

## JOB SHEET 7

### TRACEROUTE

### COMPUTER NETWORKING PRACTICUM

Name : Lovie Jechonia Tonimba

NIM : 244107060101

Class : 2G

Major : Business Information System

#### Practicum steps

1. Use the traceroute program to track gateways that are traversed to hosts outside the Polinema intranet network (facebook, google or others). Observe the results and save the screenshot.

- **traceroute google.com**

```
debian@debian:~$ traceroute google.com
traceroute to google.com (172.217.194.138), 30 hops max, 60 byte packets
 1 192.168.1.1 (192.168.1.1)  0.820 ms  0.812 ms  0.828 ms
 2 gns3vm (192.168.122.1)  1.984 ms  1.913 ms  1.920 ms
 3 _gateway (192.168.60.1)  2.318 ms  2.298 ms  2.278 ms
 4 172.16.62.254 (172.16.62.254)  2.252 ms  3.049 ms  3.168 ms
 5 10.10.40.1 (10.10.40.1)  2.144 ms  2.119 ms  2.394 ms
 6 114.6.31.173 (114.6.31.173)  3.020 ms  225.234.182.103.ipt.iforte.net.id (103.182.234.225)  2.691 ms  103.183.5.97 (103.183.5.97)  1.530 ms
 7 * 114.0.70.228 (114.0.70.228)  4.942 ms *
 8 * * *
 9 114.0.116.21 (114.0.116.21)  28.359 ms  28.750 ms  2.182.182.103.ipt.iforte.net.id (103.182.182.2)  14.747 ms
10 182.16.180.85 (182.16.180.85)  17.153 ms  15.251 ms  72.14.205.94 (72.14.205.94)  26.773 ms
11 * * *
12 142.251.241.0 (142.251.241.0)  26.365 ms isix-tebet.iforte.net.id (103.12.14.26)  17.283 ms 209.85.245.50 (209.85.245.50)  27.882 ms
13 142.251.230.50 (142.251.230.50)  27.057 ms 142.251.192.12 (142.251.192.12)  49.882 ms 72.14.196.218 (72.14.196.218)  49.129 ms
14 142.251.230.147 (142.251.230.147)  27.585 ms * *
15 142.251.252.39 (142.251.252.39)  27.962 ms 209.85.242.109 (209.85.242.109)  25.927 ms 74.125.251.206 (74.125.251.206)  53.898 ms
16 142.251.192.12 (142.251.192.12)  27.916 ms 142.251.192.8 (142.251.192.8)  53.970 ms 142.251.192.10 (142.251.192.10)  52.696 ms
17 142.251.230.145 (142.251.230.145)  43.333 ms * *
18 * 142.251.229.228 (142.251.229.228)  30.261 ms *
19 66.249.95.23 (66.249.95.23)  50.322 ms 108.170.230.105 (108.170.230.105)  50.556 ms *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * si-in-f138.1e100.net (172.217.194.138)  26.262 ms  27.177 ms
debian@debian:~$
```

