SYSC 4602 Assignment 4

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Part 3: IP Packet Structure

1

IP address of our computer: 172.17.59.194
IP address of remote server: 5.9.243.187

2

Yes the total length field includes the header size.
The header size is 20 bytes, the pyload size is 40 bytes and the total length is 60 bytes.

3

The identification field changes for each packet. The identification field in packets being sent start from 0x5442, and increase in value by 1 for each subsiquent packet. This allows the packets to be reordered if they arrive out of order. With packets being received the identification field starts at 0x4403 and increases for each subsiquent packet.

4

The TTL field on packets sent from our computer is not its maximum value of 256 (0xFF). It is a lower value of 64 (0x40)

5

The flags indicate if the packet has been fragmented, and the fragment offset will indicate fragmentation aswell.
In our trace the flags indicate not to fragment and the fragmentation offset is 0.

6

The header length is 20 bytes.

Version (1 Byte)	Diff Serv Field (1 Byte)	Total Length (2 Byte)	Identification (2 Byte)	Fragment Offset + Falgs (2 Byte)	TTL (1 Byte)	Protocol (1 Byte)	Header Checksum (2 Bytes)	Destination Address (4 Bytes)	Source Address (4 Bytes)

IP Payload (40 Bytes)
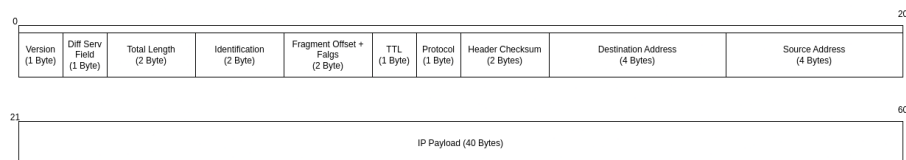
Figure 1: IP Packet Structure

Part 4: Internet Paths

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│ Node 1       │ ───▶ │ Node 2       │ ───▶ │ Node 3       │
│   172.17.32.2│      │   10.30.74.5 │      │   10.30.52.1 │
└──────────────┘      └──────────────┘      └──────────────┘
                                                   │
                                                   ▼
                                              ☁ Node 4
                                                  *
                                                   │
                                                   ▼
                                            ┌──────────────┐
                                            │ Node 5       │
                                            │   10.30.58.1 │
                                            └──────────────┘
                                                   │
                                                   ▼
  ☁ Node 30     ◀── ☁ 23 other unknown nodes ◀── ☁ Node 6
      *                                               *
```
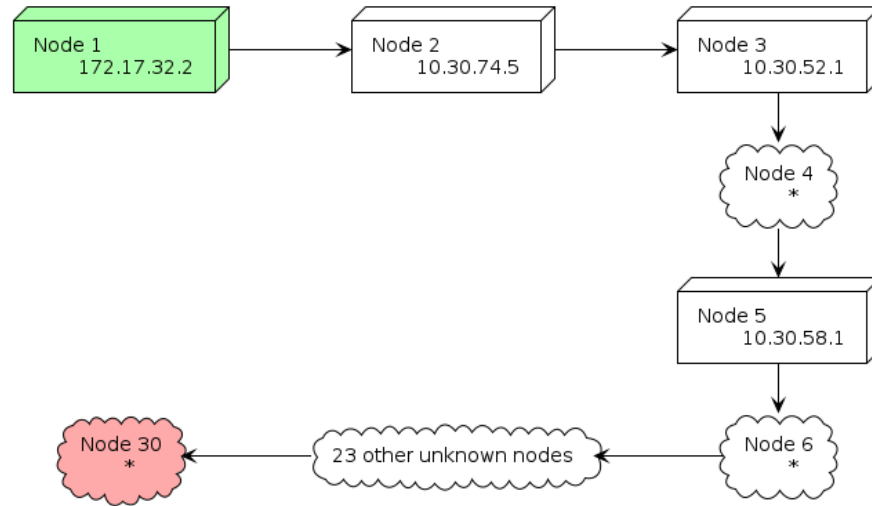
Figure 2: Network map diagram based on traceroute

Listing 1: Traceroute output

```
traceroute to www.uwa.edu.au (20.37.196.199), 30 hops max, 60 byte packets
 1  172.17.32.2 (172.17.32.2)  4.332 ms  4.156 ms  4.108 ms
 2  10.30.74.5 (10.30.74.5)  3.918 ms  3.794 ms 10.30.74.1 (10.30.74.1)
3.597 ms
 3  10.30.52.1 (10.30.52.1)  3.565 ms  3.441 ms 10.30.55.1 (10.30.55.1)
3.328 ms
 4  * * *
 5  10.30.58.1 (10.30.58.1)  5.400 ms  3.334 ms  3.274 ms
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```

Part 5: IP Header Checksum

1

2

3

4