ANNEX A · DHCP AND DNS

Name: _____ Group G = _____ Date: _____

TASK 1 **Twelve questions (alone, no notes, 7 min)**

1. The four TCP/IP layers, bottom to top: _____

2. Unit of the link layer: _____ of the internet layer: _____

3. A switch reads _____ addresses; a router reads _____

4. The broadcast MAC address: _____

5. What does ARP find out? _____

6. A switch learns from the _____ MAC

7. Bits in an IPv4 address: _____

8. `10.G.0.21/24` → network: _____ broadcast: _____

9. Hosts in a `/26`: _____

10. Network address of `10.G.0.77/26`: _____

11. The four settings a host needs: _____

12. Commands: my address _____ my routes _____ my neighbours _____

Alone I had ____ of 12.

TASK 2 **Watch a lease being born (lab)**

In `~/labs`, with the new file `svc.clab.yml` and your G. Terminal 1 = pc1, terminal 2 = srv.

```
G=3 containerlab deploy -t svc.clab.yml       # host
docker exec -it clab-svc-pc1 bash             # terminal 1
docker exec -it clab-svc-srv bash             # terminal 2
ip -br addr show eth1                         # pc1: does it have an address?
tcpdump -n -i eth1 -c 4 port 67 or port 68    # srv: waits for 4 messages
dhclient -v eth1                              # pc1: ask for an address
```

Write the first word of the four `DHCP…` lines on pc1: _____ _____ _____ _____

Address offered: _____ by server: _____ renewal in _____ seconds

In the capture on srv, the client's **source** address in line 1 is _____ and the destination is _____

DONE WHEN pc1 says `bound to 10.G.0.…` and srv printed four lines.

TASK 3 **What came with the address?**

```
ip -br addr show eth1 ; ip route                                          # pc1
grep -E "routers|name-servers|lease-time" /var/lib/dhcp/dhclient.leases   # pc1
cat /var/lib/misc/dnsmasq.leases ; ss -uln                                # srv
```

Gateway: _____ DNS server: _____ Lease time: _____ s UDP ports open on srv: _____ and _____

Open a terminal on **pc2** and run `dhclient -v eth1`. Its address: _____ Lines now in the server's lease file: ____

DONE WHEN pc1 has the four settings without you typing any of them, and pc2 got a different address.

TASK 4 **Ask the real DNS (Ubuntu host)**

```
dig +short debian.org          ;  dig +short debian.org MX
dig +short www.wikipedia.org   ;  dig +short -x 1.1.1.1
dig debian.org                 #  the full answer; run it twice
```

A records of debian.org: ____ Its first mail server: _____ `www.wikipedia.org` is an alias of _____

In the full answer — `status`: _____ TTL, 1st run: _____ 2nd run: _____ `SERVER`: _____

Why did the TTL change? _____

DONE WHEN you can say which server answered you and for how long the answer may be remembered.

TASK 5 **Ask the lab's DNS (pc1)**

```
dig @10.G.0.2 srv.tramuntana.internal +short
dig @10.G.0.2 git.tramuntana.internal +short
dig @10.G.0.2 tramuntana.internal MX +short
dig @10.G.0.2 -x 10.G.0.2 +short
dig @10.G.0.2 nope.tramuntana.internal | grep status
```

`srv` is at _____ `git` is a _____ record that points to _____ Mail goes to _____

Status for `nope`: _____ Is that a broken server or a correct answer? _____

DONE WHEN five commands, five different kinds of answer. On srv, `tail -3 /var/log/dnsmasq.log` shows your questions.

TASK 6 **Which one failed: DHCP or DNS? (pairs)**

	Symptom	Failed	Why (a few words)
A	A Windows PC shows the address `169.254.17.3`		
B	`ping 1.1.1.1` answers; `ping debian.org`: name not resolved		
C	One PC gets `192.168.1.37`; all the others `10.G.0.x`		
D	It worked this morning; now `ip -br addr` shows no IPv4		

Clean up: `exit` everywhere, then `containerlab destroy -t svc.clab.yml --cleanup`.

EXIT TICKET **Circle one answer. Alone, no notes.**

1. The four DHCP messages, in order:
a) Offer, Discover, Request, Acknowledge
b) Discover, Request, Offer, Acknowledge
c) Discover, Offer, Request, Acknowledge
d) Request, Offer, Acknowledge, Discover

2. Why is the DHCP Discover sent as a broadcast?
a) The client has no address and does not know the server's
b) Broadcasts are faster
c) Broadcasts are encrypted
d) The router demands it

3. Which of these does DHCP **not** give to a client?
a) IP address **b)** Default gateway **c)** DNS server **d)** MAC address

4. Which DNS record maps a name to an IPv4 address?
a) MX **b)** A **c)** CNAME **d)** PTR

5. A PC shows the address `169.254.20.7`. The most likely cause:
a) The DNS server is down
b) The gateway is wrong
c) No DHCP server answered
d) Two cards have the same MAC