- **traceroute facebook.com**

```
debian@debian:~$ traceroute facebook.com
traceroute to facebook.com (31.13.95.35), 30 hops max, 60 byte packets
 1 192.168.1.1 (192.168.1.1)  1.066 ms  1.028 ms  1.016 ms
 2 gns3vm (192.168.122.1)  1.756 ms  1.709 ms  1.658 ms
 3 _gateway (192.168.60.1)  2.126 ms  2.093 ms  2.108 ms
 4 172.16.62.254 (172.16.62.254)  2.137 ms  2.104 ms  2.452 ms
 5 10.10.40.1 (10.10.40.1)  2.868 ms  2.367 ms  2.376 ms
 6 114.6.31.173 (114.6.31.173)  2.745 ms 103.183.5.97 (103.183.5.97)  1.309 ms 114.6.31.173 (114.6.31.173)  1.693 ms
 7 114.0.70.228 (114.0.70.228)  3.982 ms 105.182.182.103.ipt.iforte.net.id (103.182.182.105)  21.118 ms 114.0.70.228 (114.0.70.228)  4.647 ms
 8 * 106.182.182.103.ipt.iforte.net.id (103.182.182.106)  15.073 ms 114.0.70.229 (114.0.70.229)  17.646 ms
 9 * * 2.182.182.103.ipt.iforte.net.id (103.182.182.2)  15.061 ms
10 114.0.112.71 (114.0.112.71)  15.679 ms 15.611 ms 16.285 ms
11 isix.iforte.net.id (103.116.219.5)  22.549 ms ps001.asu02.cgk1.tfbnw.net (129.134.39.44)  39.360 ms 114.0.124.104 (114.0.124.104)  17.199 ms
12 psu01.cgk1.tfbnw.net (129.134.58.47)  31.508 ms 114.0.15.42 (114.0.15.42)  17.451 ms 18.821 ms
13 msuiad.02.cgk1.tfbnw.net (129.134.91.186)  16.476 ms ae7.pr01.cgk2.tfbnw.net (157.240.94.254)  16.813 ms 16.879 ms
14 * * *
15 * psu04.cgk1.tfbnw.net (129.134.58.44)  16.944 ms *
16 msuiar.02.cgk1.tfbnw.net (129.134.91.29)  19.462 ms * *
17 * * *
18 * * *
19 * * *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * * *
27 * * *
28 * * *
29 * * *
30 * * *
debian@debian:~$
```

2. Use the traceroute program to track the gateway passed TO polinema.ac.id. Observe the results and save the screenshot.

#### **traceroute polinema.ac.id**

```
debian@debian:~$ traceroute polinema.ac.id
traceroute to polinema.ac.id (10.10.92.49), 30 hops max, 60 byte packets
 1  192.168.1.1 (192.168.1.1)  1.108 ms  1.086 ms  1.042 ms
 2  gns3vm (192.168.122.1)  1.669 ms  1.628 ms  1.701 ms
 3  _gateway (192.168.60.1)  1.661 ms  2.005 ms  2.145 ms
 4  172.16.62.254 (172.16.62.254)  2.449 ms  2.380 ms  2.397 ms
 5  10.10.92.49 (10.10.92.49)  3.877 ms  4.024 ms  4.008 ms
debian@debian:~$
```

3. Explain the meaning of the traceroute result.

- **Traceroute google.com**

The traceroute results to google.com show that the initial route starts from a local network with private IPs such as 192.168.1.1, 192.168.122.1, and 192.168.60.1, then moves to the ISP network with the domain iforte.net.id and then to Google's global router (starting with 142.251.x.x and 108.170.x.x). The response time (RTT) gradually increased from 1–2 ms at the local hop to around 50 ms at the final hop, indicating an increasing distance. The presence of several \* marks indicates that some routers along the path did not send ICMP replies due to security restrictions, but traceroute still successfully reached the destination host.

- **Traceroute facebook.com**

The traceroute to facebook.com (31.13.95.35) shows that the packet transmission process starts from the internal network (192.168.x.x), then moves to the iforte.net.id network, and finally enters the Facebook infrastructure with the tfbnu.net and fbcdn.net domains, which are part of the Facebook/Meta network. The RTT values show a gradual increase from around 1 ms on the local network to around 17–30 ms on external hops. On subsequent hops, there are many asterisks (\*), which means that the routers are blocking the ICMP traceroute responses. Nevertheless, the traceroute successfully displays the main path until it reaches the Facebook server network.

- **Traceroute polinema.ac.id**

Traceroute to polinema.ac.id (10.10.92.49) shows a much shorter route, only going through 5 hops before reaching its destination. The route starts from 192.168.1.1 as the local router, then to gns3vm (192.168.122.1), then the main gateway (192.168.60.1) and the inter-network router (172.16.62.254) before finally reaching Polinema's internal address. All hops have very low response times, between 1–4 ms, indicating that the connection is still within the local intranet. There are no asterisks in the results, indicating that all routers are responding normally and connectivity between internal nodes is working well.

4. Use the traceroute program with the other 4 parameters explained previously, to the destination host (whatever the destination you choose), observe the difference and save the screenshot.

