



**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ**  
**ННК «ІІСА» НТУУ «КПІ ІМ. ІГОРЯ СІКОРСЬКОГО»**  
**КАФЕДРА ММСА**

**Практична робота № 3**  
**З курсу: «Комп'ютерні мережі»**

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**Київ 2020**

# 3.2.1

No.	Time	Source	Destination	Protocol	Length	Info
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Frame 4: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60) Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1  
User Datagram Protocol, Src Port: 51634, Dst Port: 53  
Domain Name System (query)  
Transaction ID: 0x16d4  
Flags: 0x0100 Standard  
query Questions: 1  
Answer RRs: 0  
Authority RRs: 0  
Additional RRs: 0  
Queries  
[Response In: 5]

No.	Time	Source	Destination	Protocol	Length	Info
5	1.806988	192.168.0.1	192.168.0.102	DNS	338	Standard query response 0x16d4 A www.google.com A 216.58.209.4 NS ns4.google.com NS ns3.google.com NS ns1.google.com NS ns2.google.com A 216.239.34.10 AAAA 2001:4860:4802:34::a A 216.239.38.10 AAAA 2001:4860:4802:38::a A 216.239.32.10 AAAA 2001:4860:4802:32::a A 216.239.36.10 AAAA 2001:4860:4802:36::a

Frame 5: 338 bytes on wire (2704 bits), 338 bytes captured (2704 bits) on interface \Device\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88 (98:54:1b:f3:47:88) Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port: 51634  
Domain Name System (response)  
Transaction ID: 0x16d4  
Flags: 0x8180 Standard query response, No error  
Questions: 1  
Answer RRs: 1  
Authority RRs: 4  
Additional RRs: 8  
Queries  
Answers  
www.google.com: type A, class IN, addr 216.58.209.4  
Authoritative nameservers  
google.com: type NS, class IN, ns ns4.google.com  
google.com: type NS, class IN, ns ns3.google.com  
google.com: type NS, class IN, ns ns1.google.com  
google.com: type NS, class IN, ns ns2.google.com  
Additional records  
ns2.google.com: type A, class IN, addr 216.239.34.10  
ns2.google.com: type AAAA, class IN, addr 2001:4860:4802:34::a  
ns4.google.com: type A, class IN, addr 216.239.38.10  
ns4.google.com: type AAAA, class IN, addr 2001:4860:4802:38::a  
ns1.google.com: type A, class IN, addr 216.239.32.10  
ns1.google.com: type AAAA, class IN, addr 2001:4860:4802:32::a  
ns3.google.com: type A, class IN, addr 216.239.36.10  
ns3.google.com: type AAAA, class IN, addr 2001:4860:4802:36::a  
[Request In: 4]  
[Time: 0.004393000 seconds]

No.	Time	Source	Destination	Protocol	Length	Info
16	2.930274	192.168.0.102	192.168.0.1	DNS	72	Standard query 0x7056 A www.ietf.org

Frame 16: 72 bytes on wire (576 bits), 72 bytes captured (576 bits) on interface \Device\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60) Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1  
User Datagram Protocol, Src Port: 61717, Dst Port: 53  
Domain Name System (query)  
Transaction ID: 0x7056  
Flags: 0x0100 Standard  
query Questions: 1  
Answer RRs: 0  
Authority RRs: 0

Additional RRs: 0  
Queries  
[Response In: 17]  
No. Time Source Destination Protocol Length Info  
17 2.949203 192.168.0.1 192.168.0.102 DNS 546 Standard query response 0x7056 A  
www.ietf.org CNAME www.ietf.org.cdn.cloudflare.net A 104.20.0.85 A 104.20.1.85 NS f.gtld-servers.net NS e.gtld-servers.net  
NS g.gtld-servers.net NS c.gtld-servers.net NS h.gtld-servers.net NS b.gtld-servers.net NS i.gtld-servers.net NS l.gtld-  
servers.net NS d.gtld-servers.net NS a.gtld-servers.net NS m.gtld-servers.net NS k.gtld-servers.net NS j.gtld-servers.net A  
192.41.162.30 AAAA 2001:500:d937::30 A 192.31.80.30 AAAA 2001:500:856e::30 A 192.26.92.30 AAAA 2001:503:83eb::30 A  
192.35.51.30 AAAA 2001:503:d414::30  
Frame 17: 546 bytes on wire (4368 bits), 546 bytes captured (4368 bits) on interface  
\\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88  
(98:54:1b:f3:47:88) Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port:  
61717 Domain Name System (response)  
Transaction ID: 0x7056  
Flags: 0x8180 Standard query response, No  
error Questions: 1  
Answer RRs: 3  
Authority RRs: 13  
Additional RRs: 8

Queries

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 104.20.0.85  
www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.20.1.85

Authoritative nameservers

net: type NS, class IN, ns f.gtld-servers.net  
net: type NS, class IN, ns e.gtld-servers.net  
net: type NS, class IN, ns g.gtld-servers.net  
net: type NS, class IN, ns c.gtld-servers.net  
net: type NS, class IN, ns h.gtld-servers.net  
net: type NS, class IN, ns b.gtld-servers.net  
net: type NS, class IN, ns i.gtld-servers.net  
net: type NS, class IN, ns l.gtld-servers.net  
net: type NS, class IN, ns d.gtld-servers.net  
net: type NS, class IN, ns a.gtld-servers.net  
net: type NS, class IN, ns m.gtld-servers.net  
net: type NS, class IN, ns k.gtld-servers.net  
net: type NS, class IN, ns j.gtld-servers.net

