Chapter - 4

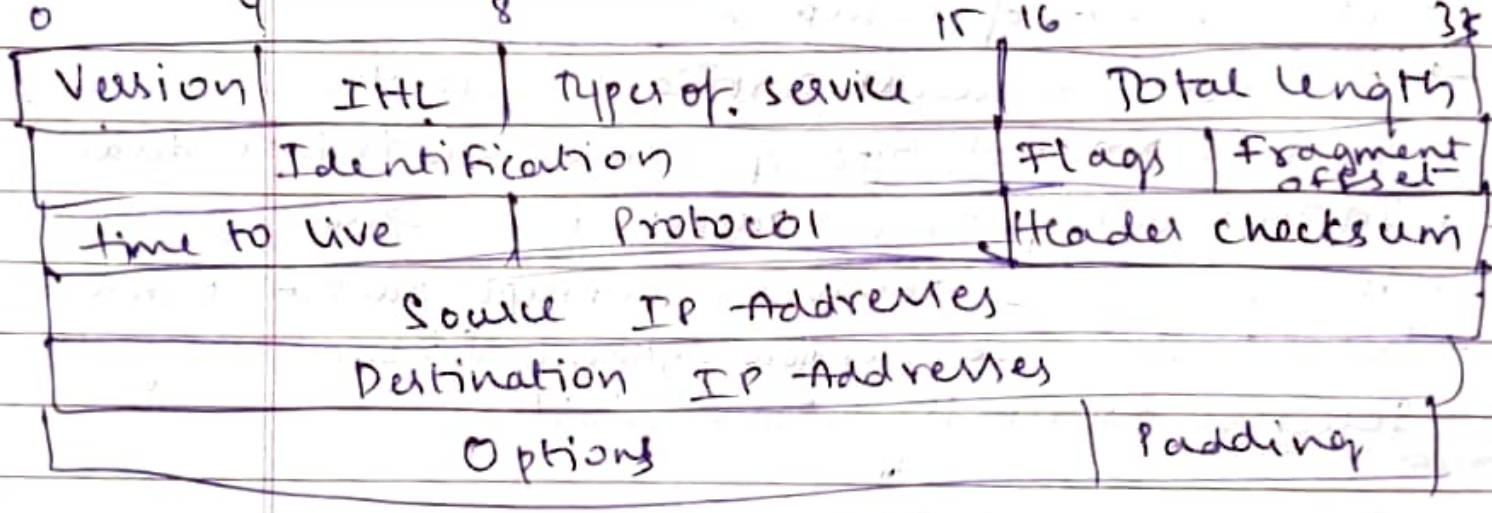
1) IPv4 datagram

→ Internet Protocol version 4 (IPv4) is the 4th version of internet protocol.

→ it is one of the core protocols of standards based internetworking methods in internet & other packet switched networks

→ IPv4 uses a 32-bit address space which provides 2^{32} unique addresses.

→ IPv4 is a connectionless protocol & operates on a best effort delivery model.



→ Fragmentation: An IP packet is broken down into smaller pieces if the packet size exceeds data link layer protocol limits. this is called fragmentation.

→ & process can take place at originating device or intermediate routers.

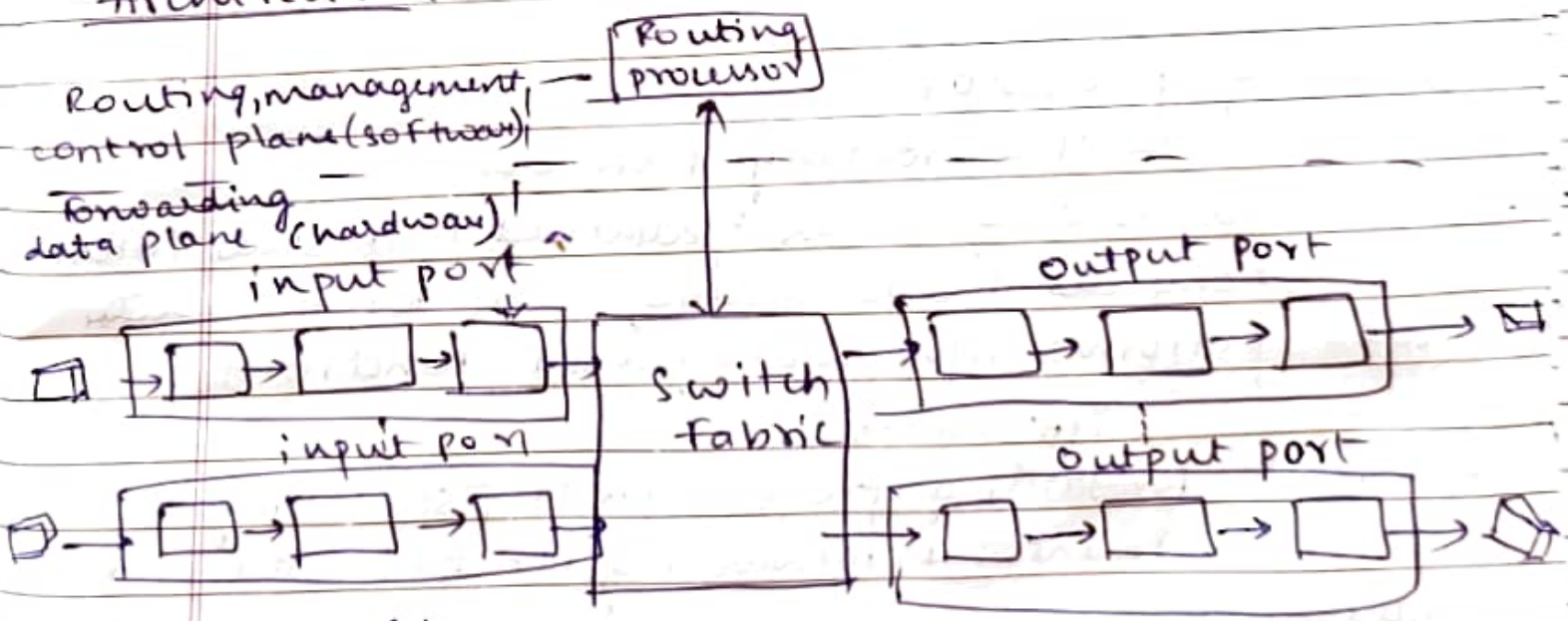
→ to retrive the message signal, the packet must be reassembled at distination device