- **traceroute -n google.com** : to disable DNS lookup (domain name) and display only the IP address without attempting to convert (resolve) it to a host name.

```

debian@debian:~$ traceroute -n google.com
traceroute to google.com (172.217.194.101), 30 hops max, 60 byte packets
 1 192.168.1.1 1.052 ms 1.026 ms 0.986 ms
 2 192.168.122.1 2.051 ms 2.015 ms 2.610 ms
 3 192.168.60.1 2.542 ms 2.470 ms 2.426 ms
 4 172.16.62.254 2.960 ms 3.139 ms 3.082 ms
 5 10.10.40.1 3.022 ms 2.884 ms 3.348 ms
 6 114.6.31.173 8.782 ms 6.932 ms 6.972 ms
 7 114.0.78.228 4.568 ms * 4.683 ms
 8 114.0.78.229 31.643 ms 31.611 ms 31.268 ms
 9 114.0.116.21 44.679 ms 46.772 ms 44.893 ms
10 72.14.205.94 44.117 ms 45.352 ms 43.026 ms
11 * * 122.102.46.1 50.356 ms
12 142.251.77.156 43.305 ms 43.323 ms 43.365 ms
13 142.251.192.8 40.198 ms 142.250.63.142 37.271 ms 142.251.192.10 35.841 ms
14 * 216.239.50.55 35.645 ms *
15 209.85.244.156 57.224 ms 142.251.231.128 34.554 ms 209.85.245.232 33.269 ms
16 72.14.238.89 34.559 ms 142.251.192.6 34.581 ms 142.251.229.66 60.030 ms
17 66.249.95.248 57.265 ms 142.251.229.215 58.023 ms 36.311 ms
18 * * *
19 209.85.246.19 58.428 ms 36.699 ms *
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 * 172.217.194.101 41.302 ms *
debian@debian:~$

```

- **traceroute -w 2 google.com** : response timeout. Sets the maximum time (in seconds) to wait for each response from a probe (TTL). If the hop does not respond within 2 seconds, an asterisk (\*) will appear sooner.

```

debian@debian:~$ traceroute -w 2 google.com
traceroute to google.com (172.217.194.100), 30 hops max, 60 byte packets
 1 192.168.1.1 (192.168.1.1) 0.866 ms 0.856 ms 0.805 ms
 2 gns3vm (192.168.122.1) 4.450 ms 4.416 ms 4.410 ms
 3 _gateway (192.168.60.1) 4.365 ms 4.316 ms 4.267 ms
 4 172.16.62.254 (172.16.62.254) 2.143 ms 2.145 ms 2.085 ms
 5 10.10.40.1 (10.10.40.1) 8.135 ms 8.260 ms 10.484 ms
 6 103.183.5.97 (103.183.5.97) 10.779 ms 114.6.31.173 (114.6.31.173) 9.440 ms 9.511 ms
 7 * 114.0.78.228 (114.0.78.228) 11.037 ms 105.182.182.103.ipt.ifforte.net.id (103.182.182.105) 21.059 ms
 8 114.0.78.229 (114.0.78.229) 16.422 ms 16.005 ms 16.660 ms
 9 114.0.116.21 (114.0.116.21) 27.514 ms 27.996 ms 38.629 ms
10 core-ref.01.idc.hypernet.co.id (122.102.47.1) 40.178 ms 72.14.205.94 (72.14.205.94) 33.044 ms 34.760 ms
11 * core-ix.01.idc.hypernet.co.id (122.102.46.1) 58.407 ms *
12 122.102.46.26 (122.102.46.26) 51.201 ms 142.251.54.248 (142.251.54.248) 32.740 ms 142.251.77.156 (142.251.77.156) 34.988 ms
13 142.251.192.10 (142.251.192.10) 32.641 ms 142.250.63.142 (142.250.63.142) 33.749 ms 72.14.196.218 (72.14.196.218) 62.269 ms
14 142.251.229.225 (142.251.229.225) 36.749 ms 216.239.35.154 (216.239.35.154) 35.832 ms *
15 216.239.62.42 (216.239.62.42) 35.347 ms 142.251.52.48 (142.251.52.48) 36.303 ms 142.251.230.148 (142.251.230.148) 34.803 ms
16 66.249.94.85 (66.249.94.85) 34.304 ms 209.85.246.17 (209.85.246.17) 34.207 ms 209.85.246.15 (209.85.246.15) 32.011 ms
17 142.251.230.135 (142.251.230.135) 33.956 ms * *
18 * * *
19 * * 108.170.231.23 (108.170.231.23) 33.715 ms
20 * * *
21 * * *
22 * * *
23 * * *
24 * * *
25 * * *
26 si-in-f100.1e100.net (172.217.194.100) 34.316 ms 35.407 ms *
debian@debian:~$