Additional records

l.gtld-servers.net: type A, class IN, addr 192.41.162.30  
l.gtld-servers.net: type AAAA, class IN, addr 2001:500:d937::30  
d.gtld-servers.net: type A, class IN, addr 192.31.80.30  
d.gtld-servers.net: type AAAA, class IN, addr 2001:500:856e::30  
c.gtld-servers.net: type A, class IN, addr 192.26.92.30  
c.gtld-servers.net: type AAAA, class IN, addr 2001:503:83eb::30  
f.gtld-servers.net: type A, class IN, addr 192.35.51.30  
f.gtld-servers.net: type AAAA, class IN, addr 2001:503:d414::30

[Request In: 16]

[Time: 0.018929000 seconds]

No.	Time	Source	Destination	Protocol	Length	Info
30	3.420200	192.168.0.102	192.168.0.1	DNS	91	Standard query 0x7de8

A webadvisorc.rest.gti.mcafee.com

Frame 30: 91 bytes on wire (728 bits), 91 bytes captured (728 bits) on interface \Device\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60) Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1  
User Datagram Protocol, Src Port: 60820, Dst Port:

53 Domain Name System (query)

Transaction ID: 0x7de8  
Flags: 0x0100 Standard

query Questions: 1

Answer RRs: 0

Authority RRs: 0

Additional RRs: 0

Queries

[Response In: 33]

No.	Time	Source	Destination	Protocol	Length	Info
33	3.423819	192.168.0.1	192.168.0.102	DNS	547	Standard query response 0x7de8 A webadvisorc.rest.gti.mcafee.com CNAME rest.gti.mcafee.akadns.net A 161.69.169.70 A 161.69.169.72 A 161.69.169.73 A 161.69.169.71 NS e.root-servers.net NS h.root-servers.net NS j.root-servers.net NS k.root-servers.net NS d.root-servers.net NS l.root-servers.net NS g.root-servers.net NS a.root-servers.net NS i.root-servers.net NS c.root-servers.net NS b.root-servers.net NS m.root-servers.net NS f.root-servers.net A 198.41.0.4 A 199.9.14.201 A 192.33.4.12 A 199.7.91.13 A 192.203.230.10 A 192.5.5.241 A 192.112.36.4 A 198.97.190.53 A 192.36.148.17

Frame 33: 547 bytes on wire (4376 bits), 547 bytes captured (4376 bits) on interface \Device\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88 (98:54:1b:f3:47:88) Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port:

60820 Domain Name System (response)

Transaction ID: 0x7de8  
Flags: 0x8180 Standard query response, No error

Questions: 1

Answer RRs: 5

Authority RRs: 13

Additional RRs: 9

## Queries

## Answers

webadvisorc.rest.gti.mcafee.com: type CNAME, class IN, cname  
rest.gti.mcafee.akadns.net rest.gti.mcafee.akadns.net: type A, class IN, addr  
161.69.169.70 rest.gti.mcafee.akadns.net: type A, class IN, addr 161.69.169.72  
rest.gti.mcafee.akadns.net: type A, class IN, addr 161.69.169.73  
rest.gti.mcafee.akadns.net: type A, class IN, addr 161.69.169.71

## Authoritative nameservers

<Root>: type NS, class IN, ns e.root-servers.net  
<Root>: type NS, class IN, ns h.root-servers.net  
<Root>: type NS, class IN, ns j.root-servers.net  
<Root>: type NS, class IN, ns k.root-servers.net  
<Root>: type NS, class IN, ns d.root-servers.net  
<Root>: type NS, class IN, ns l.root-servers.net  
<Root>: type NS, class IN, ns g.root-servers.net  
<Root>: type NS, class IN, ns a.root-servers.net  
<Root>: type NS, class IN, ns i.root-servers.net  
<Root>: type NS, class IN, ns c.root-servers.net  
<Root>: type NS, class IN, ns b.root-servers.net