→ Routers can fragment packets, but it cannot reassemble them as fragments do not always take the same routes to destination.

→ IP reassembly occurs at the final recipient of message after all fragmented datagrams have taken whatever lowest cost path was available to them have arrived
→ Here a router would have to subsequently wait for all datagrams to arrive before attempting to reassemble, which would slow down the forwarding capability of the router significantly & any other traffic that is processing.

2) Router Architecture
→ Router architecture is designed in a way that the router is equipped to perform two main functions
① Runs routable protocols
② uses routing algorithms

Architecture:



Components:-
* Input ports:
→ it performs physical layer fn of terminating an incoming physical link at a router
→ it also performs link layer functions needed to interope-rate with the link layer at the other side of the incoming link
→ lookup fun is also performed at ip port

→ Control packets are forwarded from an i/p port to the routing processor.

* Switching fabric:

→ SF connects the router's i/p ports to its o/p ports.

→ SF is completely contained within the router a network inside of a n/w router.

* Output ports :

→ An output ports stores packets received from d switching fabric & transmits these packets on the outgoing link by performing necessary link-layer & physical layer functions.

→ When a link is bidirectional, an o/p port will typically paired with d i/p port for d link on the same line card.

* Routing processor

→ it executes the routing protocols

→ maintains routing tables & attached link state information, & computes the forwarding table for the router.

→ also performs n/w management functions

i/p ports

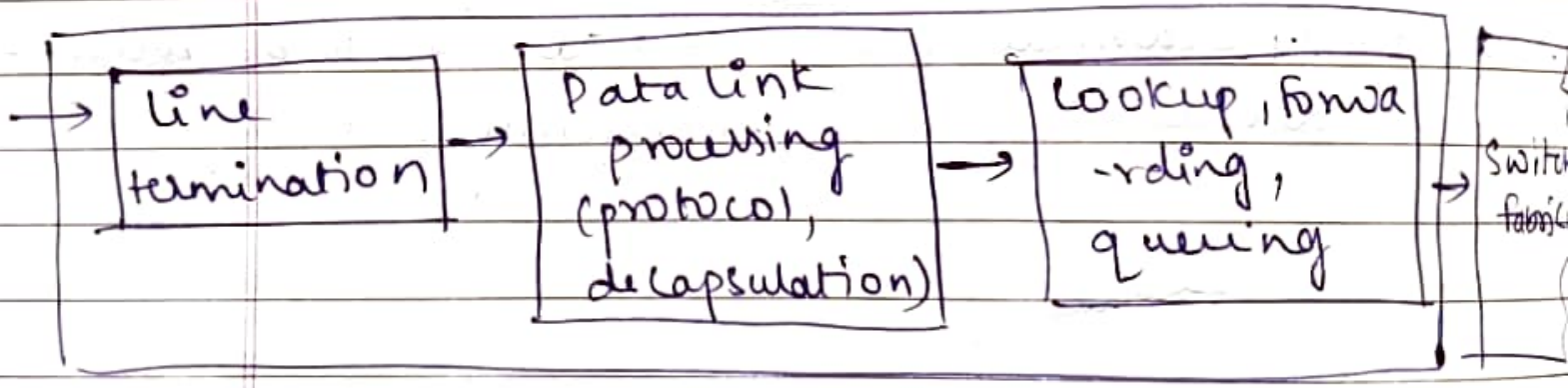
→ router's ~~forwarding fns~~, o/p ports & switching fabric together implement the forwarding function & are almost implemented in hardware

→ these forwarding functions are sometimes collectively refered as the router forward plane

→ Why routing parameters are

- it helps in determining the most efficient path from a source to destination.
- it ensure reliability & fault tolerance in the n/w
- in large networks, routing parameters are crucial for scalability.
- these parameters ensures that the n/w can adapt to changing conditions.

input port fun



output port