

Lecture 11 - Internet Protocol

Exercise 1: What is the difference between IP and "The Internet"? Does a network using IP have to be on the Internet? Does someone using the Internet have to use IP?

- IP - protocol
- Internet - public network that uses IP
- no (many private / secure networks use IP).

Exercise 2: What is the netmask in binary for a /24 network? What is it in decimal? How can the netmask be used to determine if one IP address is on the same network as another? Is the address 192.168.2.200 in the 192.168.2.0/25 network?



255.255.255.0

$$\underbrace{A_1 \text{ \& \#38; NM}}_{\text{bitwise AND}} \stackrel{?}{=} \underbrace{A_2 \text{ \& \#38; NM}}$$

200 → 128
+ ---
+ ---
+ ---

is 192.168.2.200
in 192.168.2.0 /25 network?

NM for /25 is 255.255.255.128

$$192.168.2.200 \text{ \& \#38; NM} = 192.168.2.128$$

$$\stackrel{?}{=} 192.168.2.0 \quad \underline{\underline{\text{No}}}$$

∴ not in that network.

Exercise 3: Who "owns" the 204.191.0.0/16 network?

Telus:

Networks	
TELUS-204-191-0-0 (NET-204-191-0-0-1)	204.191.0.0 - 204.191.255.255
NET204 (NET-204-0-0-0-0)	204.0.0.0 - 204.255.255.255

Exercise 4: For the routing table above, what port ("Interface") would be used by packets with the following destination IP addresses: 127.0.0.255? 192.168.1.1? 192.168.2.1? 204.191.10.32?

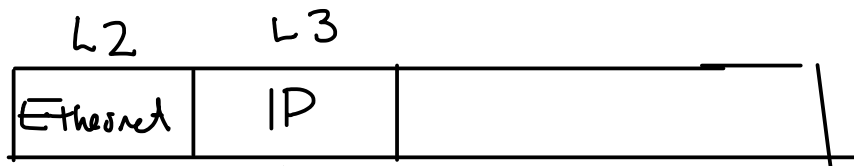
Destination	Gateway	Subnet Mask	Metric	Interface
192.168.1.0	*	255.255.255.0	0	br0 (LAN)
204.191.0.0	*	255.255.0.0	0	vlan1 (WAN)
127.0.0.0	*	255.0.0.0	0	lo
default	204.191.1.1	0.0.0.0	0	vlan1 (WAN)

127.0.0.255 → lo

192.168.1.1 → br0

192.168.2.1 → vlan1 (w/ gateway's L2 address)

204.191.10.32 → vlan1 } w/ 204.191.10.32's L2 address



both
src
& dst,

↓
MAC:
6 bytes

↓
IP:
(v4) 4 bytes

↘ { varies
 depends on location,
 assigned (usually) by DHCP
 ↙ { fixed
 depends on manufacturer
 assigned once (at factory)

4

types of IP addresses:

- normal routable
- private: 10. x.x.x
 192.168. x.x
- link-local 169. ? x.x
- loopback. 127. x.x.x