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<Root>: type NS, class IN, ns m.root-servers.net
<Root>: type NS, class IN, ns f.root-servers.net
Additional records
a.root-servers.net: type A, class IN, addr 198.41.0.4
b.root-servers.net: type A, class IN, addr 199.9.14.201
c.root-servers.net: type A, class IN, addr 192.33.4.12
d.root-servers.net: type A, class IN, addr 199.7.91.13
e.root-servers.net: type A, class IN, addr
192.203.230.10 f.root-servers.net: type A, class IN,
addr 192.5.5.241 g.root-servers.net: type A, class IN,
addr 192.112.36.4 h.root-servers.net: type A, class IN,
addr 198.97.190.53 i.root-servers.net: type A, class IN,
addr 192.36.148.17
[Request In: 30]
[Time: 0.003619000 seconds]
No.      Time      Source      Destination      Protocol Length Info
   80 3.621467    192.168.0.102    192.168.0.1      DNS       88      Standard query 0xa140
A mip.api.mcafeewebadvisor.com
Frame 80: 88 bytes on wire (704 bits), 88 bytes captured (704 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB},
id 0
Ethernet II, Src: IntelCor_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT_2d:ab:60
(64:66:b3:2d:ab:60) Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
User Datagram Protocol, Src Port: 56519, Dst Port:
53 Domain Name System (query)
Transaction ID: 0xa140
Flags: 0x0100 Standard
query Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
Queries
[Response In: 89]
No.      Time      Source      Destination      Protocol Length Info
   89 3.626928    192.168.0.1    192.168.0.102    DNS       519     Standard query response 0xa140 A
mip.api.mcafeewebadvisor.com CNAME WACloudLB-1801077940.us-east-1.elb.amazonaws.com A 34.238.24.46 A
3.223.217.186 A 52.206.61.163
A 52.86.217.36 A 34.231.15.188 A 52.2.157.209 A 34.199.12.246 A 54.81.233.88 NS u1.amazonaws.com NS
u2.amazonaws.com NS r2.amazonaws.com NS r1.amazonaws.com A 156.154.64.10 AAAA 2001:502:f3ff::10 A 156.154.65.10
AAAA 2610:a1:1014::10 A 205.251.192.27 AAAA 2600:9000:5300:1b00::1 A 205.251.195.199 AAAA 2600:9000:5303:c700::1
Frame 89: 519 bytes on wire (4152 bits), 519 bytes captured (4152 bits) on interface
\Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0
Ethernet II, Src: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor_f3:47:88
(98:54:1b:f3:47:88) Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
User Datagram Protocol, Src Port: 53, Dst Port:
56519 Domain Name System (response)
Transaction ID: 0xa140
Flags: 0x8180 Standard query response, No
error Questions: 1
Answer RRs: 9
Authority RRs: 4
Additional RRs: 8
Queries
Answers
mip.api.mcafeewebadvisor.com: type CNAME, class IN, cname WACloudLB-1801077940.us-east-
1.elb.amazonaws.com WACloudLB-1801077940.us-east-1.elb.amazonaws.com: type A, class IN,
addr 34.238.24.46
WACloudLB-1801077940.us-east-1.elb.amazonaws.com: type A, class IN, addr
3.223.217.186 WACloudLB-1801077940.us-east-1.elb.amazonaws.com: type A,
class IN, addr 52.206.61.163 WACloudLB-1801077940.us-east-
1.elb.amazonaws.com: type A, class IN, addr 52.86.217.36 WACloudLB-
1801077940.us-east-1.elb.amazonaws.com: type A, class IN, addr 34.231.15.188
WACloudLB-1801077940.us-east-1.elb.amazonaws.com: type A, class IN, addr
52.2.157.209 WACloudLB-1801077940.us-east-1.elb.amazonaws.com: type A,
class IN, addr 34.199.12.246 WACloudLB-1801077940.us-east-
1.elb.amazonaws.com: type A, class IN, addr 54.81.233.88
Authoritative nameservers
amazonaws.com: type NS, class IN, ns
u1.amazonaws.com amazonaws.com: type NS,
class IN, ns u2.amazonaws.com amazonaws.com:
type NS, class IN, ns r2.amazonaws.com
```

amazonaws.com: type NS, class IN, ns  
r1.amazonaws.com

Additional records

u1.amazonaws.com: type A, class IN, addr 156.154.64.10  
u1.amazonaws.com: type AAAA, class IN, addr  
2001:502:f3ff::10 u2.amazonaws.com: type A, class IN, addr  
156.154.65.10 u2.amazonaws.com: type AAAA, class IN, addr  
2610:a1:1014::10 r1.amazonaws.com: type A, class IN, addr  
205.251.192.27 r1.amazonaws.com: type AAAA, class IN, addr  
2600:9000:5300:1b00::1 r2.amazonaws.com: type A, class IN,  
addr 205.251.195.199 r2.amazonaws.com: type AAAA, class  
IN, addr 2600:9000:5303:c700::1

[Request In: 80]

[Time: 0.005461000 seconds]

No.	Time	Source	Destination	Protocol	Length	Info
932	5.002927	192.168.0.102	192.168.0.1	DNS	78	Standard query 0x66aa A analytics.ietf.org

Frame 932: 78 bytes on wire (624 bits), 78 bytes captured (624 bits) on interface

\Device\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60

(64:66:b3:2d:ab:60) Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1

User Datagram Protocol, Src Port: 49273, Dst Port:

53 Domain Name System (query)

Transaction ID: 0x66aa

Flags: 0x0100 Standard  
query Questions: 1  
Answer RRs: 0  
Authority RRs: 0  
Additional RRs: 0  
Queries  
[Response In: 1043]

No.	Time	Source	Destination	Protocol	Length	Info
1043	5.636543	192.168.0.1	192.168.0.102	DNS	510	Standard query response 0x66aa A

analytics.ietf.org CNAME ietf.org A 4.31.198.44 NS a0.org.afiliast-nst.info NS b2.org.afiliast-nst.org NS a2.org.afiliast-nst.info NS d0.org.afiliast-nst.org NS c0.org.afiliast-nst.info NS b0.org.afiliast-nst.org A 199.19.57.1 AAAA 2001:500:f::1 A 199.19.56.1 AAAA 2001:500:e::1 A 199.19.53.1 AAAA 2001:500:b::1 A 199.249.112.1 AAAA 2001:500:40::1 A 199.19.54.1 AAAA 2001:500:c::1 A 199.249.120.1 AAAA 2001:500:48::1

Frame 1043: 510 bytes on wire (4080 bits), 510 bytes captured (4080 bits) on interface \\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88 (98:54:1b:f3:47:88) Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port: 49273 Domain Name System (response)  
Transaction ID: 0x66aa  
Flags: 0x8180 Standard query response, No error Questions: 1  
Answer RRs: 2  
Authority RRs: 6  
Additional RRs: 12  
Queries  
Answers  
analytics.ietf.org: type CNAME, class IN, cname ietf.org ietf.org: type A, class IN, addr 4.31.198.44  
Authoritative nameservers  
org: type NS, class IN, ns a0.org.afiliast-nst.info  
org: type NS, class IN, ns b2.org.afiliast-nst.org  
org: type NS, class IN, ns a2.org.afiliast-nst.info  
org: type NS, class IN, ns d0.org.afiliast-nst.org  
org: type NS, class IN, ns c0.org.afiliast-nst.info  
org: type NS, class IN, ns b0.org.afiliast-nst.org  
Additional records  
d0.org.afiliast-nst.org: type A, class IN, addr 199.19.57.1  
d0.org.afiliast-nst.org: type AAAA, class IN, addr 2001:500:f::1  
a0.org.afiliast-nst.info: type A, class IN, addr 199.19.56.1  
a0.org.afiliast-nst.info: type AAAA, class IN, addr 2001:500:e::1  
c0.org.afiliast-nst.info: type A, class IN, addr 199.19.53.1  
c0.org.afiliast-nst.info: type AAAA, class IN, addr 2001:500:b::1  
a2.org.afiliast-nst.info: type A, class IN, addr 199.249.112.1  
a2.org.afiliast-nst.info: type AAAA, class IN, addr 2001:500:40::1  
b0.org.afiliast-nst.org: type A, class IN, addr 199.19.54.1  
b0.org.afiliast-nst.org: type AAAA, class IN, addr 2001:500:c::1  
b2.org.afiliast-nst.org: type A, class IN, addr 199.249.120.1  
b2.org.afiliast-nst.org: type AAAA, class IN, addr 2001:500:48::1  
[Request In: 932]  
[Time: 0.633616000 seconds]

3.2.2

No.	Time	Source	Destination	Protocol	Length	Info
3	3.257133	192.168.0.102	192.168.0.1	DNS	84	Standard query 0x0001 PTR 1.0.168.192.in-addr.arpa

Frame 3: 84 bytes on wire (672 bits), 84 bytes captured (672 bits) on interface \\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60)  
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1  
User Datagram Protocol, Src Port: 63338, Dst Port: 53  
Domain Name System (query)  
Transaction ID: 0x0001  
Flags: 0x0100 Standard query  
Questions: 1  
Answer RRs: 0  
Authority RRs: 0  
Additional RRs: 0  
Queries  
[Response In: 4]

No.	Time	Source	Destination	Protocol	Length	Info
4	3.282680	192.168.0.1	192.168.0.102	DNS	119	Standard query response 0x0001 No such name PTR 1.0.168.192.in-addr.arpa SOA 168.192.in-addr.arpa



Frame 4: 119 bytes on wire (952 bits), 119 bytes captured (952 bits) on interface  
\\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88 (98:54:1b:f3:47:88)  
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port: 63338  
Domain Name System (response)

Transaction ID: 0x0001  
Flags: 0x8583 Standard query response, No such name  
Questions: 1  
Answer RRs: 0  
Authority RRs: 1  
Additional RRs: 0  
Queries  
Authoritative nameservers  
168.192.in-addr.arpa: type SOA, class IN, mname 168.192.in-addr.arpa  
[Request In: 3]  
[Time: 0.025547000 seconds]

No.	Time	Source	Destination	Protocol	Length	Info
	5.3320585	192.168.0.102	192.168.0.1	DNS	71	Standard query 0x0002 A www.mit.edu

Frame 5: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface \\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60)  
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1  
User Datagram Protocol, Src Port: 63339, 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  
Queries  
[Response In: 6]

No.	Time	Source	Destination	Protocol	Length	Info
	6.3602728	192.168.0.1	192.168.0.102	DNS	529	Standard query response 0x0002 A www.mit.edu

CNAME www.mit.edu.edgekey.net CNAME e9566.dscb.akamaiedge.net A 23.63.130.176 NS e.gtld-servers.net NS l.gtld-servers.net NS j.gtld-servers.net NS f.gtld-servers.net NS d.gtld-servers.net NS m.gtld-servers.net NS b.gtld-servers.net NS i.gtld-servers.net NS c.gtld-servers.net NS a.gtld-servers.net NS h.gtld-servers.net NS k.gtld-servers.net NS g.gtld-servers.net A 192.5.6.30 AAAA 2001:503:a83e::2:30 A 192.33.14.30 AAAA 2001:503:231d::2:30 A 192.26.92.30 AAAA 2001:503:83eb::30 A 192.31.80.30

Frame 6: 529 bytes on wire (4232 bits), 529 bytes captured (4232 bits) on interface \\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88 (98:54:1b:f3:47:88)  
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port: 63339  
Domain Name System (response)

Transaction ID: 0x0002  
Flags: 0x8180 Standard query response, No error  
Questions: 1  
Answer RRs: 3  
Authority RRs: 13  
Additional RRs: 7  
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 23.63.130.176  
Authoritative nameservers  
net: type NS, class IN, ns e.gtld-servers.net  
net: type NS, class IN, ns l.gtld-servers.net  
net: type NS, class IN, ns j.gtld-servers.net  
net: type NS, class IN, ns f.gtld-servers.net  
net: type NS, class IN, ns d.gtld-servers.net  
net: type NS, class IN, ns m.gtld-servers.net  
net: type NS, class IN, ns b.gtld-servers.net  
net: type NS, class IN, ns i.gtld-servers.net

