

Computer Networks, Fall 2024, DNS Lab, Shrey Kharbanda

```
shreykharbanda@Shreys-MacBook-Air ~ % nslookup www.iitb.ac.in
Server:          10.188.0.1
Address:         10.188.0.1#53

Non-authoritative answer:
Name:   www.iitb.ac.in
Address: 103.21.124.133
```

1. The IP Address of www.iitb.ac.in is 103.21.124.133

2. The DNS Server that gave the answer to my nslookup command is 10.188.0.1
3. It came from a non-authoritative server

```
shreykharbanda@Shreys-MacBook-Air ~ % nslookup -type=NS iitb.ac.in
Server:          10.188.0.1
Address:         10.188.0.1#53

Non-authoritative answer:
iitb.ac.in       nameserver = dns3.iitb.ac.in.
iitb.ac.in       nameserver = dns1.iitb.ac.in.
iitb.ac.in       nameserver = dns2.iitb.ac.in.

Authoritative answers can be found from:
dns1.iitb.ac.in internet address = 103.21.125.129
dns2.iitb.ac.in internet address = 103.21.126.129
dns3.iitb.ac.in internet address = 103.21.127.129
```

4. The first authoritative server returned by nslookup is dns1.iitb.ac.in and it's IP Address is 103.21.125.129, we can also find it using the command: `nslookup dns1.iitb.ac.in`

```
shreykharbanda@Shreys-MacBook-Air ~ % nslookup dns1.iitb.ac.in
Server:          10.188.0.1
Address:         10.188.0.1#53

Non-authoritative answer:
Name:   dns1.iitb.ac.in
Address: 103.21.125.129
```

5.

73	2.430888	10.188.136.105	10.188.0.1	DNS	77	Standard query 0xea9e A gaia.cs.umass.edu
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Packet Number 73, It is sent over UDP (User Datagram Protocol)

6.

75	2.435488	10.188.0.1	10.188.136.105	DNS	93	Standard query response 0xea9e A gaia.cs.umass.edu
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Packet Number 75, It is received via UDP

7. Destination Port for DNS Query Message: 53
Source Port for DNS Response Message: 53
8. IP Address to which DNS Query Message is sent: 10.188.0.1

```
Domain Name System (query)
Transaction ID: 0xea9e
> Flags: 0x0100 Standard query
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
> Queries
```

9. 1 Question and 0 Answers

```
Domain Name System (response)
Transaction ID: 0xea9e
> Flags: 0x8180 Standard query response
Questions: 1
Answer RRs: 1
Authority RRs: 0
Additional RRs: 0
> Queries
```

10. 1 Question and 1 Answer

11. 

Packet Number: 84 for the initial HTTP GET Request

Packet Number: 73 for DNS request made to resolve gaia.cs.umass.edu so that this initial HTTP request can be sent to the gaia.cs.umass.edu IP address

Packet Number: 75 for the received DNS response



Packet Number: 386 for the HTTP GET request for the image object

http://gaia.cs.umass.edu/kurose_ross/header_graphic_book_8E2.jpg

No second DNS Query is sent since there are no packets for a second DNS query.

DNS caching plays a significant role in minimising the number of DNS queries. Once the domain “gaia.cs.umass.edu” is resolved, the result is cached locally. Hence, the second request to the same domain skipped the DNS query step, directly using the cached IP address.

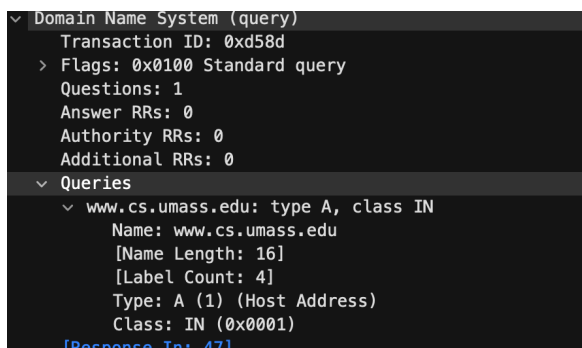
12. Destination port for the DNS query message: 53

