

C:\Users\97250>nslookup -type=NS tsinghua.edu.cn
Server: Broadcom.Home
Address: 192.168.1.1

Non-authoritative answer:
tsinghua.edu.cn nameserver = dns2.edu.cn
tsinghua.edu.cn nameserver = ns2.cuhk.hk
tsinghua.edu.cn nameserver = dns2.tsinghua.edu.cn
tsinghua.edu.cn nameserver = dns.tsinghua.edu.cn

dns.tsinghua.edu.cn internet address = 166.111.8.30
dns2.edu.cn internet address = 202.112.0.13
dns2.tsinghua.edu.cn internet address = 166.111.8.31
dns2.edu.cn AAAA IPv6 address = 2001:da8:1:100::13

.1

C:\Users\97250>nslookup -type=NS www.cam.ac.uk
Server: Broadcom.Home
Address: 192.168.1.1

cam.ac.uk
primary name server = primary.dns.cam.ac.uk
responsible mail addr = hostmaster.cam.ac.uk
serial = 1651134815
refresh = 1800 (30 mins)
retry = 900 (15 mins)
expire = 604800 (7 days)
default TTL = 3600 (1 hour)

C:\Users\97250>

.2

C:\Users\97250>nslookup primary.dns.cam.ac.uk mail.yahoo.com
DNS request timed out.
timeout was 2 seconds.
Server: UnKnown
Address: 2a00:1288:84:800::1001

DNS request timed out.
timeout was 2 seconds.
DNS request timed out.
timeout was 2 seconds.
DNS request timed out.
timeout was 2 seconds.
DNS request timed out.
timeout was 2 seconds.
*** Request to UnKnown timed-out

.3

Frame 5: 72 bytes on wire (576 bits), 72 bytes captured (576 bits) on interface \Device\NPF_{D77A8BF6-8D31-4553-A2F3-82CA261D26D2}, id 0
Ethernet II, Src: IntelCor_84:70:d3 (04:33:c2:84:70:d3), Dst: D-LinkIn_73:3a:84 (e4:6f:13:73:3a:84)
Internet Protocol Version 4, Src: 192.168.1.4, Dst: 192.168.1.1
User Datagram Protocol, Src Port: 57936, Dst Port: 53
Domain Name System (query)

.UDP .4
Src port: 57936. Dest port: 53. .5

yes the are the same. .6

```
Connection-specific DNS Suffix . : Home
IPv6 Address. . . . . : 2a0e:9cc0:23c7:3d00:5cf6:ce22:3aed:5561
Temporary IPv6 Address. . . . . : 2a0e:9cc0:23c7:3d00:58a1:c351:fcba:5134
Link-local IPv6 Address . . . . . : fe80::5cf6:ce22:3aed:5561%16
IPv4 Address. . . . . : 192.168.1.4
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : fe80::e66f:13ff:fe73:3a84%16
                          192.168.1.1
```

Frame 5: 72 bytes on wire (576 bits), 72 bytes captured (576 bits) on interface \Device\NPF_{D77A8BF6-8D31-4553-A2F3-82CA261D26D2}, id 0
Ethernet II, Src: IntelCor_84:70:d3 (04:33:c2:84:70:d3), Dst: D-LinkIn_73:3a:84 (e4:6f:13:73:3a:84)
Internet Protocol Version 4, Src: 192.168.1.4, Dst: 192.168.1.1
User Datagram Protocol, Src Port: 57936, Dst Port: 53
Domain Name System (query)

Type 'A', standard host address resource record, no answer .7

3 answer like we can see in the screen-shot. .8

containing the IP address of www.ietf.org.

