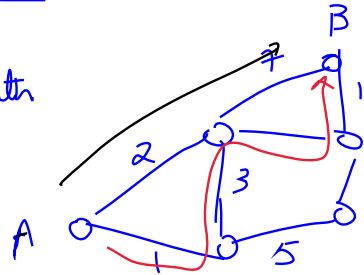# HOW TO CHOOSE LINK WEIGHTS

DV, LSR
└→ OSPF, ISIS   Shortest path
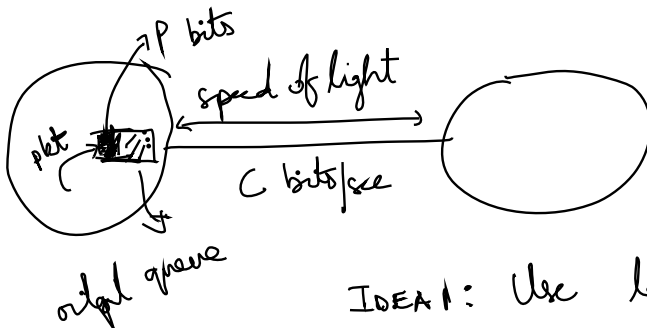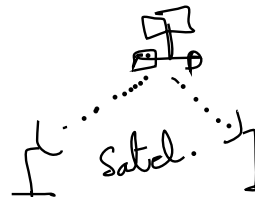↓
RIP

ARPANET

56 kbps ——— terrestrial
9.6 kpps ⟍⋯ Satellite links

64 kbps

P bits
speed of light

pkt

C bits/sec

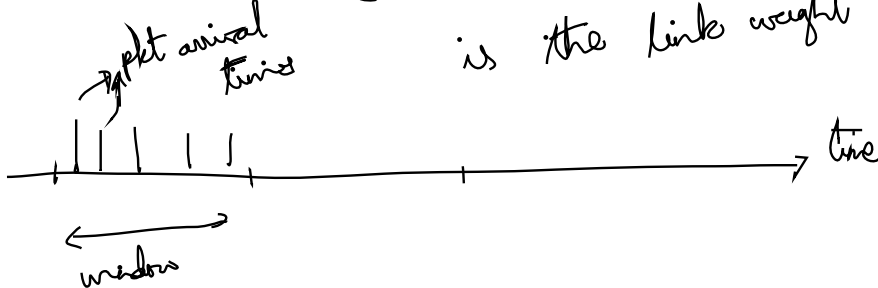o/p queue

IDEA 1: Use latency

latency of
pkt. on this = queuing delay + sp. of light delay + transmission delay
link (P/c)

Take time window, avg. latency of all pkts in window
   pkt arrival times   is the link weight
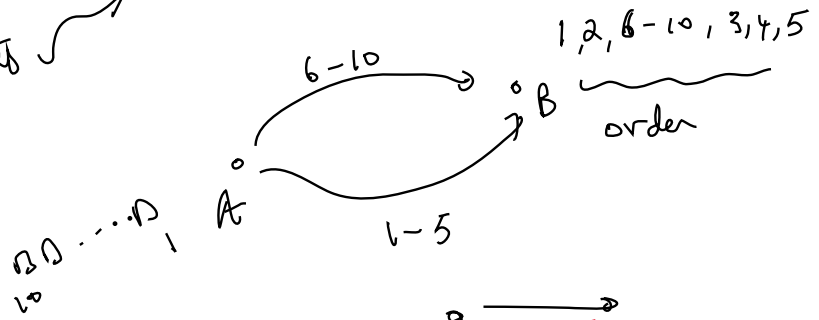

← window

ISSUES

1. Under heavy load, routing path oscillations
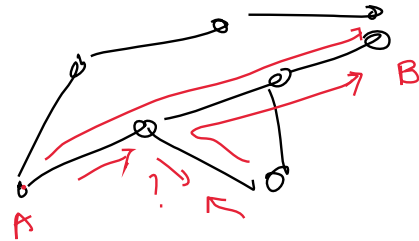   Queuing delays go up ——→ increased link weights ——→ new shortest paths
      ↑ (on paths used heavily)

