

## Hierarchical Routing

With the increase in the growth of the NW size, the size of Routing Table also increase.

As a result of large routing table, a large memory is consumed. So to solve all these problem, hierarchical routing is used.

### Advantages :-

- ⑤ Smaller size of routing table  
lesser calculation & updation of routing table

### Disadvantages :-

once the hierarchy is constructed on the NW, it is followed & possibility of direct path is ignored.

## Congestion

When the No. of packet increase beyond the limit that can be handled by the NW resources, the NW performance degrades & this situation is called as congestion.



# Congestion Control Algo:—

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## Traffic Shaping:—

It help to manage congestion by forcing the packet to be transmitted at a more uniform rate.

main goal of traffic shaping method are

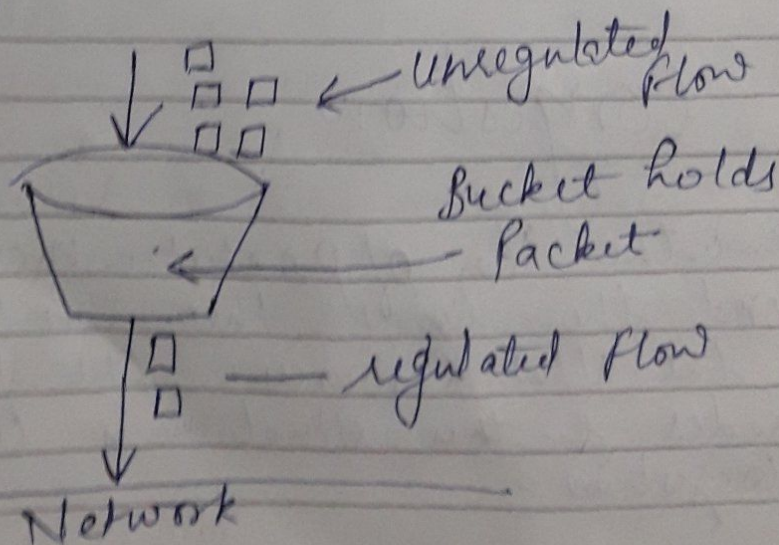
- ① To adjust the traffic.
- ② Transmission should always be uniform.

## Leaky Bucket Algo.

Take a bucket with a small hole at its bottom.

At ~~the~~ the rate at which water enter the bucket the water outflow takes place at a constant rate.

It means leaky bucket algo regulates the flow of data at a constant rate.





Disadvantages :- This algo cannot accomodate Burst Transmission.

This problem can be solved by using token bucket algo.

\* ~~Token~~ "Choke packet"

A choke packet is a special packet to request a slow down to the sender or source.

\* "load shedding"

When all the other methods cannot make congestion disappear routers may force to use load shedding technique.

It is closed loop technique.

In this method whenever a router finds that there is congestion in the network it simply start dropping out the packets. Now the problem is that which packet is to be discarded. It may depend on the application running.

Diff. Method by which Host can find out which packet to drop.

① Random policy :- Random picks packet to drop.



(II) Wine policy :-

old packet is worth more than new one

(III) Milk policy :- a new packet is more imp. than an old one

## Security Measures

(1) Encryption :-

An Effective way to safeguard data transmitted over N/w is by Encryption. This process requires an Encryption device for converting the original Message into code, & as well as decryption device for translating the code back to text.

(2) Firewall :-

It is most popular tool used by organization for N/w security & is very beneficial for organization. A Firewall controls the N/w traffic flow within the internal N/w of an organization.

(3) Digital Signatures :- is an Electronic signature whose authenticity is guaranteed through Encryption & password.