7	2.870140	192.168.1.4	192.168.1.1	DNS	72 Standard query 0x5fae AAAA www.ietf.org
8	2.906346	192.168.1.1	192.168.1.4	DNS	459 Standard query response 0xa319 A www.ietf.org CNAME www.ietf.org
9	2.908988	192.168.1.1	192.168.1.4	DNS	483 Standard query response 0x5fae AAAA www.ietf.org CNAME www.ietf.org
10	2.912014	2a0e:9cc0:23c7:3d00::5cf6:ce22:3aed:5561	2606:4700::6810:2c63	TCP	86 51785 → 443 [SYN] Seq=0 Win=64800 Len=0 MSS=1440 WS=256 S
11	2.998560	fe80::e66f:13ff:fe73:3a84	ff02::1:fffb:5134	ICMPv6	86 Neighbor Solicitation for 2a0e:9cc0:23c7:3d00:58a1:c351:fcba:5134
12	2.999222	2a0e:9cc0:23c7:3d00::5cf6:ce22:3aed:5561	fe80::e66f:13ff:fe73:3a84	ICMPv6	86 Neighbor Advertisement 2a0e:9cc0:23c7:3d00:58a1:c351:fcba:5134
13	3.030257	2606:4700::6810:2c63	2a0e:9cc0:23c7:3d00::5cf6:ce22:3aed:5561	TCP	86 443 → 51785 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1440
14	3.030658	2a0e:9cc0:23c7:3d00::5cf6:ce22:3aed:5561	2606:4700::6810:2c63	TCP	74 51785 → 443 [ACK] Seq=1 Ack=1 Win=131840 Len=0
15	3.031516	2a0e:9cc0:23c7:3d00::5cf6:ce22:3aed:5561	2606:4700::6810:2c63	TLSv1.3	623 Client Hello

Domain Name System (response)

Transaction ID: 0xa319

> Flags: 0x8180 Standard query response, No error

Questions: 1

Answer RRs: 3

Authority RRs: 5

Additional RRs: 10

> Queries

0020 01 04 00 35 ed 52 01 a9 19 5b a3 19 81 80 00 01 ...5-Res- [.....

0030 00 03 00 05 00 0a 03 77 77 77 04 69 65 74 66 03 ...-w ww-ietf-

Answers

> www.ietf.org: type CNAME, class IN, cname www.ietf.org.cdn.cloudflare.net

> www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.16.44.99

> www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.16.45.99

Authoritative nameservers

Yes, as seen in the prior screenshot, the destination address is 104.16.44.99 which is .9 the address provided by the DNS server for www.ietf.org.

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.4	20.199.120.151	TLSv1.2	98	Application Data
2	0.071319	20.199.120.151	192.168.1.4	TLSv1.2	229	Application Data
3	0.123179	192.168.1.4	20.199.120.151	TCP	54	49418 → 443 [ACK] Seq=
4	2.831670	192.168.1.4	192.168.1.1	DNS	72	Standard query 0xa319
5	2.832944	192.168.1.4	192.168.1.1	DNS	72	Standard query 0x5fae

Answer RRs: 3
 Authority RRs: 5
 Additional RRs: 10
 Queries
 > www.ietf.org: type A, class IN
 Answers
 > www.ietf.org: type CNAME, class IN, cname www.ietf.org.cdn.cloudflare.net
 Name: www.ietf.org
 Type: CNAME (Canonical NAME for an alias) (5)
 Class: IN (0x0001)
 Time to live: 974 (16 minutes, 14 seconds)
 Data length: 33
 CNAME: www.ietf.org.cdn.cloudflare.net
 > www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.16.44.99
 Name: www.ietf.org.cdn.cloudflare.net
 Type: A (Host Address) (1)
 Class: IN (0x0001)
 Time to live: 300 (5 minutes)
 Data length: 4
 Address: 104.16.44.99

No, the images are all loaded from www.ietf.org, so no additional DNS queries. .10

עברתי מהבית לספרייה לכן ה IP של ברירת המחדל השתנה..

Src port: 62799 dest port: 53 .11

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Internet Protocol Version 4, Src: 192.168.186.192, Dst: 192.168.186.165
User Datagram Protocol, Src Port: 62799, Dst Port: 53
Domain Name System (query)
  Transaction ID: 0x0002
  > Flags: 0x0100 Standard query

