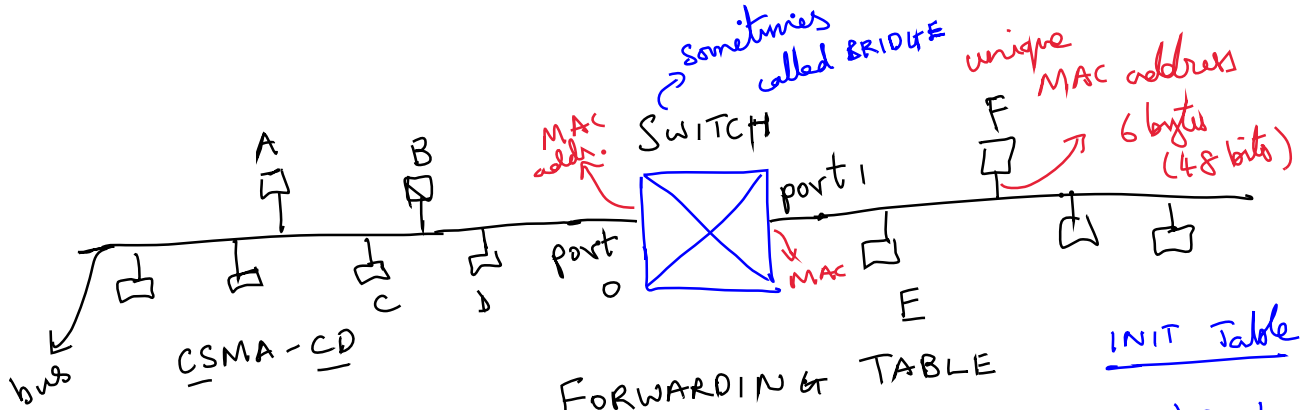


SWITCHING → L2-Switches (Ethernet)
 ↳ MAC addresses used to switch
 L3-Switches (Routers)
 ↳ use IP addresses to switch



