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Assignment 5 – DNS Computer System and Networking

1. Do Activity 3 and upload the answer (along with screenshots) in Activity 5.3

Activity 5.3

Answer all questions in Activity 3 (give screenshots)

Submission status

Submission status	Submitted for grading
Grading status	Not graded
Due date	Wednesday, 5 October 2022, 7:30 AM

2. Find out how to run nslookup on Windows cmd (or the OS your PC is using). Then perform a iterative query manually to resolve dcse.fmipa.ugm.ac.id so that the IP address can be known without contacting the local DNS server.

a. Show any step-by-step command you entered and the output (screenshot)

Step 1 – **Local DNS**: Use nslookup (with no no recurse) to identify our local DNS

```
C:\Windows\System32>nslookup -norecurse
Default Server: UnKnown
Address: 172.20.10.1
```

Step 2 – **Google DNS**: Change our Local DNS 172.20.10.1 to Google's Public DNS 8.8.8.8

```
> server 8.8.8.8
Default Server: dns.google
Address: 8.8.8.8
```

Step 3 - **root**: Lookup all the nameserver list of root (.) by using nslookup type=ns

```
> set type=ns
> .
Server: dns.google
Address: 8.8.8.8

(root) nameserver = a.root-servers.net
(root) nameserver = b.root-servers.net
(root) nameserver = c.root-servers.net
(root) nameserver = d.root-servers.net
(root) nameserver = e.root-servers.net
(root) nameserver = f.root-servers.net
(root) nameserver = g.root-servers.net
(root) nameserver = h.root-servers.net
(root) nameserver = i.root-servers.net
(root) nameserver = j.root-servers.net
(root) nameserver = k.root-servers.net
(root) nameserver = l.root-servers.net
(root) nameserver = m.root-servers.net
m.root-servers.net internet address = 202.12.27.33
m.root-servers.net AAAA IPv6 address = 2001:dc3::35
l.root-servers.net internet address = 199.7.83.42
l.root-servers.net AAAA IPv6 address = 2001:500:9f::42
k.root-servers.net internet address = 193.0.14.129
k.root-servers.net AAAA IPv6 address = 2001:7fd::1
j.root-servers.net internet address = 192.58.128.30
j.root-servers.net AAAA IPv6 address = 2001:503:c27::2:30
i.root-servers.net internet address = 192.36.148.17
i.root-servers.net AAAA IPv6 address = 2001:7fe::53
h.root-servers.net internet address = 198.97.190.53
h.root-servers.net AAAA IPv6 address = 2001:500:1::53
g.root-servers.net internet address = 192.112.36.4
>
```

Step 4 – **root**: Obtain the IP address and the name of a.root-servers.net from 8.8.8.8 by using type=a

```
> set type=a
> a.root-servers.net
Server: dns.google
Address: 8.8.8.8

Non-authoritative answer:
Name: a.root-servers.net
Address: 198.41.0.4
```

Step 5 - **.id**: After getting the IP address of the a.root-servers.net , we may continue to deeper level to find all the nameserver existing in a.root-servers.net of .id by setting our server to 198.41.0.4 (a.root-servers.net) and list all the nameserver of .id

```
> server 198.41.0.4
in-addr.arpa nameserver = a.in-addr-servers.arpa
in-addr.arpa nameserver = b.in-addr-servers.arpa
in-addr.arpa nameserver = c.in-addr-servers.arpa
in-addr.arpa nameserver = d.in-addr-servers.arpa
in-addr.arpa nameserver = e.in-addr-servers.arpa
in-addr.arpa nameserver = f.in-addr-servers.arpa
f.in-addr-servers.arpa internet address = 193.0.9.1
f.in-addr-servers.arpa AAAA IPv6 address = 2001:67c:e0::1
e.in-addr-servers.arpa internet address = 203.119.86.101
e.in-addr-servers.arpa AAAA IPv6 address = 2001:dd8:6::101
d.in-addr-servers.arpa internet address = 200.10.60.53
d.in-addr-servers.arpa AAAA IPv6 address = 2001:13c7:7010::53
c.in-addr-servers.arpa internet address = 196.216.169.10
c.in-addr-servers.arpa AAAA IPv6 address = 2001:43f8:110::10
b.in-addr-servers.arpa internet address = 199.253.183.183
b.in-addr-servers.arpa AAAA IPv6 address = 2001:500:87::87
a.in-addr-servers.arpa internet address = 199.180.182.53
a.in-addr-servers.arpa AAAA IPv6 address = 2620:37:e000::53
Default Server: [198.41.0.4]
Address: 198.41.0.4

> set type=ns
> id.
Server: [198.41.0.4]
Address: 198.41.0.4

id nameserver = b.dns.id
id nameserver = c.dns.id
id nameserver = d.dns.id
id nameserver = e.dns.id
id nameserver = ns4.apnic.net
ns4.apnic.net internet address = 202.12.31.53
ns4.apnic.net AAAA IPv6 address = 2001:dd8:12::53
e.dns.id internet address = 103.19.177.177
e.dns.id AAAA IPv6 address = 2001:df5:4000:4::4
d.dns.id internet address = 45.126.57.57
d.dns.id AAAA IPv6 address = 2402:ee80:d::d
c.dns.id internet address = 103.19.178.178
c.dns.id AAAA IPv6 address = 2402:ee80:c::c
b.dns.id internet address = 103.19.179.179
b.dns.id AAAA IPv6 address = 2402:ee80:b::b
```

