STATE MACHINE

State transitions

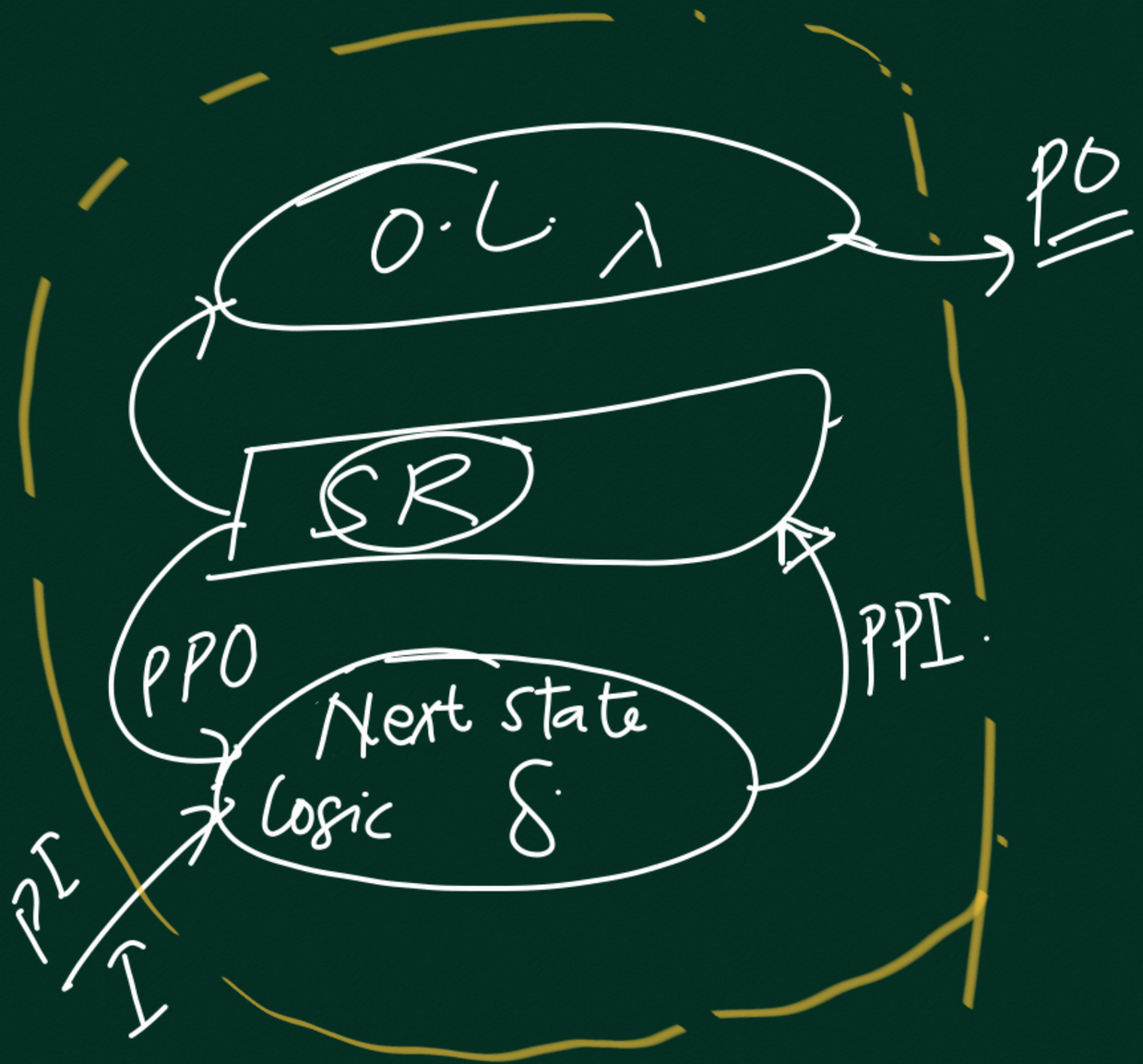
$M(S, S_0, I, O, \delta, \lambda)$

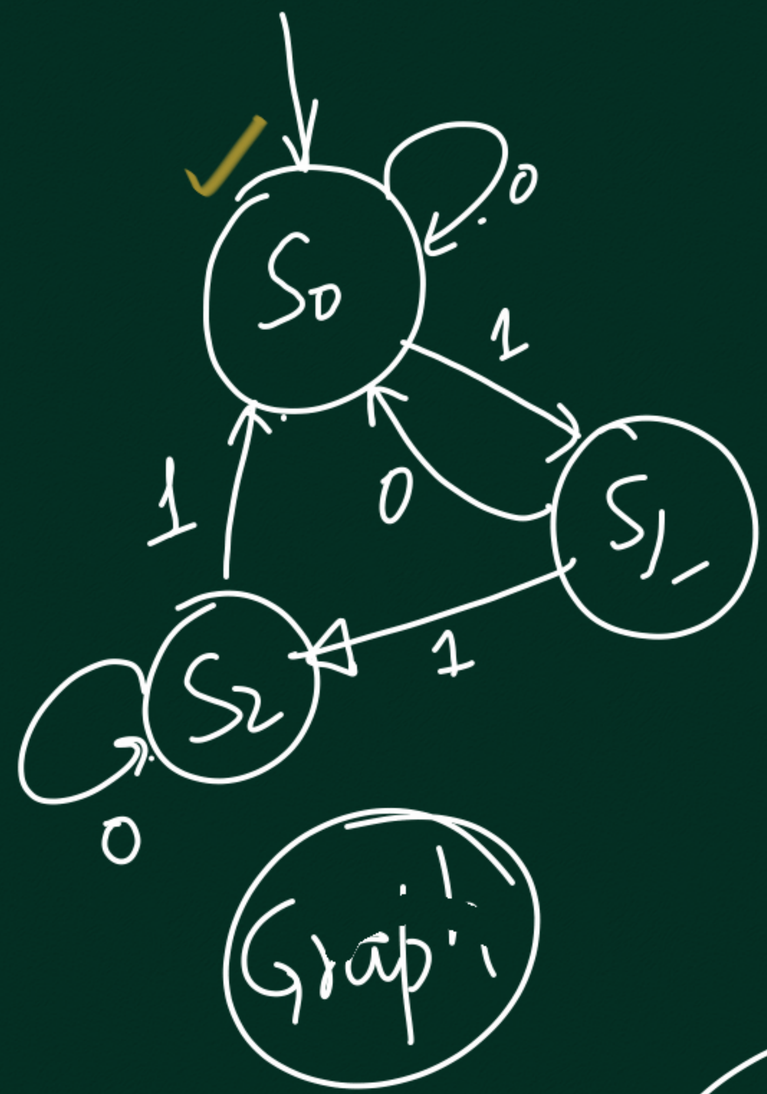
- S: Set of States
- S_0: Initial state
- I: Input Set (input symbols)
- O: Output set
- δ: Transition function
- λ: Output function

$\delta : S \times I \rightarrow S$

$\lambda : S \rightarrow O$ ← MOORE

$S \times I \rightarrow O$ ← MEALY