- end-to-end latency (e.g. A to B) keeps varying
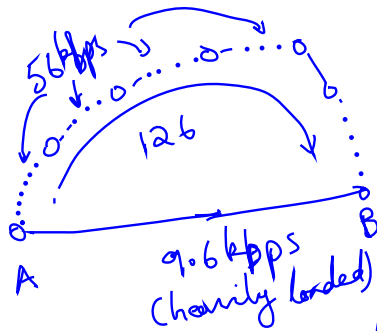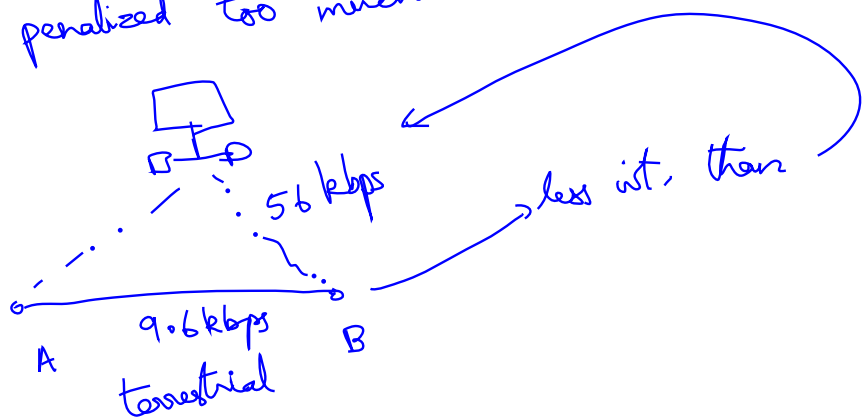 - ↳ may affect appl. layer performance
- reordering of pkts ✓

6-10 → B   1,2,6-10,3,4,5
A   order
1-5

⌐□....□, A

- Routing loops possible

2) Range of link weights was large.
   due to which some links were penalized (due to very high weights) too much.

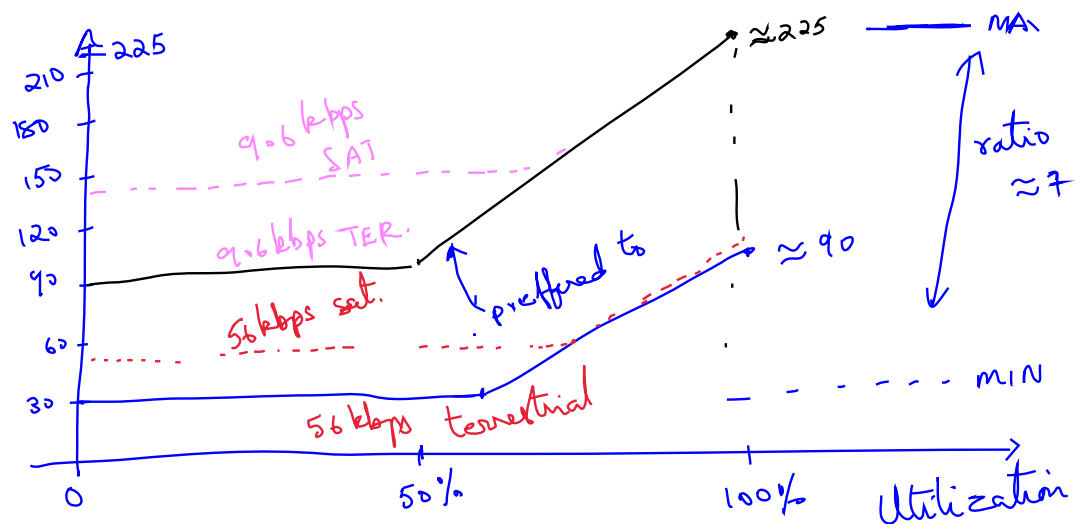56kbps
126
A   9.6kbps   B
   (heavily loaded)

Found that 126 links of 56kbps had same wt. as single 9.6 kbps link

3) Satellite links penalized too much

56 kbps   less wt. than
A   9.6kbps   B
   terrestrial

link wt

225

210
180
155   9.6 kbps SAT
120
90   9.6 kbps TER.

56 kbps sat.
60
30   56 kbps terrestrial

0   50%   100%   Utilization

≈225 ──── MAX

ratio ≈7

≈90

preffered to

- - - - - - - MIN

(fraction of link capacity used)

wts. changed infrequently
_____

Today

OSPF: wt. of link max. $\left(\dfrac{10^8}{\text{link speed (bps)}}, 1 \right)$

NOC: Network Operations Center (AT&T)