TOPOLOGY

FORWARDING TABLE

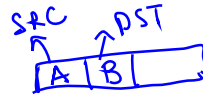
DEST	PORT #
A	0
B	0
C	0
D	0
E	1
F	1

expiry time
Delete after expiry time

INIT Table

DEST	Port #
A	0
B	0

populate



Frame

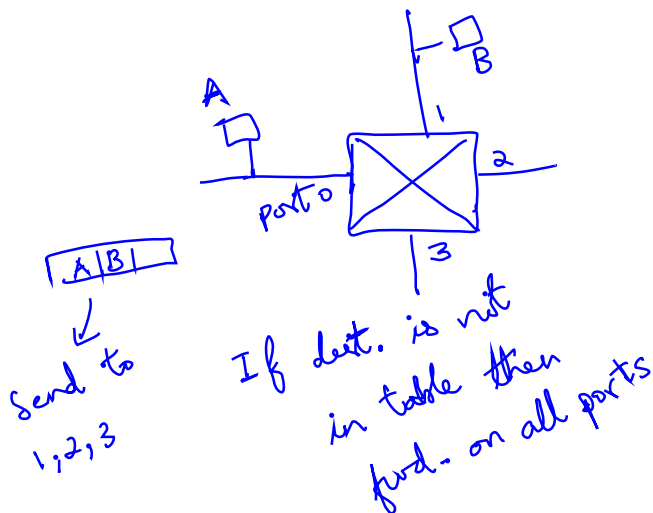
↳ forwards to port 1



↳ forward to port 1

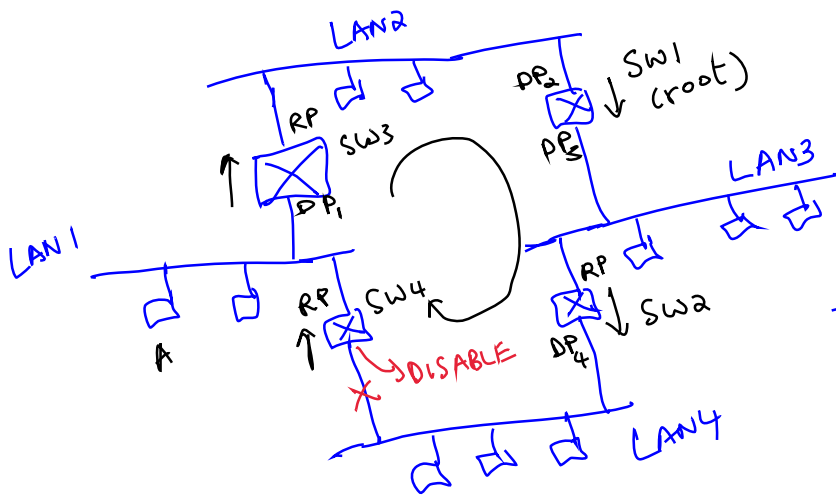
[B | A | ...] → received on port 0

Don't forward



(MAC)

dest	port
A	0



SPANNING TREE
PROTOCOL
(RADIO PERLMAN)

ANY PORT NOT A RP or
DP IS DISABLED

SPT PROTOCOL

1. ELECT ROOT BRIDGE
2. Each bridge finds which port is closest to root,
assigns this port as ROOT PORT
(TIE Breaking rule)
3. ALL Bridges connected to a LAN, elect one among them
to forward frames on that LAN
(DESIGNATED PORT)

DETAILS

1. ELECT ROOT

BRIDGE ID!

↓
LOWEST BECOMES ROOT

def: 32768

0 - 61440
(multiples of 4096)

CONFIGURABLE
PART (2 bytes)

MAC address
6 bytes
(smallest MAC
of all ports)

Each bridge tells its neighbours

(y, d, x) → my ID
↓
the smallest
ID heard
till now

distance to y

SW1: ID is

SW1: (1, 0, 1)

⋮

SW4: (4, 0, 4)

after hearing
SW2, SW3

SW2: (1, 1, 2)
⋮
SW4: (2, 1, 4)
⋮
converge

SW1: (1, 0, 1)
SW2: (1, 1, 2)
SW3: (1, 1, 3)
SW4: (1, 2, 4)

Y
⋮
d



→
(Y, d, X)

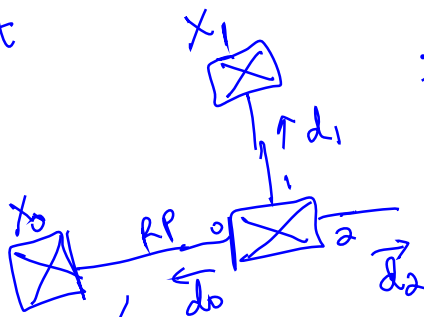


(Y_Z, d_Z, Z)

If $Y < Y_Z$ then $Y_Z = Y$ and $d_Z = d + \text{dist}(X, Z)$

If $Y = Y_Z$ but $d + \text{dist}(X, Z) < d_Z$
then $d_Z = d + \text{dist}(X, Z)$

2) Root port



if more than one port
has the same smallest
distance to root, then
tie-break based on ID (smallest)

if $d_0 = d_1 < d_2$
and $X_0 < X_1$
of neighbours on ports

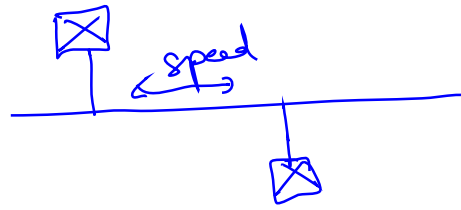
3) Designated Port



$d_1 < d_2$
 $d_1 < d_3$

if $d_1 = d_2 < d_3$, then tie break
based on ID of SW1, SW2

Ports not RP or DP are disabled



speed	cost
10 Gbps	2
1 Gbps	4
100 Mbps	19
10 Mbps	100