```
net: type NS, class IN, ns c.gtld-servers.net
net: type NS, class IN, ns a.gtld-servers.net
net: type NS, class IN, ns h.gtld-servers.net
net: type NS, class IN, ns k.gtld-servers.net
net: type NS, class IN, ns g.gtld-servers.net
Additional records
a.gtld-servers.net: type A, class IN, addr 192.5.6.30
a.gtld-servers.net: type AAAA, class IN, addr 2001:503:a83e::2:30
b.gtld-servers.net: type A, class IN, addr 192.33.14.30
b.gtld-servers.net: type AAAA, class IN, addr 2001:503:231d::2:30
c.gtld-servers.net: type A, class IN, addr 192.26.92.30
c.gtld-servers.net: type AAAA, class IN, addr 2001:503:83eb::30
d.gtld-servers.net: type A, class IN, addr 192.31.80.30
[Request In: 5]
[Time: 0.282143000 seconds]
No.      Time      Source      Destination      Protocol Length Info
  7 3.611424      192.168.0.102      192.168.0.1      DNS           71      Standard query 0x0003 AAAA www.mit.edu
Frame 7: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
User Datagram Protocol, Src Port: 63340, 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
[Response In: 8]
No.      Time      Source      Destination      Protocol Length Info
  8 3.744121      192.168.0.1      192.168.0.102      DNS          553      Standard query response 0x0003 AAAA www.mit.edu
CNAME www.mit.edu.edgekey.net CNAME e9566.dscb.akamaiedge.net AAAA 2a02:26f0:d200:19e::255e AAAA 2a02:26f0:d200:191::255e NS b.gtld-
servers.net NS i.gtld-servers.net NS a.gtld-servers.net NS c.gtld-servers.net NS d.gtld-servers.net NS j.gtld-servers.net NS m.gtld-servers.net NS e.gtld-
servers.net NS h.gtld-servers.net NS g.gtld-servers.net NS k.gtld-servers.net NS f.gtld-servers.net NS l.gtld-servers.net A 192.5.6.30 AAAA
2001:503:a83e::2:30 A 192.33.14.30 AAAA 2001:503:231d::2:30 A 192.26.92.30 AAAA 2001:503:83eb::30 Frame 8: 553 bytes on wire (4424 bits), 553 bytes
captured (4424 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor_f3:47:88 (98:54:1b:f3:47:88)
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
User Datagram Protocol, Src Port: 53, Dst Port: 63340
Domain Name System (response)
  Transaction ID: 0x0003
  Flags: 0x8180 Standard query response, No error
  Questions: 1
  Answer RRs: 4
  Authority RRs: 13
  Additional RRs: 6
  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 AAAA, class IN, addr 2a02:26f0:d200:19e::255e
    e9566.dscb.akamaiedge.net: type AAAA, class IN, addr 2a02:26f0:d200:191::255e
  Authoritative nameservers
    net: type NS, class IN, ns b.gtld-servers.net
    net: type NS, class IN, ns i.gtld-servers.net
    net: type NS, class IN, ns a.gtld-servers.net
    net: type NS, class IN, ns c.gtld-servers.net
    net: type NS, class IN, ns d.gtld-servers.net
    net: type NS, class IN, ns j.gtld-servers.net
    net: type NS, class IN, ns m.gtld-servers.net
    net: type NS, class IN, ns e.gtld-servers.net
    net: type NS, class IN, ns h.gtld-servers.net
    net: type NS, class IN, ns g.gtld-servers.net
    net: type NS, class IN, ns k.gtld-servers.net
    net: type NS, class IN, ns f.gtld-servers.net
    net: type NS, class IN, ns l.gtld-servers.net
  Additional records
    a.gtld-servers.net: type A, class IN, addr 192.5.6.30
    a.gtld-servers.net: type AAAA, class IN, addr 2001:503:a83e::2:30
    b.gtld-servers.net: type A, class IN, addr 192.33.14.30
    b.gtld-servers.net: type AAAA, class IN, addr 2001:503:231d::2:30
    c.gtld-servers.net: type A, class IN, addr 192.26.92.30
    c.gtld-servers.net: type AAAA, class IN, addr 2001:503:83eb::30
[Request In: 7]
[Time: 0.132697000 seconds]
```

## 3.2.3

