Roll = K21-4568 Course = Computer Networking (C

ASSIGNMENT = 03

Q1) (a)

Software Defined Network (SDN) is approach to networking that aims to make network management more dynamic and flexible by separting the control plane from the data plane. In traditional network control plane, that determines that how packets are forwarded, is tightly integrated with network devices (routers, switches, etc). However SDN, the control plane is decoupled and centralized in a software-based controller, which communicates with data plane devices through an open protocol such as openflow.

In SDN, the control plane is centralized in a software controller, which provides a globle network resources based on traffic patterns, policies and other factors.

Software Defined Network is the adaption of network of changing conditions, such as traffic patterns or

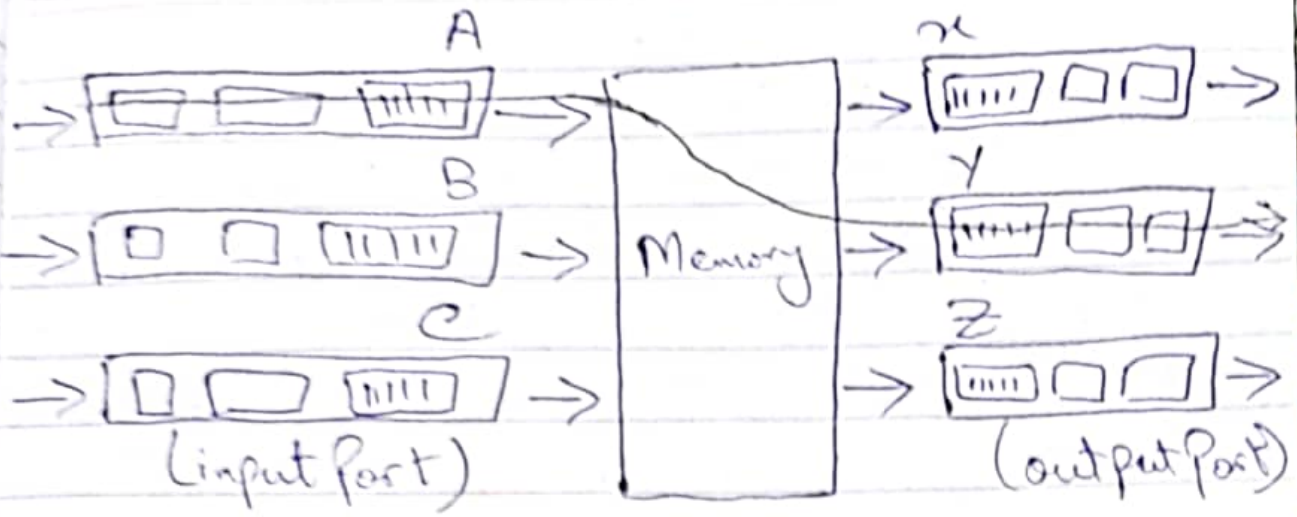
security threats, by dynamically reconfiguring network policies and forwarding behaviors in real time. Traditional network requires manual interaction to adjust to such changes, leading to slower response times and potential network disruptions.

(Q1) (b)

Switching Via Memory :-

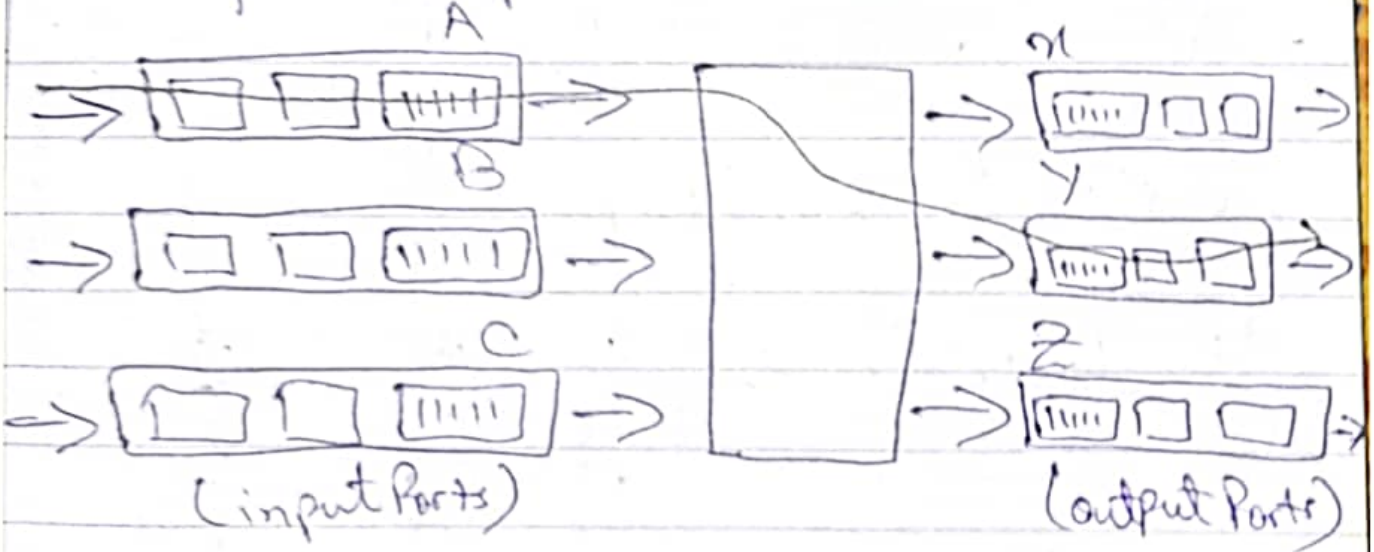
It involves the routing processor manages packet forwarding. Packets are copied from input ports to processor memory for processing. Processin on input lines cards handles lookup and storage into memory.

