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CMPE 150/150L

Pre-Lab 2

1) 5 HTTP status codes
   a) 404 Not Found
      => The resource that is being looked for could not be found at this moment but later, it may become available. Requests made after this, by the client, are allowed to be made.
   b) 403 Forbidden
      => The server is refusing to attend to this valid request. This means that you don't have permission to view this resource.
   c) 301 Moved Permanently
      => This Uniform Resource Identifier should be where this and all forthcoming requests be directed to.
   d) 204 No Content
      => There is no content returned from the server but the request successfully was processed by the server
   e) 412 Precondition Failed
      => One of the requester's preconditions that was put on the request was not met by the server

2) 8 HTTP 1.1 methods
   a) GET
      => This method retrieves information from a given server by using a given Uniform Resource Identifier. These requests that use GET should have no other effect on the data other than just retrieving the data.
   b) HEAD
      => This method has the same functionality as GET but instead of transferring data, it only transfers the status line and header section.
   c) POST
      => This request is used to send data to the server. For example, file upload, customer information, etc. by using HTML forms
   d) PUT
      => This method replaces all the current representations of the target resource with the content being uploaded.
   e) DELETE
      => This method takes away all the current representations of a target resource provided by the URI
   f) CONNECT
      => This method makes a tunnel to the server which is identified by a given Uniform Resource Identifier
   g) OPTIONS
      => This methods shows the target resource's communication options

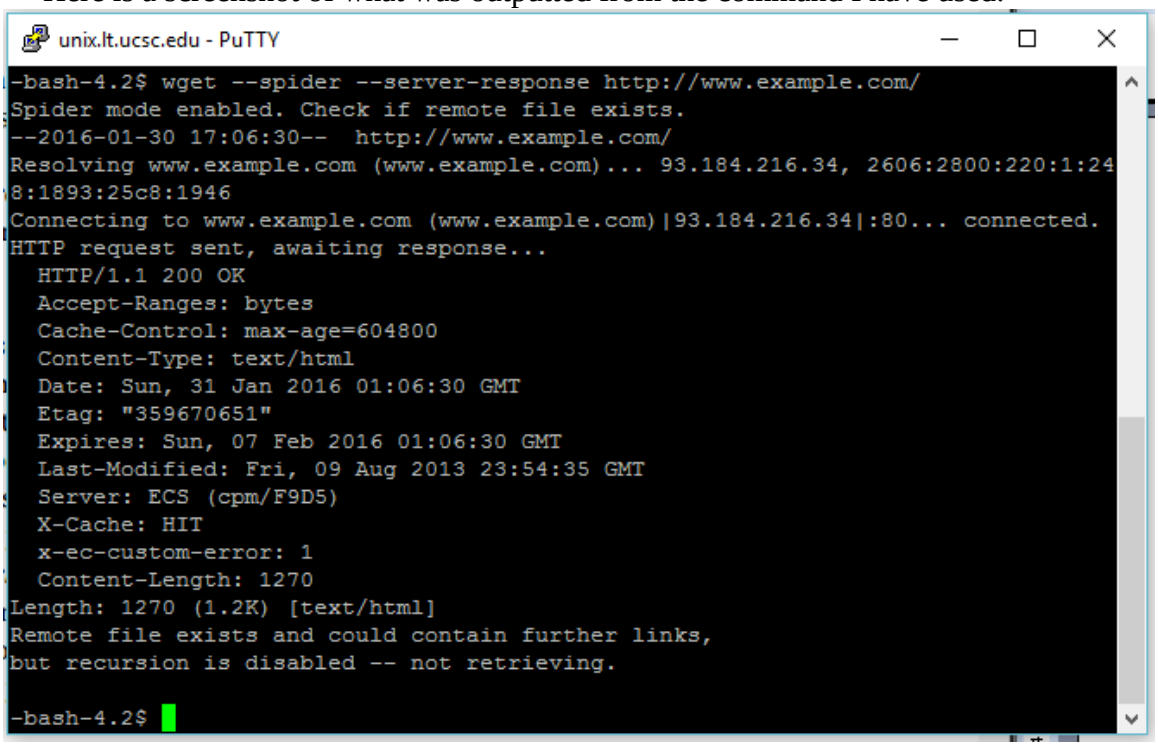
h) TRACE

=> This method does a message loop-back test along a path to the target resource

3) The command used to view all this is:

wget --spider --server-response http://www.example.com/

Here is a screenshot of what was outputted from the command I have used:



The last modified date of this webpage is:

Fri, 09 Aug 2013 23:54:35 GMT

The http return status given is:

200 OK

4) Here is a screenshot of using the telnet command:

After pressing enter, a star wars movie started playing. Here is a screenshot:

The purpose of this telnet server is to play a star wars movie. It is playing Star Wars 4.

