Phang Teng Fone 1003296 LAB 6

DNS basics

Question 1: Using dig, find the IP address for thyme.lcs.mit.edu. What is the IP address?

18.26.0.122

Question 2: The dig answer for the previous question includes a record of type CNAME. What does CNAME mean?

Canonical Name

Question 3: What is the expiration time for the CNAME record?

1800

Question 4: Run the following commands to find out what your computer receives when it looks up *'ai'* and *'ai.'* in the mit.edu domain. What are the two resulting IP addresses? ● dig +domain=mit.edu ai No IP Address received ● dig +domain=mit.edu ai.

209.59.119.34

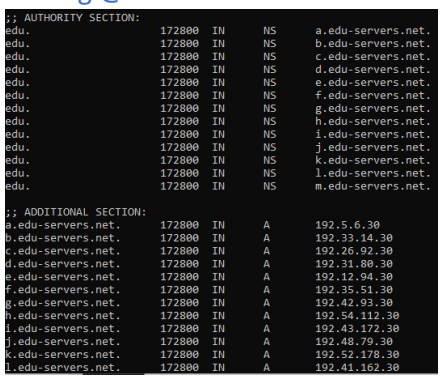
Question 5: Why are the results for both queries different? Look up the manual for dig to find out what the +domain parameter does. Based on the output of the two commands, what is the difference between the DNS searches being performed for *'ai'* and *'ai.'*?

By adding a trailing dot at the end, it signifies the DNS root (absolute address). When selecting mit.edu ai it is querying ai.mit.edu which does not exist thus no return IP address, while the absolute address of ai. turns out to be ai. is a TLD so that it redirects to a domain registrar which contains an IP address.

Question 6: Use dig to query one of the DNS root servers for the IP address of lirone.csail.mit.edu without using recursion. What is the command that you use to do this?

1st: dig . NS lirone.csail.mit.edu

2nd: dig @d.root-servers.net. lirone.csail.mit.edu +norecurs



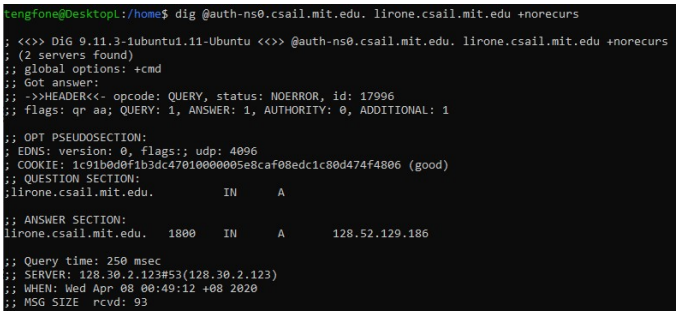
```
;; AUTHORITY SECTION:
edu.                    172800  IN      NS      a.edu-servers.net.
edu.                    172800  IN      NS      b.edu-servers.net.
edu.                    172800  IN      NS      c.edu-servers.net.
edu.                    172800  IN      NS      d.edu-servers.net.
edu.                    172800  IN      NS      e.edu-servers.net.
edu.                    172800  IN      NS      f.edu-servers.net.
edu.                    172800  IN      NS      g.edu-servers.net.
edu.                    172800  IN      NS      h.edu-servers.net.
edu.                    172800  IN      NS      i.edu-servers.net.
edu.                    172800  IN      NS      j.edu-servers.net.
edu.                    172800  IN      NS      k.edu-servers.net.
edu.                    172800  IN      NS      l.edu-servers.net.
edu.                    172800  IN      NS      m.edu-servers.net.

;; ADDITIONAL SECTION:
a.edu-servers.net.      172800  IN      A       192.5.6.30
b.edu-servers.net.      172800  IN      A       192.33.14.30
c.edu-servers.net.      172800  IN      A       192.26.92.30
d.edu-servers.net.      172800  IN      A       192.31.80.30
e.edu-servers.net.      172800  IN      A       192.12.94.30
f.edu-servers.net.      172800  IN      A       192.35.51.30
g.edu-servers.net.      172800  IN      A       192.42.93.30
h.edu-servers.net.      172800  IN      A       192.54.112.30
i.edu-servers.net.      172800  IN      A       192.43.172.30
j.edu-servers.net.      172800  IN      A       192.48.79.30
k.edu-servers.net.      172800  IN      A       192.52.178.30
l.edu-servers.net.      172800  IN      A       192.41.162.30
```

Question 7: Go through the DNS hierarchy from the root until you have found the IP address of lirone.csail.mit.edu. You should disable recursion and follow the referrals manually. Which commands did you use, and what address did you find?