We can see that nameservers that exist in a-root are b.dns.id, c.dns.id, d.dns.id, e.dns.id ns4.apnic.net

Step 6 - **.ac.id** : Select e.dns.id (103.19.177.177) as our next visit and lookup for the nameserver of *ac.id* in the server

```
> server 103.19.177.177
103.in-addr.arpa nameserver = ns2.apnic.net
103.in-addr.arpa nameserver = ns3.lacnic.net
103.in-addr.arpa nameserver = apnic.authdns.ripe.net
103.in-addr.arpa nameserver = rirns.arin.net
rirns.arin.net internet address = 199.253.249.53
rirns.arin.net AAAA IPv6 address = 2620:38:2000::53
apnic.authdns.ripe.net internet address = 193.0.9.9
apnic.authdns.ripe.net AAAA IPv6 address = 2001:67c:e0::9
ns3.lacnic.net internet address = 200.3.13.14
ns3.lacnic.net AAAA IPv6 address = 2001:13c7:7002:3000::14
ns2.apnic.net internet address = 203.119.95.53
ns2.apnic.net AAAA IPv6 address = 2001:ddd::53
Default Server: [103.19.177.177]
Address: 103.19.177.177

> ac.id
Server: [103.19.177.177]
Address: 103.19.177.177

ac.id nameserver = d.dns.id
ac.id nameserver = b.dns.id
ac.id nameserver = c.dns.id
ac.id nameserver = e.dns.id
e.dns.id internet address = 103.19.177.177
e.dns.id AAAA IPv6 address = 2001:df5:4000:4::4
c.dns.id internet address = 103.19.178.178
c.dns.id AAAA IPv6 address = 2402:ee80:c::c
b.dns.id internet address = 103.19.179.179
b.dns.id AAAA IPv6 address = 2402:ee80:b::b
d.dns.id internet address = 45.126.57.57
d.dns.id AAAA IPv6 address = 2402:ee80:d::d
```

Step 7 – **ugm.ac.id**: After getting the list of servers obtained from the .id, we may select d.dns.id (45.126.57.57) as our next traversal and lookup for *ugm.ac.id*.

```
> set type=ns
> ugm.ac.id
Server: [45.126.57.57]
Address: 45.126.57.57

ugm.ac.id nameserver = ns1.ugm.ac.id
ugm.ac.id nameserver = ns2.ugm.ac.id
ugm.ac.id nameserver = ns3.ugm.ac.id
ns3.ugm.ac.id internet address = 175.111.88.4
ns2.ugm.ac.id internet address = 175.111.88.2
ns1.ugm.ac.id internet address = 202.43.92.2
>
```

Step 8 – **ugm.ac.id**: Above, ugm.ac.id have several servers namely ns1.ugm.ac.id, ns2.ugm.ac.id, and ns3.ugm.ac.id. We're going to pick ns2.ugm.ac.id as our next chosen server (175.111.88.2)

```

> server 175.111.88.2
in-addr.arpa    nameserver = a.in-addr-servers.arpa
in-addr.arpa    nameserver = b.in-addr-servers.arpa
in-addr.arpa    nameserver = c.in-addr-servers.arpa
in-addr.arpa    nameserver = d.in-addr-servers.arpa
in-addr.arpa    nameserver = e.in-addr-servers.arpa
in-addr.arpa    nameserver = f.in-addr-servers.arpa
f.in-addr-servers.arpa  internet address = 193.0.9.1
f.in-addr-servers.arpa  AAAA IPv6 address = 2001:67c:e0::1
e.in-addr-servers.arpa  internet address = 203.119.86.101
e.in-addr-servers.arpa  AAAA IPv6 address = 2001:dd8:6::101
d.in-addr-servers.arpa  internet address = 200.10.60.53
d.in-addr-servers.arpa  AAAA IPv6 address = 2001:13c7:7010::53
c.in-addr-servers.arpa  internet address = 196.216.169.10
c.in-addr-servers.arpa  AAAA IPv6 address = 2001:43f8:110::10
b.in-addr-servers.arpa  internet address = 199.253.183.183
b.in-addr-servers.arpa  AAAA IPv6 address = 2001:500:87::87
a.in-addr-servers.arpa  internet address = 199.180.182.53
a.in-addr-servers.arpa  AAAA IPv6 address = 2620:37:e000::53
Default Server: [175.111.88.2]
Address: 175.111.88.2