5) A DNS resource record is a basic information element of the domain name system. Each of these records contains information such as an expiration time, type-specific data, a class, and a type (number and name).

Here is a screenshot of how I used the command line tool nslookup to find the LOC resource records of ucsc.edu and the output:

```
unix.lt.ucsc.edu - PuTTY
> ^C-bash-4.2$ nslookup
> set type=LOC
> ucsc.edu
Server:         128.114.104.250
Address:        128.114.104.250#53

Non-authoritative answer:
ucsc.edu        loc = 37 0 1.818 N 122 3 43.873 W 244.00m 1m 10000m 10m

Authoritative answers can be found from:
ucsc.edu        nameserver = ns.zocalo.net.
ucsc.edu        nameserver = adns1.ucsc.edu.
ucsc.edu        nameserver = sns-pb.isc.org.
ucsc.edu        nameserver = dns.princeton.edu.
ucsc.edu        nameserver = adns2.ucsc.edu.
adns2.ucsc.edu  internet address = 128.114.100.200
adns2.ucsc.edu  has AAAA address 2607:f5f0:2::200
adns1.ucsc.edu  internet address = 128.114.100.100
adns1.ucsc.edu  has AAAA address 2607:f5f0:2::100
>
```

The coordinates described is:
loc = 37 0 1.818 N 122 3 43.873 W 244.00m 1m 10000m 10m

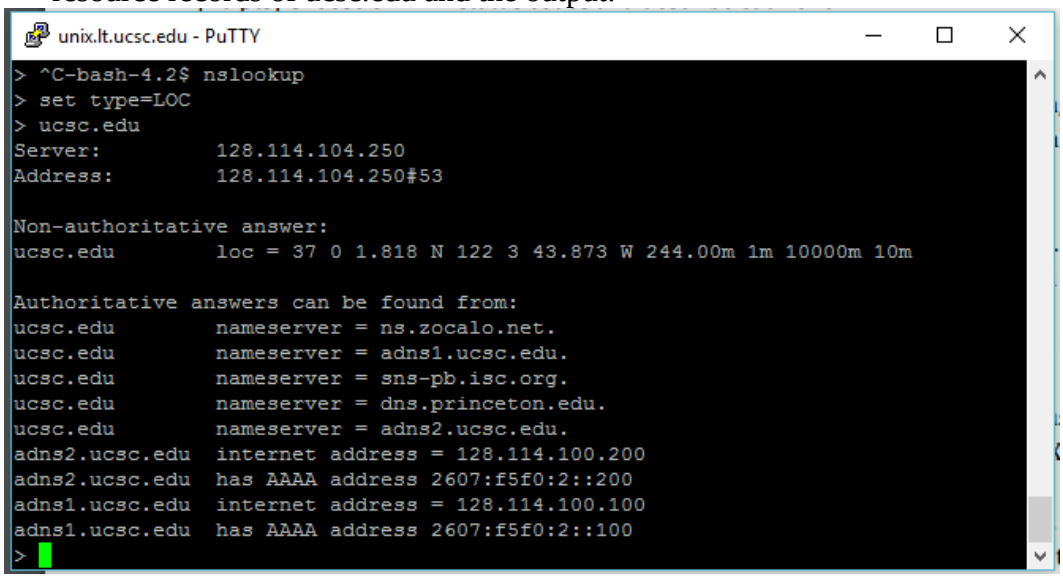
Here is a screenshot of how I used the command line tool nslookup to find the MX resource records of ucsc.edu and the output:

```
unix.lt.ucsc.edu - PuTTY
-bash-4.2$ nslookup
> set type=MX
> ucsc.edu
Server:         128.114.104.250
Address:        128.114.104.250#53

Non-authoritative answer:
ucsc.edu        mail exchanger = 5 alt2.aspmx.l.google.com.
ucsc.edu        mail exchanger = 5 alt1.aspmx.l.google.com.
ucsc.edu        mail exchanger = 10 alt4.aspmx.l.google.com.
ucsc.edu        mail exchanger = 1 aspmx.l.google.com.
ucsc.edu        mail exchanger = 10 alt3.aspmx.l.google.com.

Authoritative answers can be found from:
ucsc.edu        nameserver = ns.zocalo.net.
ucsc.edu        nameserver = adns2.ucsc.edu.
ucsc.edu        nameserver = dns.princeton.edu.
ucsc.edu        nameserver = sns-pb.isc.org.
ucsc.edu        nameserver = adns1.ucsc.edu.
alt1.aspmx.l.google.com internet address = 173.194.69.27
alt1.aspmx.l.google.com has AAAA address 2607:f8b0:4001:c13::1a
alt4.aspmx.l.google.com internet address = 74.125.141.27
alt4.aspmx.l.google.com has AAAA address 2607:f8b0:400c:c06::1b
aspmx.l.google.com      internet address = 74.125.25.27
aspmx.l.google.com      has AAAA address 2607:f8b0:400e:c01::1b
alt3.aspmx.l.google.com internet address = 173.194.68.27
alt3.aspmx.l.google.com has AAAA address 2607:f8b0:400d:c0c::1a
alt2.aspmx.l.google.com internet address = 173.194.219.27
alt2.aspmx.l.google.com has AAAA address 2607:f8b0:4002:c03::1a
adns2.ucsc.edu  internet address = 128.114.100.200
>
```

