

## CN Assignment 3

21K-3153

(Q1) (a) Software defined networks make networks more agile and configurable. They separate network control plane from data plane, which ~~can~~ traditional networks don't do.

Moreover, SDNs allow networks to be programmed, traditional networks don't.

(b) (i) Shared memory switching fabric:

- all input packets temporarily stored in a shared memory buffer, allowing greater flexibility. However, it is a bottleneck in high traffic situation.

(ii) Bus Based fabric:

- incoming packets forwarded through a common communication bus b/w input & output ports.
- Each packet travels bus until output

(iii) Cross bar switching fabric:

- grid like matrix of interconnected switches b/w input & output paths.
- Any input can be connected to any output.
- high throughput. Low latency. Expensive.

Q)

~~Packet~~ ~~Arrival~~

	1	2	3	4	5	6	7	8	9	10	11	12
arrival	0	0	1	1	3	2	3	5	5	7	8	0
<del>departure</del>	<del>1</del>	<del>2</del>	<del>3</del>	<del>6</del>	<del>5</del>	<del>7</del>	<del>8</del>	<del>9</del>	<del>10</del>	<del>11</del>		
departure	1	2	3	4	6	5	7	8	9	10	11	12
<del>delay</del>	<del>1</del>	<del>2</del>	<del>2</del>	<del>3</del>	<del>3</del>	<del>3</del>	<del>4</del>					

~~Average delay =~~

delay: 0 1 1 2 2 3 3 2 3 2 2 3

$$\frac{23}{12} = 1.92$$



Q2)

Classful addressing is the original method of assigning IPv4 addresses. 5 classes had a different range of IP addresses. IP addresses could be 8, 16 or 24 bits in length.

Class A:

- for large ISP with many hosts.

0.0.0.0 - 127.255.255.255

- First 8 bits for network. ~~24~~ leaving 24 bits for host.

Private range = 10.0.0.0 - 10.255.255.255

Class B:

- for medium sized networks

128.0.0.0 - 191.255.255.255

128      0

network

host

private = 172.16.0.0 to 172.31.255.255

Class C:

for small networks

192.0.0.0 - 223.255.255.255

192      0

network

host

private: 192.168.0.0 - 192.168.255.255

118 on 31 12 14 21  
 1 1 1

Class D:

for multicast addresses, group communication

224.0.0.0 - 239.255.255.255

no networks or hosts be

unicast.

Class E:

for experimental use, not public.

240.0.0.0 - 255.255.255.255

⑥ VLSM allows for a creation of subnets with different sizes.

Subnets can have different sizes and different lengths, allowing for more efficient use of IP addresses.

192.168.10.160.

| 255.255.255.224

||||| ||||| ||||| ||00000

all consecutive 1's are network portion

all 0 bits are host.

27 consecutive ones thus

27 = subnetwork bits



5 = host bits

$2^5 \rightarrow$  host bits

$- 2$   
 $\downarrow$

network broadcast

30

$\downarrow$   
usable  
addresses

c)

~~$1500 - 20 = 1480$~~

$$1500 - 20 = 1480$$

$\rightarrow$  IP header size

~~48~~

$$\frac{1480}{48} = 33 \rightarrow \text{datagrams}$$

33 datagrams of 1480 bytes will be required  
to send MP3 file.

total  
max size




11 00 1000

10010001

01010001 01010101

Since opening 3 bits do not match any address,  
(51) the datagram will be sent  
to link interface 3

11100001



matches 2

01000000 H000011 001111100  
↓  
stages + 1 (64)

stigma + lily (6h)

Int  $z = 65 + 127$

will be sent to link interface 2