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Yes, 192.168.186.165 .12

Standard type A query (see screenshot). The message only contains a query. .13

Source	Destination	Protocol	Length	Info
fe80::5cf6:ce22:3ae...	ff02::1:2	DHCPv6	157	Solicit XID: 0xbd6237 CID: 000100012611621
192.168.186.192	192.168.186.165	DNS	88	Standard query 0x0001 PTR 165.186.168.192.
192.168.186.165	192.168.186.192	DNS	88	Standard query response 0x0001 No such nam
192.168.186.192	192.168.186.165	DNS	71	Standard query 0x0002 A www.mit.edu
192.168.186.165	192.168.186.192	DNS	163	Standard query response 0x0002 A www.mit.e
192.168.186.192	192.168.186.165	DNS	71	Standard query 0x0003 AAAA www.mit.edu
192.168.186.165	192.168.186.192	DNS	203	Standard query response 0x0003 AAAA www.mi
192.168.186.192	10.0.0.13	TCP	66	59055 → 7680 [SYN] Seq=0 Win=64240 Len=0 M
192.168.186.192	10.1.9.87	TCP	66	59056 → 7680 [SYN] Seq=0 Win=64240 Len=0 M

> User Datagram Protocol, Src Port: 62799, Dst Port: 53
 > Domain Name System (query)
 Transaction ID: 0x0002
 > Flags: 0x0100 Standard query
 Questions: 1
 Answer RRs: 0
 Authority RRs: 0
 Additional RRs: 0

Three answers ,two corre sponding to CNAMEs and one host address .14

.15

Source	Destination	Protocol	Length	Info
fe80::5cf6:ce22:3ae...	ff02::1:2	DHCPv6	157	Solicit XID: 0xbd6237 CID: 000100012611621df87
192.168.186.192	192.168.186.165	DNS	88	Standard query 0x0001 PTR 165.186.192.in-4
192.168.186.165	192.168.186.192	DNS	88	Standard query response 0x0001 No such name P
192.168.186.192	192.168.186.165	DNS	71	Standard query 0x0002 A www.mit.edu
192.168.186.165	192.168.186.192	DNS	163	Standard query response 0x0002 A www.mit.edu
192.168.186.192	192.168.186.165	DNS	71	Standard query 0x0003 AAAA www.mit.edu
192.168.186.165	192.168.186.192	DNS	203	Standard query response 0x0003 AAAA www.mit.e
192.168.186.192	10.0.0.13	TCP	66	55055 -> 7680 [SYN] Seq=0 Win=64240 Len=0 MSS=
192.168.186.192	10.1.9.87	TCP	66	55056 -> 7680 [SYN] Seq=0 Win=64240 Len=0 MSS=

Transaction ID: 0x0002
> Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 3
Authority RRs: 0
Additional RRs: 0
> Queries
Answers
> www.mit.edu: type CNAME, class IN, cname www.mit.edu.edgekey.net
> www.mit.edu.edgekey.net: type CNAME, class IN, cname e9566.dscb.akamaiedge.net
> e9566.dscb.akamaiedge.net: type A, class IN, addr 23.79.130.108
[Request In: 4]
[Time: 0.008133000 seconds]

Yes 192.168.186.165 .16

IPv4 Address. : 192.168.186.192
Subnet Mask : 255.255.255.0
Default Gateway : 192.168.186.165

Time	Source	Destination	Protocol	Length	Info
28.1.599735	192.168.186.192	192.168.186.165	DNS	88	Standard query 0x0001 PTR 165.186.192.in-4
29.1.605492	192.168.186.165	192.168.186.192	DNS	88	Standard query response 0x0001 No such name P
30.1.607387	192.168.186.192	192.168.186.165	DNS	67	Standard query 0x0002 NS mit.edu
31.1.725141	192.168.186.165	192.168.186.192	DNS	346	Standard query response 0x0002 NS mit.edu

Frame 30: 67 bytes on wire (536 bits), 67 bytes captured (536 bits) on interface \Device\NPF_{D77A8BF6-B031-4...} Ethernet II, Src: IntelCor_84:70:d3 (04:33:c2:84:70:d3), Dst: 0a:2a:b8:7d:49:58 (0a:2a:b8:7d:49:58)
Internet Protocol Version 4, Src: 192.168.186.192, Dst: 192.168.186.165
User Datagram Protocol, Src Port: 54443, Dst Port: 53
Domain Name System (query)

Standard type A query (see screenshot). The message only contains a query. .17

Time	Source	Destination	Protocol	Length	Info
28.1.599735	192.168.186.192	192.168.186.165	DNS	88	Standard query 0x0001 PTR 165.186.192.in-4
29.1.605492	192.168.186.165	192.168.186.192	DNS	88	Standard query response 0x0001 No such name P
30.1.607387	192.168.186.192	192.168.186.165	DNS	67	Standard query 0x0002 NS mit.edu
31.1.725141	192.168.186.165	192.168.186.192	DNS	346	Standard query response 0x0002 NS mit.edu