```

- **traceroute -q 1 google.com** : number of probes per hop. Only 1 time value (ms) per hop, not 3. The output is shorter and completes faster.

```

debian@debian:~$ traceroute -q 1 google.com
traceroute to google.com (74.125.24.139), 30 hops max, 60 byte packets
 1  192.168.1.1 (192.168.1.1)  0.777 ms
 2  gns3vm (192.168.122.1)  37.298 ms
 3  _gateway (192.168.60.1)  37.273 ms
 4  172.16.62.254 (172.16.62.254)  37.248 ms
 5  10.10.40.1 (10.10.40.1)  4.182 ms
 6  114.6.31.173 (114.6.31.173)  4.439 ms
 7  *
 8  114.0.78.229 (114.0.78.229)  16.957 ms
 9  2.182.182.103.ipt.iforte.net.id (103.182.182.2)  15.094 ms
10  74.125.48.68 (74.125.48.68)  26.989 ms
11  isix.iforte.net.id (103.116.219.5)  17.584 ms
12  142.251.192.12 (142.251.192.12)  29.041 ms
13  142.251.230.145 (142.251.230.145)  29.381 ms
14  72.14.236.223 (72.14.236.223)  30.210 ms
15  172.253.68.249 (172.253.68.249)  29.370 ms
16  *
17  *
18  *
19  *
20  *
21  *
22  *
23  *
24  *
25  sf-in-f139.1e100.net (74.125.24.139)  34.315 ms
debian@debian:~$

```

- **traceroute -f 5 google.com** : Specifies the TTL (first hop) value to use when starting traceroute. By default, traceroute starts from TTL = 1 (first hop). Traceroute will not display hops 1–4, starting directly from hop 5. Usually, the first hop number = 5 is visible in the results.

```

debian@debian:~$ traceroute -f 5 google.com
traceroute to google.com (74.125.24.101), 30 hops max, 60 byte packets
 5  10.10.40.1 (10.10.40.1)  2.143 ms  2.253 ms  2.269 ms
 6  225.234.182.103.ipt.iforte.net.id (103.182.234.225)  6.645 ms  4.393 ms  114.6.31.173 (114.6.31.173)  2.640 ms
 7  114.0.78.228 (114.0.78.228)  5.804 ms  6.012 ms *
 8  * 114.0.78.229 (114.0.78.229)  27.434 ms  27.532 ms
 9  2.182.182.103.ipt.iforte.net.id (103.182.182.2)  26.341 ms  114.0.116.23 (114.0.116.23)  34.122 ms  33.557 ms
10  74.125.48.68 (74.125.48.68)  33.343 ms core-ix.01.csf.hypernet.co.id (122.102.46.9)  38.241 ms 74.125.48.68 (74.125.48.68)  26.665 ms
11  192.178.109.205 (192.178.109.205)  31.570 ms 192.178.109.119 (192.178.109.119)  28.025 ms 72.14.196.218 (72.14.196.218)  52.519 ms
12  142.251.192.8 (142.251.192.8)  27.447 ms 142.251.229.66 (142.251.229.66)  31.394 ms 142.250.63.142 (142.250.63.142)  27.842 ms
13  142.251.54.248 (142.251.54.248)  53.525 ms 216.239.35.148 (216.239.35.148)  31.224 ms google-pn1.jkt-link.iforte.net.id (103.116.216.158)  35.039 ms
14  142.251.230.228 (142.251.230.228)  26.938 ms 142.251.229.66 (142.251.229.66)  48.823 ms 216.239.51.46 (216.239.51.46)  25.937 ms
15  74.125.251.206 (74.125.251.206)  33.773 ms 142.251.240.254 (142.251.240.254)  31.079 ms 64.233.174.185 (64.233.174.185)  26.326 ms
16  * * 142.251.192.10 (142.251.192.10)  33.583 ms
17  * * 172.253.69.5 (172.253.69.5)  55.510 ms
18  72.14.238.177 (72.14.238.177)  35.624 ms * *
19  * * 172.253.69.1 (172.253.69.1)  30.883 ms
20  * * *
21  * * *
22  * * *
23  * * *
24  sf-in-f101.1e100.net (74.125.24.101)  43.422 ms * *
debian@debian:~$