```
No.      Time      Source      Destination      Protocol Length Info
 35 1.826481      192.168.0.102      192.168.0.1      DNS           84      Standard query 0x0001 PTR 1.0.168.192.in-
addr.arpa
Frame 35: 84 bytes on wire (672 bits), 84 bytes captured (672 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0
```

Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60)  
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1  
User Datagram Protocol, Src Port: 57148, Dst Port: 53  
Domain Name System (query)  
Transaction ID: 0x0001  
Flags: 0x0100 Standard query  
Questions: 1  
Answer RRs: 0  
Authority RRs: 0  
Additional RRs: 0  
Queries  
[Response In: 36]

No.	Time	Source	Destination	Protocol	Length	Info
36	1.828532	192.168.0.1	192.168.0.102	DNS	119	Standard query response 0x0001 No such name PTR

1.0.168.192.in-addr.arpa SOA 168.192.in-addr.arpa  
Frame 36: 119 bytes on wire (952 bits), 119 bytes captured (952 bits) on interface  
\\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88 (98:54:1b:f3:47:88)  
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port: 57148  
Domain Name System (response)  
Transaction ID: 0x0001  
Flags: 0x8583 Standard query response, No such name  
Questions: 1  
Answer RRs: 0  
Authority RRs: 1  
Additional RRs: 0  
Queries  
Authoritative nameservers  
168.192.in-addr.arpa: type SOA, class IN, mname 168.192.in-addr.arpa  
[Request In: 35]  
[Time: 0.002051000 seconds]

No.	Time	Source	Destination	Protocol	Length	Info
37	1.829724	192.168.0.102	192.168.0.1	DNS	67	Standard query 0x0002 NS mit.edu

Frame 37: 67 bytes on wire (536 bits), 67 bytes captured (536 bits) on interface \\Device\\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
  
Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60)  
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1  
User Datagram Protocol, Src Port: 57149, 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  
Queries  
[Response In: 38]

No.	Time	Source	Destination	Protocol	Length	Info
38	1.831726	192.168.0.1	192.168.0.102	DNS	446	Standard query response 0x0002 NS mit.edu NS

eur5.akam.net NS use5.akam.net NS use2.akam.net NS usw2.akam.net NS ns1-37.akam.net NS ns1-173.akam.net NS asia2.akam.net NS asia1.akam.net A  
96.7.49.64 A 2.16.40.64 AAAA 2600:1403:a::40 A 95.101.36.64 A 193.108.91.173 AAAA 2600:1401:2::ad A 193.108.91.37 AAAA 2600:1401:2::25 A 23.74.25.64  
A 95.100.175.64 A 184.26.161.64  
Frame 38: 446 bytes on wire (3568 bits), 446 bytes captured (3568 bits) on interface \\Device\\  
NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0  
Ethernet II, Src: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor\_f3:47:88 (98:54:1b:f3:47:88)  
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102  
User Datagram Protocol, Src Port: 53, Dst Port: 57149  
Domain Name System (response)  
Transaction ID: 0x0002  
Flags: 0x8180 Standard query response, No error  
Questions: 1  
Answer RRs: 8  
Authority RRs: 0  
Additional RRs: 11  
Queries  
Answers  
mit.edu: type NS, class IN, ns eur5.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 usw2.akam.net  
mit.edu: type NS, class IN, ns ns1-37.akam.net  
mit.edu: type NS, class IN, ns ns1-173.akam.net  
mit.edu: type NS, class IN, ns asia2.akam.net  
mit.edu: type NS, class IN, ns asia1.akam.net  
Additional records  
use2.akam.net: type A, class IN, addr 96.7.49.64  
use5.akam.net: type A, class IN, addr 2.16.40.64  
use5.akam.net: type AAAA, class IN, addr 2600:1403:a::40  
asia2.akam.net: type A, class IN, addr 95.101.36.64

