

```
root@VM: /etc
  GNU nano 4.8                    hosts                    Modified
10.9.0.5        www.SeedLabSQLInjection.com

# For XSS Lab
10.9.0.5        www.xsslabelgg.com
10.9.0.5        www.example32a.com
10.9.0.5        www.example32b.com
10.9.0.5        www.example32c.com
10.9.0.5        www.example60.com
10.9.0.5        www.example70.com

# For CSRF Lab
10.9.0.5        www.csrflabelgg.com
10.9.0.5        www.csrflab-defense.com
10.9.0.105      www.csrflab-attacker.com

# For Shellshock Lab
10.9.0.80       www.seedlab-shellshock.com

9.9.9.9 www.csci476.com


^G Get Help   ^O Write Out  ^W Where Is   ^K Cut Text   ^J Justify
^X Exit       ^R Read File  ^\ Replace    ^U Paste Text ^T To Spell
```

In a new window in the VM, I ran “dig www.csci476.com”, and got the right response, or the IP we just entered into the /etc/hosts file

```
seed@VM: ~
[04/02/23]seed@VM:~$ dig www.csci476.com

; <<>> DiG 9.16.1-Ubuntu <<>> www.csci476.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 8772
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL:
1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;www.csci476.com.               IN      A

;; ANSWER SECTION:
www.csci476.com.        0       IN      A       9.9.9.9

;; Query time: 0 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Sun Apr 02 02:04:12 EDT 2023
;; MSG SIZE  rcvd: 60

[04/02/23]seed@VM:~$
```

To verify that it worked, I took out the custom line in the /etc/hosts file, 9.9.9.9 www.csci476.com, and it didn't return anything, probably because of my firewall or internet is being blocked in the VM.

```
[04/02/23]seed@VM:~$ dig www.csci476.com

; <<>> DiG 9.16.1-Ubuntu <<>> www.csci476.com
;; global options: +cmd
;; connection timed out; no servers could be reached

[04/02/23]seed@VM:~$
```

Success.

The end.