```

5. Use the windows operating system and tracert program to track gateways traversed to hosts outside the intranet network (facebook, google, or others) and to polinema.ac.id. Observe the results and save the screenshot.

- **tracert google.com**

```

C:\Users\lovie tonimba>tracert google.com

Tracing route to google.com [172.217.194.113]
over a maximum of 30 hops:

  1     3 ms     2 ms     4 ms  Lovie [192.168.56.1]
  2    10 ms     3 ms     4 ms  192.168.61.1
  3     5 ms     4 ms     7 ms  172.16.62.254
  4    26 ms     7 ms     6 ms  10.10.40.1
  5    35 ms    59 ms    20 ms  114.6.31.173
  6    96 ms    16 ms    11 ms  114.0.78.228
  7    45 ms    77 ms    24 ms  114.0.78.229
  8    60 ms    29 ms    80 ms  114.0.116.21
  9    42 ms   113 ms   99 ms  72.14.205.94
 10    61 ms   100 ms  102 ms  172.253.77.225
 11    36 ms    62 ms    *    142.251.192.12
 12    90 ms    *        40 ms  209.85.255.43
 13   106 ms    85 ms   102 ms  216.239.62.42
 14    68 ms   142 ms   99 ms  74.125.37.249
 15    *        *        *    Request timed out.
 16    *        *        *    Request timed out.
 17    *        *        *    Request timed out.
 18    *        *        *    Request timed out.
 19    *        *        *    Request timed out.
 20    *        *        *    Request timed out.
 21    *        *        *    Request timed out.
 22    *        *        *    Request timed out.
 23    *        *        *    Request timed out.
 24    *        *        *    Request timed out.
 25    *        *        *    Request timed out.
 26    66 ms   102 ms   33 ms  si-in-f113.1e100.net [172.217.194.113]

Trace complete.

C:\Users\lovie tonimba>

```

- **tracert facebook.com**

```

C:\Users\lovie tonimba>tracert facebook.com

Tracing route to facebook.com [57.144.192.1]
over a maximum of 30 hops:

  1     8 ms     7 ms    15 ms  Lovie [192.168.56.1]
  2    10 ms     6 ms     2 ms  192.168.61.1
  3    15 ms     6 ms    16 ms  172.16.62.254
  4    19 ms     3 ms     3 ms  10.10.40.1
  5     *        4 ms     5 ms  114.6.31.173
  6    16 ms     7 ms     6 ms  114.0.78.228
  7    34 ms    46 ms   1738 ms  114.0.78.229
  8     *        *        *    Request timed out.
  9    32 ms    20 ms    20 ms  114.0.112.71
 10   113 ms    92 ms    99 ms  114.0.124.184
 11    77 ms   110 ms    87 ms  163.77.191.233
 12    59 ms    98 ms   105 ms  163.77.192.3
 13    88 ms    96 ms    25 ms  edge-star-mini-shv-02-cgk2.facebook.com [57.144.192.1]

Trace complete.

C:\Users\lovie tonimba>

```

- **tracert polinema.ac.id**

```

Tracing route to polinema.ac.id [10.10.92.49]
over a maximum of 30 hops:

  1     9 ms     4 ms     3 ms  Lovie [192.168.56.1]
  2     7 ms     3 ms     4 ms  192.168.61.1
  3    11 ms     8 ms     3 ms  172.16.62.254
  4    11 ms     4 ms    10 ms  10.10.92.49

Trace complete.

C:\Users\lovie tonimba>

