Lab 1 – Networking Tools – Answer Sheet

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Operating System : Linux (Arch distro)

Lab dates
Tuesday 4 September 2018

Deadline
Thursday 6 September 2018 at 23:59 CEST

Total points
10

This lab must be done individually

Task 1 – Application Layer

Task 1a – Wireshark

1. (a) 64.131.69.134
   (b) 172.16.83.2
   (c) 1126 DNS

2. (a) 23
   (b) http.request.method == "GET" and ip.addr == 64.131.69.134

Task 1b – HTTP Authentication

3. (a) 403 Unauthorized
   (b) Authorization

Task 1c – More tools: nmap, netcat

4. (a) yes
   (b) yes
   (c) 22, 80, 443, 2000, 5060, 8443 and 8888
   (d) ssh, http, https, cisco-sccp, sip, https-alt and sun-answerbook respectively

5. (a) nc -zv -p 4040 www.cambridge.org 80
   (b) An HTTP response with status code 403. It contains a header followed by data in the form of HTML.

6. (a) nmap -sP 145.100.104.96/27
   (b) 15

7. (a) nc -l 6060
   (b) nc localhost 6060
   (c) when entering text in either the host or the client, this text will appear at the other end throught the TCP connection

8. (a) curl -vL www.anandtech.com

(b) AkamaiGHost and nginx

Task 2 – Network Layer

Task 2a – ICMP

9. (a) traceroute -q 7 www.nintendo.co.jp
   (b) The use of '-q 7' is evident due to the fact that each node in the route is sent 7 queries instead of the default 3. The fact that the rout to www.nintendo.co.jp is traced can be seen from the DNS requests.
   (c) 10
   (d) Since the the max observed TTL is 10, which means a maximum of 10 nodes could have been passed.

10. (a) The source sends ICMP messages with a TTL starting at 1 targetting the destination on an unreachable port. A new message is sent after a TTL exceeded message has been received but with each new message the TTL is increased by 1.
    (b) An ICMP message containing a TTL exceeded.
    (c) The soucre knows the desired destination has been reached when a ICMP containing Destination Unreachable message

Task 2b – Ping and Traceroute

11. (a)

www.netflix.com	Ping not available, site available
www.gvb.nl	Ping available
www.nintendo.co.jp	Ping available
www.surf.nl	Ping available
www.nos.nl	Ping not available, site available
www.auone.jp	Ping available
www.craigslist.com	Ping available
www.alipay.com	Ping available

    (b) They might block pings to avoid potential spam or misuse of the ping functionality like the Ping of Death for example

12. (a) (time in *ms*)

www.netflix.com	n.a.
www.gvb.nl	26.763
www.nintendo.co.jp	25.020
www.surf.nl	15.645
www.nos.nl	n.a.
www.auone.jp	466.385
www.craigslist.com	298.411
www.alipay.com	396.805

    (b) There are vast differences in the RTT times. This is most likely caused by a difference in geographical distance between my computer and the host server.
    (c) Propagation delay

13. (a) In both of these cases, the largest amount of delay increase occurs when international and, in the case of www.craigslist.com, sea borders. Crossing borders introduces additional network infrastructure, which in the case of American websites is usually embodied by the large trans-Atlantic underwater fiberoptic cables.

Task 2c – Tracerouting Network Paths

14. (a) 4

(b)

```
100ge3-1.core1.ams1.he.net (184.105.65.17)  48.077 ms  28.483 ms  58.142 ms

broadband-hosting.10gigabitethernet1-15.core1.ams1.he.net (216.66.90.78)  28.480
ms  30.364 ms  28.869 ms

jointtransit-3.rtl.nl (217.170.10.188)  28.837 ms  29.877 ms  30.999 ms

217.118.160.215 (217.118.160.215)  30.616 ms  28.716 ms  31.271 ms
```

(c) These are links inside the Netherlands. These are the same for both hosts since the route will eventually enter the Netherlands, from which point they'll follow the same path
(d) In the cases of both hosts the largest increase occurs when entering Poland and the Netherlands. This delay is a result of crossing the border and passing from one county's infrastructure to another's

15. (a) 6
(b) These are the same because the route has entered the US and will therefore take the same path.
(c) The Czech host takes a route from ffm-bb4-link.telia.net directly to nyk-bb4-link.telia.net, while the Polish one also passes through prs-bb4-link.telia.net between the aforementioned links.