As it can be seen in the above image, the first non-authoritative server is shown here:
ucsc.edu mail exchanger = 5 alt2.aspmx.1.google.com.
As it can be seen in the above image, the first authoritative server is shown here:
ucsc.edu nameserver = ns.zocalo.net.

The reason why it makes sense to have google as one of the non-authoritative servers is because whenever we log onto our ucsc email accounts we use google. We go to the google mail tab and instead of entering our gmail accounts there, we enter our ucsc.edu email accounts there. Thus, this makes sense.

6) Here is a screenshot of how I used the command line tool nslookup to find the LOC resource records of ucsc.edu and the output:



The coordinates described is:
loc = 37 0 1.818 N 122 3 43.873 W 244.00m 1m 10000m 10m

7) Differences between these two Top-Level Domains

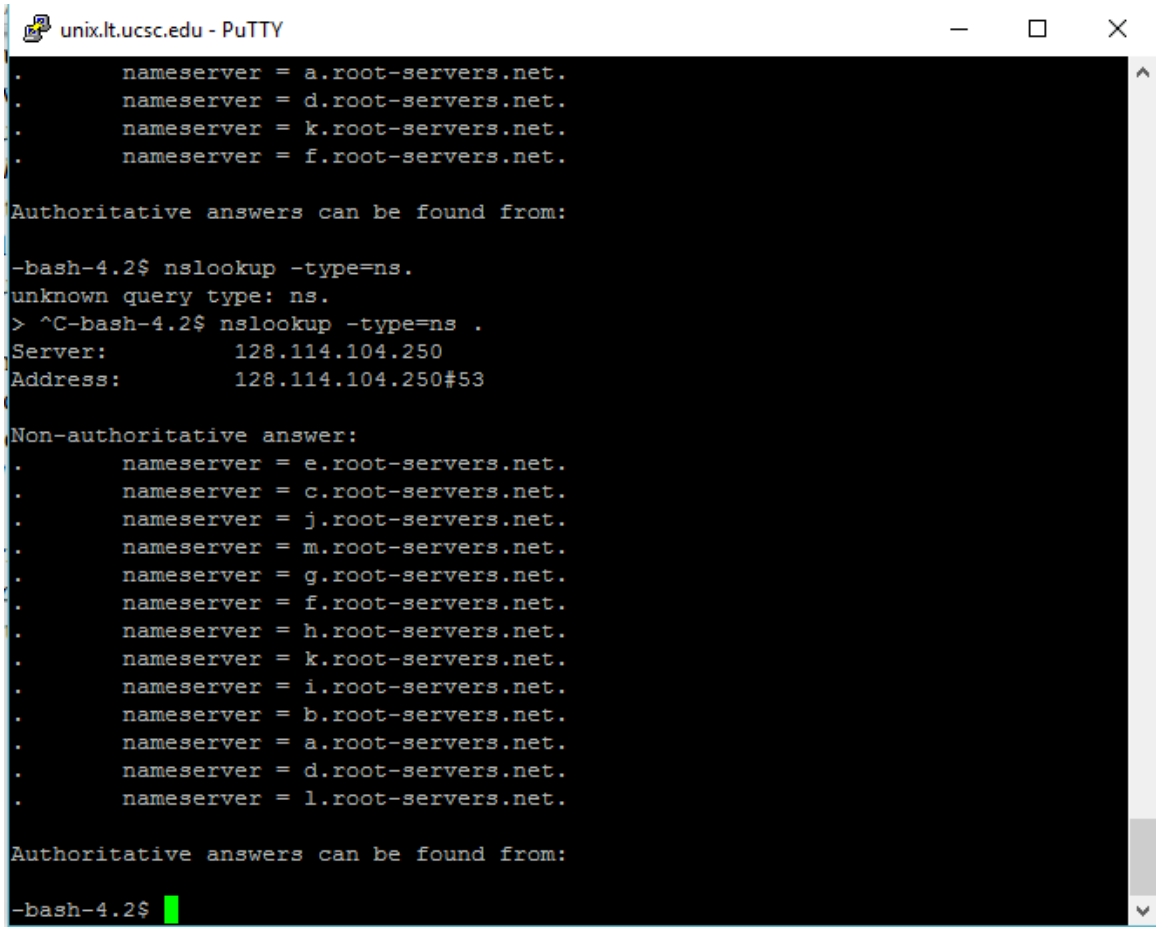
a) .com and .net
=> .com is generally for commercial (for-profit) websites while .net is generally for network-related domains