Frame 30: 67 bytes on wire (536 bits), 67 bytes captured (536 bits) on interface \Device\NPF_{D77A8BF6-B031-4...} Ethernet II, Src: IntelCor_84:70:d3 (04:33:c2:84:70:d3), Dst: 0a:2a:b8:7d:49:58 (0a:2a:b8:7d:49:58)
Internet Protocol Version 4, Src: 192.168.186.192, Dst: 192.168.186.165
User Datagram Protocol, Src Port: 54443, Dst Port: 53
Domain Name System (query)
Transaction ID: 0x0100
> Flags: 0x0100 Standard query
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
> Queries
[Response In: 31]

answer do not have mit IP addresses .18

8 corresponding to ns answer

.19

26	1.399905	192.168.186.192	142.250.186.142	TCP	55 64102 → 443 [ACK] Seq=
27	1.529422	192.168.186.192	192.168.186.192	TCP	66 443 → 64102 [ACK] Seq=
28	1.599735	192.168.186.192	192.168.186.165	DNS	88 Standard query 0x0001
29	1.605492	192.168.186.165	192.168.186.192	DNS	88 Standard query response
30	1.607387	192.168.186.192	192.168.186.165	DNS	67 Standard query 0x0002
31	1.725141	192.168.186.165	192.168.186.192	DNS	346 Standard query response

< >

> Flags: 0x8180 Standard query response, No error

Questions: 1

Answer RRs: 8

Authority RRs: 0

Additional RRs: 7

Queries

> mit.edu: type NS, class IN

Answers

> mit.edu: type NS, class IN, ns ns1-173.akam.net

> mit.edu: type NS, class IN, ns use5.akam.net

> mit.edu: type NS, class IN, ns use2.akam.net

> mit.edu: type NS, class IN, ns asia2.akam.net

> mit.edu: type NS, class IN, ns eur5.akam.net

> mit.edu: type NS, class IN, ns usw2.akam.net

> mit.edu: type NS, class IN, ns asia1.akam.net

> mit.edu: type NS, class IN, ns ns1-37.akam.net

Additional records

[Request In: 30]

[Time: 0.117754000 seconds]

different, address know its sent to 18.0.72.3 because we ask him to connect .20

through other DNS server.
its comper to the DNS of bitsy.mit.edu..

```
C:\Users\97250>nslookup bitsy.mit.edu
Server: UnKnown
Address: 192.168.186.165

Non-authoritative answer:
Name: bitsy.mit.edu
Address: 18.0.72.3

C:\Users\97250>
```

25	2.701037	192.168.186.192	142.250.184.238	UDP	75 4920 → 443 Len=33
26	2.875840	142.250.184.238	192.168.186.192	UDP	68 443 → 4920 Len=26
27	3.922875	192.168.186.192	18.0.72.3	DNS	82 Standard query 0x0001 PTR 3.72.0.18.in-addr.arpa
28	5.930132	192.168.186.192	18.0.72.3	DNS	74 Standard query 0x0002 A www.ait.or.kr
29	5.996420	35.216.18.75	192.168.186.192	TCP	54 443 → 62300 [ACK] Seq=1 Ack=1 Win=501 Len=0
30	5.996517	192.168.186.192	35.216.18.75	TCP	54 [TCP ACKed unseen segment] 62300 → 443 [ACK] Seq=1 Ack=2 Win=511 Len=0
31	7.936243	192.168.186.192	18.0.72.3	DNS	74 Standard query 0x0003 AAAA www.ait.or.kr
32	9.941064	192.168.186.192	18.0.72.3	DNS	74 Standard query 0x0004 A www.ait.or.kr
33	10.398786	192.168.186.192	192.168.186.165	DNS	75 Standard query 0x45cb A play.google.com
34	10.451141	192.168.186.165	192.168.186.192	DNS	311 Standard query response 0x45cb A play.google.com A 142.250.185.110 NS ns1.goog
35	10.453484	192.168.186.192	142.250.185.110	QUIC	1292 Initial, DCID=4bdd6e928cf83bd8, PKN: 1, CRYPTO, PADDING, PING, PADDING, CRYPTC
36	10.454111	192.168.186.192	142.250.185.110	QUIC	121 0-RTT, DCID=4bdd6e928cf83bd8
37	10.555644	142.250.185.110	192.168.186.192	QUIC	1292 Protected Payload (KP0)
38	10.556096	192.168.186.192	142.250.185.110	QUIC	1292 Protected Payload (KP0)