Cisco Catalyst And 5000 Series switches use this method



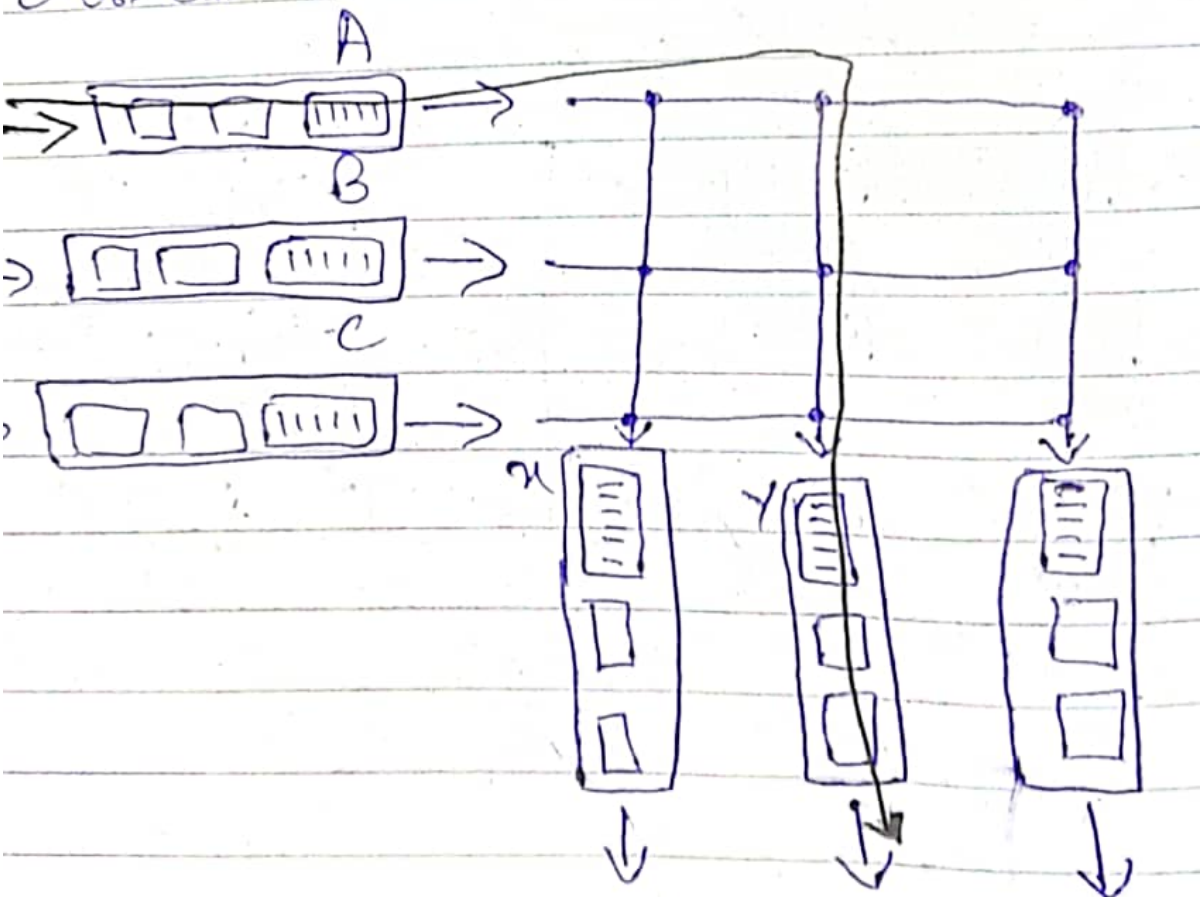
Switching Via Bus:

Packets are transformed directly from input to output ports over a shared bus. Input ports prepend a switch-internal label indicating switching speed. Cisco+ 6500 routers internally switch packets over a 32-gbps-backplane bus.