b) .org and .edu
=> .org is generally for non-profit organizations while .edu is generally for educational institutions in the US

c) .gov and .mil
=> .gov is generally for US government entities while .mil is generally for US military use

d) .ca and .mx
=> .ca is the internet country code top-level domain for Canada while .mx is the internet country code top-level domain for Mexico

8) The command nslookup –type=ns . displays all the root name servers. Here is a screenshot:



In the above screenshot, it can be seen that there are 13 root name servers. A root name server has the function of being a name server for the root zone of the DNS of the Internet. In a tree diagram, it can been seen that these root servers are on the top and below these servers lie the .com, .net, .gov, and more.

9) The command line tool, dig, is a tool for testing DNS name servers in various ways. It performs DNS lookups and returns and shows the answers received from the name servers that were queried. Dig can also be used to troubleshoot DNS problems and has a batch mode of operation that can be used for reading lookup requests of a file.

After running dig on www.ucsc.edu, here is the output I received:

unix.lt.ucsc.edu - PuTTY

```
-bash-4.2$ dig www.ucsc.edu

; <<>> DiG 9.9.4-RedHat-9.9.4-29.el7_2.1 <<>> www.ucsc.edu
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 26667
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 5, ADDITIONAL: 5

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;www.ucsc.edu.                  IN      A

;; ANSWER SECTION:
www.ucsc.edu.           300     IN      CNAME   wcms-ucsc.aws-wcms.ucsc.edu.
wcms-ucsc.aws-wcms.ucsc.edu. 38 IN      A       128.114.109.5

;; AUTHORITY SECTION:
ucsc.edu.               76093   IN      NS      ns.zocalo.net.
ucsc.edu.               76093   IN      NS      sns-pb.isc.org.
ucsc.edu.               76093   IN      NS      adns1.ucsc.edu.
ucsc.edu.               76093   IN      NS      dns.princeton.edu.
ucsc.edu.               76093   IN      NS      adns2.ucsc.edu.

;; ADDITIONAL SECTION:
adns2.ucsc.edu.         34144   IN      A       128.114.100.200
adns2.ucsc.edu.         77043   IN      AAAA    2607:f5f0:2::200
adns1.ucsc.edu.         34144   IN      A       128.114.100.100
adns1.ucsc.edu.         77043   IN      AAAA    2607:f5f0:2::100

;; Query time: 2 msec
;; SERVER: 128.114.104.250#53(128.114.104.250)
;; WHEN: Sat Jan 30 18:24:04 PST 2016
;; MSG SIZE  rcvd: 301

-bash-4.2$
```

From this command we are able to see a lot of information about this host. We see that another way to get to www.ucsc.edu is by using the website wcms-ucsc.aws-wcms.ucsc.edu. website. CNAME which is written next to our www.ucsc.edu is an alias of one name to another, meaning the DNS will continue by retrying the lookup with the new name. Other information which can be seen is the A which means the address record. Next to the A is the IP address of the host. Some more information which can be seen is the NS which is short for name server record and AAAA which returns a 128-bit IPv6 address.

After running dig on www.google.com, here is the output I received:

unix.lt.ucsc.edu - PuTTY

```
-bash-4.2$ dig www.google.com

; <<>> DiG 9.9.4-RedHat-9.9.4-29.el7_2.1 <<>> www.google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 30741
;; flags: qr rd ra; QUERY: 1, ANSWER: 6, AUTHORITY: 4, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;www.google.com.                IN      A

;; ANSWER SECTION:
www.google.com.         151     IN      A       74.125.28.106
www.google.com.         151     IN      A       74.125.28.99
www.google.com.         151     IN      A       74.125.28.105
www.google.com.         151     IN      A       74.125.28.104
www.google.com.         151     IN      A       74.125.28.103
www.google.com.         151     IN      A       74.125.28.147

;; AUTHORITY SECTION:
google.com.             140218  IN      NS      ns4.google.com.
google.com.             140218  IN      NS      ns2.google.com.
google.com.             140218  IN      NS      ns1.google.com.
google.com.             140218  IN      NS      ns3.google.com.

;; Query time: 0 msec
;; SERVER: 128.114.104.250#53(128.114.104.250)
;; WHEN: Sat Jan 30 18:41:55 PST 2016
;; MSG SIZE  rcvd: 211

-bash-4.2$
```

From this command we are able to see a lot of information about this host. Some information which can be seen is the A which means the address record. Next to the A is an IP address of the host. Some more information which can be seen is the NS which is short for name server record.

