1. Packet Forwarding
   1. No, packets cannot be forwarded at the same time using a shared bus.
   2. Yes, they can be forwarded at the same time with switching via memory.
   3. Yes, a crossbar allows multiple packets to be forwarded at the same time.
2. Interface and Ranges with Number of hosts

|  |  |  |  |
| --- | --- | --- | --- |
| Interface | Prefix | Range | Number of |
| 0 | 00 | 0000 0000 – 0001 1111 | 32 |
| 1 | 001 | 0010 0000 – 0011 1111 | 32 |
| 2 | 10 | 1000 0000 – 1001 1111,  1011 0000 – 1011 1111 | 32+16=48 |
| 1 | 1010 | 1010 0000 – 1010 1111 | 16 |
| 2 | 110 | 1100 0000 – 1101 1111 | 32 |
| 3 | NA | 0100 0000 – 0111 1111,  1110 0000 – 1111 1111 | 64+32 |

Totals: 0=32, 1= 48, 2=80, 3=96

1. 128.119.40.0/23

Example IP is 128.119.40.1

Class B address with /23 to be subnetted into four new subnets -> /26 makes four subnets

NIDs:

128.119.40.0/26, 128.119.40.64/26, 128.119.40.128/26, 128.119.40.192/26

1. It is impossible to establish a TCP connection while behind NATs without any application configuration because either the expected port or IPs will be desynced and the connection will not be allowed.
2. Flow Tables
   1. Only traffic arriving from hosts h1 and h6 should be delivered to hosts h3 or h4 (i.e., that arriving traffic from hosts h2 and h5 is blocked)

|  |  |
| --- | --- |
| Match | Action |
| Src = 10.3.0.6  Dest = 10.2.0.4 | Forward(4) |
| Src = 10.3.0.6  Dest = 10.2.0.3 | Forward(3) |
| Src = 10.1.0.1  Dest = 10.2.0.4 | Forward(4) |
| Src = 10.1.0.1  Dest = 10.2.0.3 | Forward(3) |

* 1. Only TCP traffic is allowed to be delivered to hosts h3 or h4 (i.e., that UDP traffic is blocked)

|  |  |
| --- | --- |
| Match | Action |
| Src = \*.\*.\*.\*  Dest = 10.2.0.3  Port = TCP | Forward(3) |
| Src = \*.\*.\*.\*  Dest = 10.2.0.4  Port = TCP | Forward(4) |

* 1. Only traffic destined for h3 is to be delivered (i.e., all traffic to h4 is blocked)

|  |  |
| --- | --- |
| Match | Action |
| Src = \*.\*.\*.\*  Dest = 10.2.0.3 | Forward(3) |

* 1. Only UDP traffic from h1 and destined to h3 is to be delivered. All other traffic is blocked.

|  |  |
| --- | --- |
| Match | Action |
| Src = 10.1.0.1  Dest = 10.2.0.3  Port = UDP | Forward(3) |