

1.

- a. The input ports
- b. The sending IPv6 router creates an IPv6 datagram and puts it in the data field of an IPv4 datagram.

2.

- a. Yes, it is possible for an application to enjoy reliable data transfer through udp if reliability mechanisms are employed like: acknowledgements, retransmissions, sequencing, and error detection
- b.  $(20 \text{ TCP} + 20 \text{ IP} = 40) / (20 \text{ data bytes} + 40 \text{ headers} = 60) * 100 = 66.67\%$

3.

Prefix	Interface	Range	Number of Addresses
00	0	0 - 63 (6 bits are free - 00000000 - 00111111)	64
010	1	64 - 95 (5 bits are free)	32
011	2	96 - 127 (5 bits are free)	32
10	2	128 - 191 (6 bits are free to vary)	64
11	3	192 - 255 (6 bits are free to vary)	64

4.

- a. Host B -> Host A: SEQ = 700(arbitrary), ACK = 331  
Host A -> Host B: SEQ = 331, ACK = 703
- b. Client -> server: SEQ = 4704, FLAG = SYN (to init)  
Server -> client: SEQ = 2022(arbitrary), ACK = 4705( client SEQ +1), Flag = SYN-ACK(ack the request to init connection)  
Client -> Server: SEQ = 4705, ACK: 2023(server SEQ +1), flag = ACK (ack to confirm)

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- a.  $2^{15} = 32,768$
- b. 11001101, 11000100, 11000000 00000000 = 205.196.192.0/17
- c. Last usable is -1 from max which ends in 255 = 205.196.223.254