```

Step 9 – **fmipa.ugm.ac.id**: After getting the ugm.ac.id, we are going to lookup for the information and ip address of fmipa.ugm.ac.id from ugm.ac.id (175.111.88.2 – ns2.ugm.ac.id)

```

> set type=ns
> fmipa.ugm.ac.id
Server: [175.111.88.2]
Address: 175.111.88.2

ugm.ac.id      nameserver = ns1.ugm.ac.id
ugm.ac.id      nameserver = ns2.ugm.ac.id
ugm.ac.id      nameserver = ns3.ugm.ac.id
ns3.ugm.ac.id  internet address = 175.111.88.4
ns2.ugm.ac.id  internet address = 175.111.88.2
ns1.ugm.ac.id  internet address = 202.43.92.2
> set type=a
> fmipa.ugm.ac.id
Server: [175.111.88.2]
Address: 175.111.88.2

Name:  fmipa.ugm.ac.id
Served by:
- ns3.ugm.ac.id
  175.111.88.4
  ugm.ac.id
- ns1.ugm.ac.id
  202.43.92.2
  ugm.ac.id
- ns2.ugm.ac.id
  175.111.88.2
  ugm.ac.id
> server 175.111.88.4

```

fmipa.ugm.ac.id have 3 nameservers that are ns1.ugm.ac.id, ns2.ugm.ac.id, and ns3.ugm.ac.id, we are going to pick ns3.ugm.ac.id to lookup for dsce.fmipa.ugm.ac.id

Down here, we select 175.111.88.4 (ns3.ugm.ac.id) of fmipa.ugm.ac.id server to

Step 10 – **dsce.fmipa.ugm.ac.id**: Lastly, as our last objective to resolve the *dcse.fmipa.ugma.ac.id* can be obtained by checking from the fmipa.ugm.ac.id DNS server.

```

> set type=a
> dcse.fmipa.ugm.ac.id.
Server: [175.111.88.137]
Address: 175.111.88.137

```

dcse.fmipa.ugm.ac.id resolved ip address: 175.111.88.173

b. In total, how many name servers did you visit? Also show the IP addresses of these servers.

Answer: 6 from root until dcse.fmipa.ugm.ac.id

1.) root – a.root-servers.net (198.41.0.4)

```
> set type=a
> a.root-servers.net
Server:  dns.google
Address:  8.8.8.8

Non-authoritative answer:
Name:     a.root-servers.net
Address:  198.41.0.4

> server 198.41.0.4
```

2.) .id – e.dns.id (103.19.117.117)

```
> set type=ns
> id.
Server:  [198.41.0.4]
Address: 198.41.0.4

id      nameserver = b.dns.id
id      nameserver = c.dns.id
id      nameserver = d.dns.id
id      nameserver = e.dns.id
id      nameserver = ns4.apnic.net
```

```
ns4.apnic.net AAAA IPv6 address = 2001:dd8:12::53
e.dns.id      internet address = 103.19.117.117
```

```
ns2.apnic.net AAAA IPv6 address = 2001:dd8:12::52
Default Server: [103.19.117.117]
Address: 103.19.117.117
```

3.) .ac.id – d.dns.id (45.126.57.57)

```
> set type=ns
> ac.id
Server:  [103.19.117.117]
Address: 103.19.117.117

ac.id    nameserver = d.dns.id
ac.id    nameserver = b.dns.id
ac.id    nameserver = c.dns.id
ac.id    nameserver = e.dns.id
```

```
b.dns.id AAAA IPv6 address = 2402:cc80:0::10
d.dns.id internet address = 45.126.57.57
```

```
> server 45.126.57.57
Default Server: [45.126.57.57]
Address: 45.126.57.57
```

4.) .ugm.ac.id – ns2.ugm.ac.id (175.111.88.2)

```
> set type=ns
> ugm.ac.id
Server: [45.126.57.57]
Address: 45.126.57.57

ugm.ac.id      nameserver = ns1.ugm.ac.id
ugm.ac.id      nameserver = ns2.ugm.ac.id
ugm.ac.id      nameserver = ns3.ugm.ac.id
ns3.ugm.ac.id  internet address = 175.111.88.4
ns2.ugm.ac.id  internet address = 175.111.88.2
ns1.ugm.ac.id  internet address = 202.43.92.2
> server 175.111.88.2
```

5.) fmipa.ugm.ac.id – ns1.ugm.ac.id (175.111.88.4)

```
> fmipa.ugm.ac.id
Server: [175.111.88.2]
Address: 175.111.88.2

ugm.ac.id      nameserver = ns1.ugm.ac.id
ugm.ac.id      nameserver = ns2.ugm.ac.id
ugm.ac.id      nameserver = ns3.ugm.ac.id
```

```
Name: fmipa.ugm.ac.id
Served by:
- ns3.ugm.ac.id
  175.111.88.4
  ugm.ac.id
- ns1.ugm.ac.id
  202.43.92.2
  ugm.ac.id
- ns2.ugm.ac.id
  175.111.88.2
  ugm.ac.id

> server 175.111.88.4
in: addn: 202.43.92.2 - newoserver
```

6.) dcse.fmipa.ugm.ac.id – (175.111.88.137)

```
> set type=a
> dcse.fmipa.ugm.ac.id.
Server: [175.111.88.137]
Address: 175.111.88.137

Name: dcse.fmipa.ugm.ac.id
Served by:
```