10) After running the dig –x www.google.com here is a screenshot of what was outputted:

unix.lt.ucsc.edu - PuTTY

```
-bash-4.2$
-bash-4.2$ dig -x www.google.com

; <<>> DiG 9.9.4-RedHat-9.9.4-29.el7_2.1 <<>> -x www.google.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 46911
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;com.google.www.in-addr.arpa.   IN      PTR

;; AUTHORITY SECTION:
in-addr.arpa.           1556    IN      SOA     b.in-addr-servers.arpa. nstld.ia
na.org. 2015072812 1800 900 604800 3600

;; Query time: 0 msec
;; SERVER: 128.114.104.250#53(128.114.104.250)
;; WHEN: Sat Jan 30 18:46:50 PST 2016
;; MSG SIZE  rcvd: 124

-bash-4.2$
```

Here is an output of using google's IP address with the dig –x command:

unix.lt.ucsc.edu - PuTTY

```
-bash-4.2$ dig -x 216.58.192.46

; <<>> DiG 9.9.4-RedHat-9.9.4-29.el7_2.1 <<>> -x 216.58.192.46
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 21969
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 6, ADDITIONAL: 13

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;46.192.58.216.in-addr.arpa.    IN      PTR

;; ANSWER SECTION:
46.192.58.216.in-addr.arpa. 15476 IN    PTR     nuq04s30-in-f46.1e100.net.
46.192.58.216.in-addr.arpa. 15476 IN    PTR     nuq04s30-in-f14.1e100.net.

;; AUTHORITY SECTION:
in-addr.arpa.           77658   IN      NS      a.in-addr-servers.arpa.
in-addr.arpa.           77658   IN      NS      f.in-addr-servers.arpa.
in-addr.arpa.           77658   IN      NS      e.in-addr-servers.arpa.
in-addr.arpa.           77658   IN      NS      c.in-addr-servers.arpa.
in-addr.arpa.           77658   IN      NS      b.in-addr-servers.arpa.
in-addr.arpa.           77658   IN      NS      d.in-addr-servers.arpa.

;; ADDITIONAL SECTION:
f.in-addr-servers.arpa. 77658   IN      A       193.0.9.1
f.in-addr-servers.arpa. 77658   IN      AAAA    2001:67c:e0::1
e.in-addr-servers.arpa. 77658   IN      A       203.119.86.101
e.in-addr-servers.arpa. 77658   IN      AAAA    2001:dd8:6::101
d.in-addr-servers.arpa. 77658   IN      A       200.10.60.53
d.in-addr-servers.arpa. 77658   IN      AAAA    2001:13c7:7010::53
c.in-addr-servers.arpa. 77658   IN      A       196.216.169.10
c.in-addr-servers.arpa. 77658   IN      AAAA    2001:43f8:110::10
b.in-addr-servers.arpa. 77658   IN      A       199.253.183.183
b.in-addr-servers.arpa. 77658   IN      AAAA    2001:500:87::87
a.in-addr-servers.arpa. 77658   IN      A       199.212.0.73
a.in-addr-servers.arpa. 77658   IN      AAAA    2001:500:13::73

;; Query time: 6 msec
;; SERVER: 128.114.104.250#53(128.114.104.250)
;; WHEN: Sat Jan 30 18:55:07 PST 2016
;; MSG SIZE  rcvd: 500

-bash-4.2$
```

What I did differently is that with the –x option for dig, a reverse lookup is done. This means that a mapping of addresses to names is done. When using this option, we do not need to provide the name, class, and type arguments. Dig automatically sets the query type to PTR and class type to IN.

Sources That I Have Used To Help Me Figure Out The Questions:

1) http://www.tutorialspoint.com/http/http_methods.htm
2) http://www.howtogeek.com/126670/the-difference-between-.com-.net-.org-and-why-were-about-to-see-many-more-top-level-domains/
3) http://linux.about.com/od/commands/l/blcmdl1_dig.htm
4) https://en.wikipedia.org/wiki/List_of_DNS_record_types