

# 6.033 Handson Exercise 6

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1. The host ginger.lcs.mit.edu has an IP address of 18.26.0.82. This record has a TTL of 1773 seconds or about 30 minutes. I used the command “dig ginger.lcs.mit.edu” to discover this.
2. The command “dig . ns” returns a list of name servers because it effectively asks dig for any name server records (type ns) relating to the name ., which signifies the root of the DNS hierarchy.

I used the command “dig @128.8.10.90 redlab.lcs.mit.edu +norecurs” to ask a root server for redlab’s address without recursion. Tracing through the heirarchy looking for redlab’s address took three iterations. These are the commands I used:

```
dig @128.8.10.90 redlab.lcs.mit.edu +norecurs
dig @18.72.0.3 redlab.lcs.mit.edu +norecurs
dig @18.26.0.36 redlab.lcs.mit.edu +norecurs
```

The first line asks one of the root servers. That server didn’t know and referred me to MIT’s name server bitsy.mit.edu. The second line shows the same query directed to bitsy. Bitsy referred me to LCS’s name server mintaka.lcs.mit.edu. The third line shows the same query directed to Mintaka. Mintaka actually knew the answer.

Redlab has an address of 18.26.4.10. This is the output of my query to LCS’s name server:

```
mike@beg-for-more:~/athena/6.033/6 dig @18.26.0.36 redlab.lcs.mit.edu +norecurs

; <<>> DiG 9.2.0 <<>> @18.26.0.36 redlab.lcs.mit.edu +norecurs
;; global options:  printcmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 9921
;; flags: qr aa ra; QUERY: 1, ANSWER: 2, AUTHORITY: 4, ADDITIONAL: 8

;; QUESTION SECTION:
redlab.lcs.mit.edu.          IN      A

;; ANSWER SECTION:
redlab.lcs.mit.edu.        1800    IN      CNAME   reeducation-labor.lcs.mit.edu.
```

```

reeducation-labor.lcs.mit.edu. 1800 IN A      18.26.4.10

;; AUTHORITY SECTION:
lcs.mit.edu.      1800 IN NS      mintaka.lcs.mit.edu.
lcs.mit.edu.      1800 IN NS      fedex.ai.mit.edu.
lcs.mit.edu.      1800 IN NS      lampang.lcs.mit.edu.
lcs.mit.edu.      1800 IN NS      ossipee.lcs.mit.edu.

;; ADDITIONAL SECTION:
mintaka.lcs.mit.edu. 1800 IN A      18.26.0.36
fedex.ai.mit.edu.   14400 IN A     192.148.252.43
lampang.lcs.mit.edu. 1800 IN A     18.24.0.120
lampang.lcs.mit.edu. 1800 IN A     18.24.1.120
lampang.lcs.mit.edu. 1800 IN A     18.24.4.120
ossipee.lcs.mit.edu. 1800 IN A     18.26.0.18
ossipee.lcs.mit.edu. 1800 IN A     18.24.10.7
ossipee.lcs.mit.edu. 1800 IN A     18.111.0.2

;; Query time: 35 msec
;; SERVER: 18.26.0.36#53(18.26.0.36)
;; WHEN: Fri Mar 22 18:18:15 2002
;; MSG SIZE rcvd: 301

```

3. (a) I used the command “dig dmoz.org +norecurs” and discovered that my DNS server did not have dmoz.org in it’s cache. The query took 15 ms. I know the answer was not cached because the result did not include an address for dmoz.org. Instead, my local server referred me to the root name servers.
  - (b) With recursion, I got an answer in 55 ms.
  - (c) This time, the request only took 3 ms, indicating that the cache significantly improved performance.
  - (d) Ad.doubleclick.net is actually a canonical name with a moderately long TTL (about 10 minutes). This CNAME gets aliased to a series of different servers each of which has a very short TTL (about 10 seconds).
4. I spent about one hour on this assignment.