```
ns1-173.akam.net: type A, class IN, addr 193.108.91.173
ns1-173.akam.net: type AAAA, class IN, addr 2600:1401:2::ad
ns1-37.akam.net: type A, class IN, addr 193.108.91.37
ns1-37.akam.net: type AAAA, class IN, addr 2600:1401:2::25
eur5.akam.net: type A, class IN, addr 23.74.25.64
asia1.akam.net: type A, class IN, addr 95.100.175.64
usw2.akam.net: type A, class IN, addr 184.26.161.64
[Request In: 37]
[Time: 0.002002000 seconds]

3.2.4

No.      Time      Source      Destination      Protocol Length Info
  2 1.480798  192.168.0.102 192.168.0.1      DNS           73      Standard query 0x1d7b A bitsy.mit.edu
Frame 2: 73 bytes on wire (584 bits), 73 bytes captured (584 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
User Datagram Protocol, Src Port: 64118, Dst Port: 53
Domain Name System (query)
  Transaction ID: 0x1d7b
  Flags: 0x0100 Standard query
  Questions: 1
  Answer RRs: 0
  Authority RRs: 0
  Additional RRs: 0
  Queries
[Response In: 3]
No.      Time      Source      Destination      Protocol Length Info
  3 1.488613  192.168.0.1 192.168.0.102    DNS           332     Standard query response 0x1d7b A bitsy.mit.edu A
18.0.72.3 NS f.root-servers.net NS c.root-servers.net NS e.root-servers.net NS j.root-servers.net NS m.root-servers.net NS k.root-servers.net NS d.root-
servers.net NS i.root-servers.net NS a.root-servers.net NS h.root-servers.net NS b.root-servers.net NS l.root-servers.net NS g.root-servers.net A 198.41.0.4
A 199.9.14.201
Frame 3: 332 bytes on wire (2656 bits), 332 bytes captured (2656 bits) on interface \Device\
NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0
Ethernet II, Src: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor_f3:47:88 (98:54:1b:f3:47:88)
Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
User Datagram Protocol, Src Port: 53, Dst Port: 64118
Domain Name System (response)
  Transaction ID: 0x1d7b
  Flags: 0x8180 Standard query response, No error
  Questions: 1
  Answer RRs: 1
  Authority RRs: 13
  Additional RRs: 2
  Queries
  Answers
    bitsy.mit.edu: type A, class IN, addr 18.0.72.3
  Authoritative nameservers
    <Root>: type NS, class IN, ns f.root-servers.net
    <Root>: type NS, class IN, ns c.root-servers.net
    <Root>: type NS, class IN, ns e.root-servers.net
    <Root>: type NS, class IN, ns j.root-servers.net
    <Root>: type NS, class IN, ns m.root-servers.net
    <Root>: type NS, class IN, ns k.root-servers.net
    <Root>: type NS, class IN, ns d.root-servers.net
    <Root>: type NS, class IN, ns i.root-servers.net
    <Root>: type NS, class IN, ns a.root-servers.net
    <Root>: type NS, class IN, ns h.root-servers.net
    <Root>: type NS, class IN, ns b.root-servers.net
    <Root>: type NS, class IN, ns l.root-servers.net
    <Root>: type NS, class IN, ns g.root-servers.net
  Additional records
    a.root-servers.net: type A, class IN, addr 198.41.0.4
    b.root-servers.net: type A, class IN, addr 199.9.14.201
[Request In: 2]
[Time: 0.007815000 seconds]
No.      Time      Source      Destination      Protocol Length Info
  4 1.491638  192.168.0.102 18.0.72.3        DNS           82      Standard query 0x0001 PTR 3.72.0.18.in-addr.arpa
Frame 4: 82 bytes on wire (656 bits), 82 bytes captured (656 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60)
Internet Protocol Version 4, Src: 192.168.0.102, Dst: 18.0.72.3
User Datagram Protocol, Src Port: 64119, Dst Port: 53
Domain Name System (query)
  Transaction ID: 0x0001
  Flags: 0x0100 Standard query
  Questions: 1
  Answer RRs: 0
  Authority RRs: 0
  Additional RRs: 0
  Queries
No.      Time      Source      Destination      Protocol Length Info
  5 3.518912  192.168.0.102 18.0.72.3        DNS           74      Standard query 0x0002 A www.aiit.or.kr
Frame 5: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0
```

Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60)

Internet Protocol Version 4, Src: 192.168.0.102, Dst: 18.0.72.3

User Datagram Protocol, Src Port: 64120, 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

Queries

No.	Time	Source	Destination	Protocol	Length	Info
6	5.534220	192.168.0.102	18.0.72.3	DNS	74	Standard query 0x0003 AAAA www.aiit.or.kr

Frame 6: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF\_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0

Ethernet II, Src: IntelCor\_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT\_2d:ab:60 (64:66:b3:2d:ab:60)

Internet Protocol Version 4, Src: 192.168.0.102, Dst: 18.0.72.3

User Datagram Protocol, Src Port: 64121, 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

## Контрольні запитання

1. Знайдіть запит та відповідь DNS, який протокол вони використовують, UDP або TCP? Який номер цільового порта запиту DNS? Який номер вихідного порта відповіді DNS?