> Frame 31: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{D77ABBF6-8D31-4553-A2F3-82CA261D26D2}, id 0

> Ethernet II, Src: IntelCor_84:70:d3 (04:33:c2:84:70:d3), Dst: 0a:2a:b8:7d:49:58 (0a:2a:b8:7d:49:58)

> Internet Protocol Version 4, Src: 192.168.186.192, Dst: 18.0.72.3

> User Datagram Protocol, Src Port: 58065, Dst Port: 53

> Domain Name System (query)

Standard type A query (see screenshot). The message only contains a query. .21

27	3.922875	192.168.186.192	18.0.72.3	DNS	82 Standard query 0x0001 PTR 3.72.0.18.in-addr.arpa
28	5.930132	192.168.186.192	18.0.72.3	DNS	74 Standard query 0x0002 A www.ait.or.kr
29	5.996420	35.216.18.75	192.168.186.192	TCP	54 443 → 62300 [ACK] Seq=1 Ack=1 Win=501 Len=0
30	5.996517	192.168.186.192	35.216.18.75	TCP	54 [TCP ACKed unseen segment] 62300 → 443 [ACK] Seq=1 Ack=2 Win=511 Len=0
31	7.936243	192.168.186.192	18.0.72.3	DNS	74 Standard query 0x0003 AAAA www.ait.or.kr
32	9.941064	192.168.186.192	18.0.72.3	DNS	74 Standard query 0x0004 A www.ait.or.kr
33	10.398786	192.168.186.192	192.168.186.165	DNS	75 Standard query 0x45cb A play.google.com
34	10.451141	192.168.186.165	192.168.186.192	DNS	311 Standard query response 0x45cb A play.google.com A 142.250.185.110 NS ns
35	10.453484	192.168.186.192	142.250.185.110	QUIC	1292 Initial, DCID=4bdd6e928cf83bd8, PKN: 1, CRYPTO, PADDING, PING, PADDING,
36	10.454111	192.168.186.192	142.250.185.110	QUIC	121 0-RTT, DCID=4bdd6e928cf83bd8
37	10.555644	142.250.185.110	192.168.186.192	QUIC	1292 Protected Payload (KP0)
38	10.556096	192.168.186.192	142.250.185.110	QUIC	1292 Protected Payload (KP0)

> Frame 31: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{D77ABBF6-8D31-4553-A2F3-82CA261D26D2}, id 0

> Ethernet II, Src: IntelCor_84:70:d3 (04:33:c2:84:70:d3), Dst: 0a:2a:b8:7d:49:58 (0a:2a:b8:7d:49:58)

> Internet Protocol Version 4, Src: 192.168.186.192, Dst: 18.0.72.3

> User Datagram Protocol, Src Port: 58065, Dst Port: 53

> Domain Name System (query)

Transaction ID: 0x0003

> Flags: 0x0100 Standard query

Questions: 1

Answer RRs: 0

Authority RRs: 0

Additional RRs: 0

Queries

iges. .22

```
C:\Users\97250>nslookup www.iiit.or.kr bitsy.mit.edu
DNS request timed out.
        timeout was 2 seconds.
Server: UnKnown
Address: 18.0.72.3

DNS request timed out.
        timeout was 2 seconds.
DNS request timed out.
        timeout was 2 seconds.
DNS request timed out.
        timeout was 2 seconds.
DNS request timed out.
        timeout was 2 seconds.
*** Request to UnKnown timed-out
```

```

# 1) Log: network standard query
Queries: 5
Answer: 80%
Accuracy: 80%
Additional Info: 0
Queries:

# 2) Log: network standard query
Queries: 5
Answer: 80%
Accuracy: 80%
Additional Info: 0
Queries:
```