Source port of the DNS response message: 53

13. IP Address to which DNS Query Message is sent: 10.188.0.1

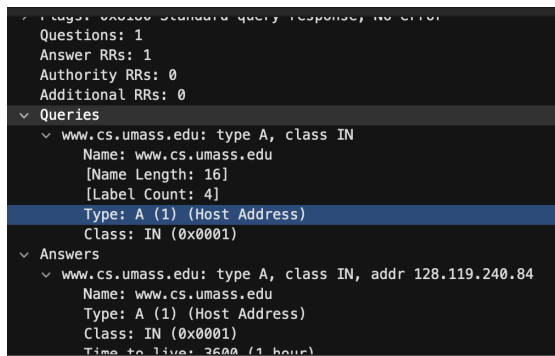
Yes, this is the IP Address of my default local DNS Server

14.



Type: A query.

No, it contains 0 answers



15.

It contains 1 question and 1 answer

```

[shreykharbanda@Shreys-MacBook-Air ~ % nslookup -type=NS umass.edu
Server:      10.188.0.1
Address:     10.188.0.1#53

Non-authoritative answer:
umass.edu    nameserver = ns2.umass.edu.
umass.edu    nameserver = ns1.umass.edu.
umass.edu    nameserver = ns3.umass.edu.

Authoritative answers can be found from:
ns2.umass.edu internet address = 128.119.10.28
ns1.umass.edu internet address = 128.119.10.27
ns3.umass.edu internet address = 69.16.40.18
    
```

16. It is sent to 10.188.0.1. Yes, it is the IP Address of my local DNS Server.

17. 1 question. No answers in query

18. 2 types of answers are provided:

- a. Non authoritative answer has 3 records with name of server
- b. Authoritative answer has 3 records of server name along with its IP Address

Re-answering Qs 16-18 using capture method for umass.edu:

No.	Time	Source	Destination	Protocol	Length	Info
12	1.432715	10.188.136.105	10.188.0.1	DNS	73	Standard query 0x9d9d A www.umass.edu
13	1.432795	10.188.136.105	10.188.0.1	DNS	73	Standard query 0xd469 HTTPS www.umass.edu
14	1.436881	10.188.0.1	10.188.136.105	DNS	184	Standard query response 0x9d9d A www.umass.edu C
15	1.436882	10.188.0.1	10.188.136.105	DNS	249	Standard query response 0xd469 HTTPS www.umass.e
16	1.437334	10.188.136.105	10.188.0.1	DNS	88	Standard query 0x7336 A fonts.googleapis.com

16. It is sent to 10.188.0.1. Yes, it is the IP Address of my local DNS Server.

17. 1 question. No answers in query

```

Domain Name System (query)
Transaction ID: 0x9d9d
> Flags: 0x0100 Standard query
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
> Queries
[Response Too Large]
    
```

```

Domain Name System (response)
Transaction ID: 0x9d9d
> Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 4
Authority RRs: 0
Additional RRs: 0
> Queries
> Answers
  www.umass.edu: type CNAME, class IN, cname www.umass.edu.e
    Name: www.umass.edu
    Type: CNAME (5) (Canonical NAME for an alias)
    Class: IN (0x0001)
    Time to live: 2254 (37 minutes, 34 seconds)
    Data length: 27
    CNAME: www.umass.edu.edgekey.net
  www.umass.edu.edgekey.net: type CNAME, class IN, cname e28
    Name: www.umass.edu.edgekey.net
    Type: CNAME (5) (Canonical NAME for an alias)
    Class: IN (0x0001)
    Time to live: 18420 (2 hours, 53 minutes, 40 seconds)
    Data length: 28
    CNAME: e28010.dscb.akamaiedge.net
    
```

18.

4 non-authoritative answers are provided in the response to the first DNS Query:

These are different. They return a different IP Address than above and they also return canonical names for the DNS.