```
> Frame 4: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface \Device\NPF_{DD4C1491-1450-4267-96D7-9C982304A0FB}, id 0
> Ethernet II, Src: IntelCor_f3:47:88 (98:54:1b:f3:47:88), Dst: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60)
> Internet Protocol Version 4, Src: 192.168.0.102, Dst: 192.168.0.1
> User Datagram Protocol, Src Port: 51634, Dst Port: 53
> Domain Name System (query)
```

Цільовий порт: 53

Вихідний порт: 51634

2. На який адрес IP був відправлений запит DNS? Чи є цей адрес адресом локального сервера DNS?

IP: 192.168.0.1, є адресом локального порта.

3. Проаналізуйте повідомлення із запитом DNS. Якого «Типу» цей запит? Чи вміщує цей запит деякі можливі компоненти «відповіді»?

Цей запит – є запитом стандартного типу. Вміщує.

4. [Response In: 5] Дослідіть повідомлення із відповіддю DNS. Яка кількість відповідей запропонована сервером? Що вміщує кожна з цих відповідей?

```
Transaction ID: 0x16d4
> Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 1
Authority RRs: 4
Additional RRs: 8
> Queries
▼ Answers
  > www.google.com: type A, class IN, addr 216.58.209.4
  > Authoritative nameservers
  > Additional records
[Request In: 4]
[Time: 0.004393000 seconds]
```

5. Проаналізуйте повідомлення TCP SYN, яке відправила ваша робоча станція після отримання відповіді сервера DNS. Чи співпадає цільова IP адреса цього повідомлення з одною із відповідей сервера DNS?

Так, співпадає

15	1.941731	192.168.0.102	216.58.209.4	UDP	70	51635 → 443	Len=28
16	2.930274	192.168.0.102	192.168.0.1	DNS	72	Standard query 0x7056 A www.ietf.org	
17	2.949203	192.168.0.1	192.168.0.102	DNS	546	Standard query response 0x7056 A www.ietf.org CNAME www.ietf.org.cdn.cloudflare.net A 104.20.0.85 A 104.20.1.85	
18	2.950192	192.168.0.102	104.20.0.85	TCP	62	50138 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1	
19	2.950722	192.168.0.102	104.20.0.85	TCP	62	50139 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1	
20	2.969445	104.20.0.85	192.168.0.102	TCP	64	80 → 50138 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1400 SACK_PERM=1	

6. Чи виконує ваша робоча станція нові запити DNS для отримання ресурсів, які використовує документ, що отримав браузер?

```
74 Standard query 0x16d4 A www.google.com
338 Standard query response 0x16d4 A www.google.com A 216.58.209.4 NS ns4.google.com NS ns3.google.com NS ns1.google...
72 Standard query 0x7056 A www.ietf.org
546 Standard query response 0x7056 A www.ietf.org CNAME www.ietf.org.cdn.cloudflare.net A 104.20.0.85 A 104.20.1.85 N...
91 Standard query 0x7de8 A webadvisorc.rest.gti.mcafee.com
547 Standard query response 0x7de8 A webadvisorc.rest.gti.mcafee.com CNAME rest.gti.mcafee.akadns.net A 161.69.169.70...
88 Standard query 0xa140 A mip.api.mcafeewebadvisor.com
519 Standard query response 0xa140 A mip.api.mcafeewebadvisor.com CNAME WACloudLB-1801077940.us-east-1.elb.amazonaws...
78 Standard query 0x66aa A analytics.ietf.org
510 Standard query response 0x66aa A analytics.ietf.org CNAME ietf.org A 4.31.198.44 NS a0.org.afiliat-nst.info NS b2...
```

7. Яким був цільовий порт повідомлення із запитом DNS? Яким був вихідний порт повідомлення із відповіддю DNS?

Цільовий: 192.168.0.1

Вихідний: 192.168.0.1



8. На яку IP-адресу був направлений запит DNS? Чи є ця адреса адресою вашого локального сервера DNS за замовчанням?

192.168.0.1, є адресою локального сервера

9. Дослідіть повідомлення із запитом DNS. Якого «типу» був цей запит? Чи вміщує цей запит деякі можливі компоненти «відповіді»?

Цей запит – є запитом стандартного типу. Вміщує.