Switching Via An Interconnection Network :-

It uses a interconnection ~~to~~ network like a cross bar switch. Cross Bar Switch consists of 2N buses connecting N inputs and output ports. Each bus intersection has a controllable cross point allowing parallel packet forwarding. Cisco 12000 series switches use a cross bar switching network, while the cisco 7600 series can be configured for either bus or cross bar switch.



Q1) (c)

For The time to which packets 2 through 12 each leave the queue So, the packets that entered the queue first (arrival time), leaves the queue first (leaving time) for the FIFO Service.

Delay Time = Leaving Time − Arrival Time

Service

Packet	Arrival time	Service time	Delay Time	Depart ure
1	0	0	0	1
2	0	1	1	2
3	1	2	1	3
4	1	3	2	4
5	3	5	2	6
6	2	4	2	5
7	3	6	3	7
8	5	7	2	8
9	5	8	3	9
10	7	9	2	10
11	8	10	2	11
12	8	11	3	12

The average of this delay over all 12 packets = $\frac{\text{Total number of delays}}{\text{Total number of packets}}$

$$= \frac{0+1+1+2+2+2+3+2+3+2+2+2+3}{12}$$

$$= 1.9167 = \boxed{1.92}$$

Ans

(Q2) (a)

Classful addressing in IPV4 is an addressing scheme where IP addresses are divided into predefined classes, each with its own range of addresses. There are five class of IPV4 addresses:-

Class A :-

Class A addresses are identified by having first bit set to 0. They have a range of from 0.0.0.0 to 127.255.255.255. The range 10.0.0.0 to .10.255.255

255 is reserved for private use with in an organization.

Class B :-

Class B addresses are identified by having the first two bit set to 10. They have a range from 128.0.0.0 to 191.255.255.255. The range 172.16.00 to 172.31.255.255 is reserved for private use within an organization.

Class C :-

Class C addresses are identified by having the first 3 bits set to 110. They have a range from 192.0.0.0 to 223.255.255.255 The range 192.168.0.0 to 192.168.255.255 is reserved for private use within an organization.

Class D:-

Class D address are identified by having the first 4 bits set to 1110. Class D addresses have a range from 224.0.0.0 to 239.255.255.255.

Class E:-

Class E addresses are identified by having the first 4 bits set to 1111. Class E addresses have arrange from 240.0.0.0 to 255.255.255.255.

Q2) (b)

Variable length Subnet Mask (VLSM) is a technique used in IP addressing to allocate IP addresses efficiently by allowing d/f ~~subnet~~ subnets to have d/f subnet mask lengths. This means that subnets ~~to have~~ can be divided into smaller subnets of various sizes, optimizing the allocation of IP addresses based on the specific requirements of each subnet.

In VLSM, a subnet mask can have varing numbers of configurous ~~is followed by~~ 1s followed by configurous 0s.

IP address = 192.168.10.160
Subnet Mask = 255.255.255.224

To determine the ~~sub~~ number of sub-network bits, count the number of consecutive 1s in the subnet mask.

11111111 11111111 11111111 11100000
Sub net 255 . 255 . 255 . 224/27

No. of sub-network bits = 27

Total no. of bits = 32
Hosts = 32-27 = 5

No. of Subnet per subnet = $2^{\text{host bits per}}$ usable address -2
No. of host bits = 5
$\therefore 2^5 - 2 = 30$

Q2) (c)

MP3 file size = 48840 bytes

→ Assume the data is carried in TCP segments, with each TCP segment also having 20 bytes of header. Then each data gram can carry 1500 − 40 = 1460 bytes of the MP3 file.

No. of datagram Required = $\frac{48840}{1460}$ = 33.4

= 33 datagram.

∴ The last datagram will be 1500 bytes, the last datagram will be 960 + 40 = 1000 bytes.

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Q3) (a)

Destination Address:

11001000 10010001 01010001 01010101

∴ The destination address falls outside the range specified for interfaces 0, 1 and 2. Therefore the datagram will be forwarded to link interface 3 since no more specific match is found.

Q3) (b)

Destination Address:

11100001 01000000 11000011 00111100

∴ The destination address falls within the ranges specified for link interface 2. Therefore the datagram will be forwarded to link interface 2.