```

6. Use the 3 parameters described above for the tracert program and observe and then save the screenshot.

- **tracert -d google.com**

```
C:\Users\lovie tonimba>tracert -d google.com

Tracing route to google.com [74.125.24.101]
over a maximum of 30 hops:

  1      4 ms      3 ms      5 ms  192.168.56.1
  2      3 ms     11 ms      3 ms  192.168.61.1
  3      3 ms      3 ms      4 ms  172.16.62.254
  4     19 ms      3 ms      3 ms  10.10.40.1
  5     19 ms      4 ms      8 ms  103.182.234.225
  6     30 ms     20 ms     34 ms  103.182.182.105
  7     30 ms     21 ms     23 ms  103.182.182.106
  8     17 ms     15 ms     19 ms  103.182.182.2
  9     22 ms     24 ms     16 ms  182.16.180.85
 10     20 ms     18 ms     18 ms  103.116.219.5
 11     27 ms     28 ms     18 ms  103.12.14.26
 12     36 ms     36 ms     37 ms  103.116.216.158
 13     35 ms     40 ms     36 ms  172.253.77.225
 14     36 ms     36 ms     39 ms  142.251.192.10
 15     37 ms     35 ms     34 ms  216.239.50.43
 16     34 ms     33 ms     35 ms  142.251.231.128
 17     35 ms     41 ms     34 ms  172.253.68.247
 18      *        *        *    Request timed out.
 19      *        *        *    Request timed out.
 20      *        *        *    Request timed out.
 21      *        *        *    Request timed out.
 22      *        *        *    Request timed out.
 23      *        *        *    Request timed out.
 24      *        *        *    Request timed out.
 25      *        *        *    Request timed out.
 26      *        *        *    Request timed out.
 27     36 ms     32 ms     33 ms  74.125.24.101

Trace complete.
```

- **tracert -h 10 polinema.ac.id**

```
C:\Users\lovie tonimba>tracert -h 10 google.com

Tracing route to google.com [74.125.24.113]
over a maximum of 10 hops:

  1      3 ms      2 ms      5 ms  Lovie [192.168.56.1]
  2      5 ms      8 ms      3 ms  192.168.61.1
  3      2 ms      3 ms      4 ms  172.16.62.254
  4      4 ms      4 ms      3 ms  10.10.40.1
  5      8 ms      3 ms      2 ms  114.6.31.173
  6      6 ms      7 ms      5 ms  114.0.78.228
  7      *      18 ms     29 ms  114.0.78.229
  8     36 ms     30 ms     29 ms  114.0.116.23
  9     30 ms     30 ms     31 ms  74.125.48.68
 10     29 ms     29 ms     29 ms  192.178.109.119

Trace complete.
```

- **tracert -w 5000 google.com**

```
C:\Users\lovie tonimba>tracert -w 5000 google.com

Tracing route to google.com [74.125.24.113]
over a maximum of 30 hops:

  1    1 ms    1 ms    4 ms  Lovie [192.168.56.1]
  2    3 ms    2 ms    2 ms  192.168.61.1
  3    2 ms    2 ms    5 ms  172.16.62.254
  4    5 ms    8 ms    4 ms  10.10.40.1
  5    3 ms    5 ms    5 ms  114.6.31.173
  6    6 ms    5 ms    5 ms  114.0.78.228
  7   18 ms   19 ms   20 ms  114.0.78.229
  8   36 ms   31 ms   31 ms  114.0.116.23
  9   28 ms   39 ms   37 ms  74.125.48.68
 10   29 ms   28 ms   28 ms  192.178.109.119
 11   31 ms   30 ms   33 ms  142.251.192.6
 12   40 ms   37 ms   34 ms  216.239.35.154
 13   28 ms   28 ms   27 ms  216.239.51.46
 14   30 ms   30 ms   30 ms  172.253.69.5
 15    *      *      *    Request timed out.
 16    *      *      *    Request timed out.
 17    *      *      *    Request timed out.
 18    *      *      *    Request timed out.
 19    *      *      *    Request timed out.
 20    *      *      *    Request timed out.
 21    *      *      *    Request timed out.
 22    *      *      *    Request timed out.
 23    *      *      *    Request timed out.
 24    *      *      *    Request timed out.
 25    *      *      *    Request timed out.
 26   29 ms   29 ms   29 ms  sf-in-f113.1e100.net [74.125.24.113]

Trace complete.
```