```
> Flags: 0x0100 Standard query
```

```
Questions: 1
```

```
Answer RRs: 0
```

```
Authority RRs: 0
```

```
Additional RRs: 0
```

```
> Queries
```

```
\[Response In: 8\]
```

10. Дослідіть повідомлення із відповіддю DNS. Скільки записів із відповідями було запропоновано сервером? З чого складається кожна із цих відповідей?

```

> Frame 8: 553 bytes on wire (4424 bits), 553 bytes captured (4424 bits) on interface \Device\NPF_{DD4C1491-1...
> Ethernet II, Src: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor_f3:47:88 (98:54:1b:f3:47:88)
> Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
> User Datagram Protocol, Src Port: 53, Dst Port: 63340
▼ Domain Name System (response)
  Transaction ID: 0x0003
  > Flags: 0x8180 Standard query response, No error
    Questions: 1
    Answer RRs: 4
    Authority RRs: 13
    Additional RRs: 6
  > 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 AAAA, class IN, addr 2a02:26f0:d200:19e::255e
    > e9566.dscb.akamaiedge.net: type AAAA, class IN, addr 2a02:26f0:d200:191::255e
  ▼ Authoritative nameservers
    > net: type NS, class IN, ns b.gtld-servers.net

```

11. На яку IP-адресу був направлений запит DNS? Чи є ця адреса адресою вашого локального сервера DNS за замовчанням?

IP: 192.168.0.1. Так є.

12. Дослідіть повідомлення із запитом DNS. Якого «типу» був цей запит? Чи вміщує цей запит деякі можливі компоненти «відповіді»?

Стандартний тип запиту. Так вміщує.

```

> Flags: 0x0100 Standard query
  Questions: 1
  Answer RRs: 0
  Authority RRs: 0
  Additional RRs: 0
> Queries
  [Response In: 38]

```

13. Дослідіть повідомлення із відповіддю DNS. Скільки

записів із відповідями було запропоновано сервером?  
Які сервери DNS були запропоновані у відповіді?  
Сервери були запропоновані за допомогою доменного імені, адреси IP або й того й іншого?

```
Questions: 1
Answer RRs: 8
Authority RRs: 0
Additional RRs: 11
> Queries
  Answers
    > mit.edu: type NS, class IN, ns eur5.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 usw2.akam.net
    > mit.edu: type NS, class IN, ns ns1-37.akam.net
    > mit.edu: type NS, class IN, ns ns1-173.akam.net
    > mit.edu: type NS, class IN, ns asia2.akam.net
    > mit.edu: type NS, class IN, ns asia1.akam.net
  Additional records
[Request In: 37]
[Time: 0.002002000 seconds]
```

00e0	00 08 05 61 73 69 61 31 c0 2a c0 53 00 01 00 01	...asia1.*.S....
00f0	00 00 01 a2 00 04 60 07 31 40 c0 40 00 01 00 01	..... 1@.@....
0100	00 00 01 a2 00 04 02 10 28 40 c0 40 00 1c 00 01	..... (@.@....
0110	00 00 01 a2 00 10 26 00 14 03 00 0a 00 00 00 00	.....&.....
0120	00 00 00 00 00 40 c0 a4 00 01 00 01 00 00 01 a2	.....@.....
0130	00 04 5f 65 24 40 c0 8e 00 01 00 01 00 00 01 a2	..._e\$@.....
0140	00 04 c1 6c 5b ad c0 8e 00 1c 00 01 00 00 01 a2	...l[.....

14. На яку IP-адресу був направлений запит DNS? Чи є ця адреса адресою вашого локального сервера DNS за замовчанням? Якщо ні, то якому доменному імені відповідає ця IP-адреса?

IP: 18.0.72.3. Не є адресою локального сервера.

```
  Domain Name System (query)
    Transaction ID: 0x1d7b
    > Flags: 0x0100 Standard query
    Questions: 1
    Answer RRs: 0
    Authority RRs: 0
    Additional RRs: 0
    > Queries
      [Response In: 3]
```

15. Дослідіть повідомлення із запитом DNS. Якого «типу» був цей запит? Чи вміщує цей запит деякі можливі компоненти «відповіді»?

Стандартний тип запиту. Ні не вміщує.

```
▼ Domain Name System (query)
  Transaction ID: 0x1d7b
  > Flags: 0x0100 Standard query
  Questions: 1
  Answer RRs: 0
  Authority RRs: 0
  Additional RRs: 0
  > Queries
    [Response In: 3]
```

16. Дослідіть повідомлення із відповіддю DNS. Скільки записів із відповідями було запропоновано сервером? З чого складається кожна з цих відповідей?

1 запис.

```
> Frame 3: 332 bytes on wire (2656 bits), 332 bytes captured (2656 bits) on interface \Device\NPF{...}
> Ethernet II, Src: Tp-LinkT_2d:ab:60 (64:66:b3:2d:ab:60), Dst: IntelCor_f3:47:88 (98:54:1b:f3:47:88)
> Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.102
> User Datagram Protocol, Src Port: 53, Dst Port: 64118
▼ Domain Name System (response)
  Transaction ID: 0x1d7b
  > Flags: 0x8180 Standard query response, No error
  Questions: 1
  Answer RRs: 1
  Authority RRs: 13
  Additional RRs: 2
  > Queries
  ▼ Answers
    > bitsy.mit.edu: type A, class IN, addr 18.0.72.3
  > Authoritative nameservers
  > Additional records
    [Request In: 2]
```

**Висновок:** В ході виконання даної лабораторної роботи, були покращені навички використання програми Wireshark для захоплення пакетів. Було проаналізовано протоколи DNS та було проведено аналіз деталей роботи даних протоколів.