1st: dig @a.edu-servers.net. lirone.csail.mit.edu +norecurs

2nd: dig @usw2.akam.net. lirone.csail.mit.edu +norecurs

3rd: dig @auth-ns0.csail.mit.edu. lirone.csail.mit.edu +norecurs



Found IP address 128.52.129.186

Understanding caching

Question 8: Without using recursion, query your default DNS server for information about www.dmoz.org and answer the following questions.

● What is the command that you used?

1st getting my DNS server: cat /etc/resolv.conf

2nd query: dig @192.168.1.1 www.dmoz.org +norecurs

● Did your default server have the answer in its cache? How did you know?

No. There was no answer section on the first run.

● How long did the query take?

4 msec

Note: If the information was cached, find another host name that was not cached and complete all the questions in this section using that host.

Question 9: Query your default DNS server for information about the host in the previous question, using the recursion option this time. How long did the query take?

dig @192.168.1.1 www.bling.com +norecurs

13ms

Question 10: Query your default DNS server for information about the same host without using recursion. How long did the query take? Has the cache served its purpose? Explain why.

4ms. Yes it has served its purpose as it returns an answer section (query) within a shorter time.

Part 2: Tracing DNS using Wireshark

Question 1: Locate the DNS query and response messages. Are they sent over UDP or TCP?

UDP

Question 2: What is the destination port for the DNS query message? What is the source port of the DNS response message?

Destination Port: 53

Source Port: 57763

Question 3: What is the IP address to which the DNS query message was sent? Use ifconfig to determine the IP address of your local DNS server. Are these two addresses the same?

192.168.2.11. They are not the same (mine is 192.168.1.1)

Question 4: Examine the second DNS query message. What type of DNS query is it? Does the query message contain any answers?

It is a standard recursive DNS query. The query message contains no answers.

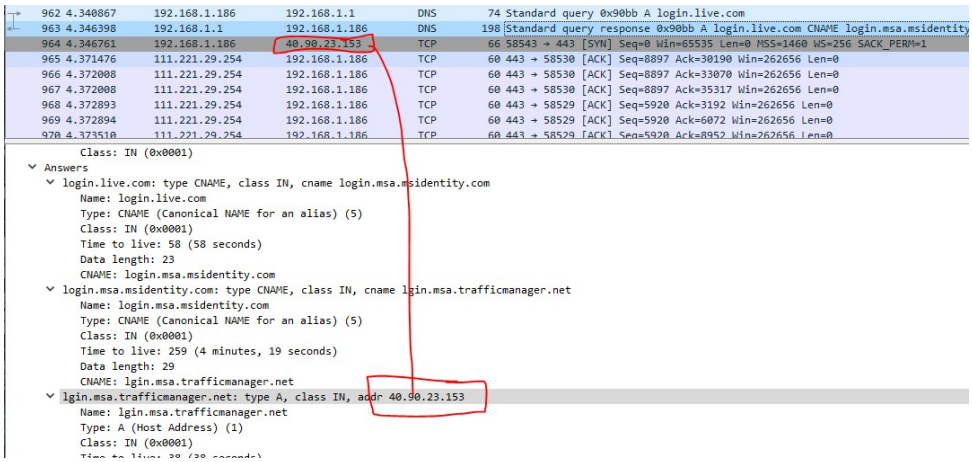
Question 5: Examine the second DNS response message. How many answers are provided? What does each of these answers contain?

2 answers are provided. A CNAME updatekeepalive.glb.mcafee.com and a type A host address of 161.69.12.13.

```
Answers
  updatekeepalive.mcafee.com: type CNAME, class IN, cname updatekeepalive.glb.mcafee.com
      Name: updatekeepalive.mcafee.com
      Type: CNAME (Canonical NAME for an alias) (5)
      Class: IN (0x0001)
      Time to live: 209 (3 minutes, 29 seconds)
      Data length: 22
      CNAME: updatekeepalive.glb.mcafee.com
  updatekeepalive.glb.mcafee.com: type A, class IN, addr 161.69.12.13
      Name: updatekeepalive.glb.mcafee.com
      Type: A (Host Address) (1)
      Class: IN (0x0001)
      Time to live: 3 (3 seconds)
      Data length: 4
      Address: 161.69.12.13
  [Request In: 11]
  [Time: 0.005536000 seconds]
```

Question 6: Locate a TCP SYN packet sent by your host subsequent to the above DNS response. This packet opens a TCP connection between your host and the web server. Does the destination IP address of the SYN packet correspond to any of the IP addresses provided in the DNS response message?

I tried by sniffing my own packets to Microsoft.com and here are the responses:



This shows that the destination IP address of the SYN packet correspond to the DNS responses message under Answers.