Computation Tree

Beha

TREE

Execution path

π_1

π_2

π_3

π_4

BEHAVIOR (Algorithm)

Temporal

Static

Temporal

Use logical operators ($\neg$, $\vee$, $\wedge$)

NOT, OR, AND

~, +

Behaviour $\overset{?}{\equiv}$ Implementation

Stable m/c

g_1 g_2

$g_1 \cdot g_2$

→ TEMPORAL LOGIC

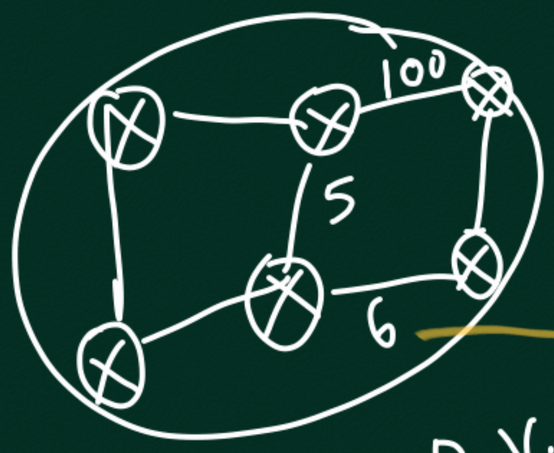
↳ LTL

↳ CTL

SAFE: SIGN UP FOR CS378 COURSE

L3 ROUTING

INTRA-DOMAIN



D.V.
LSR

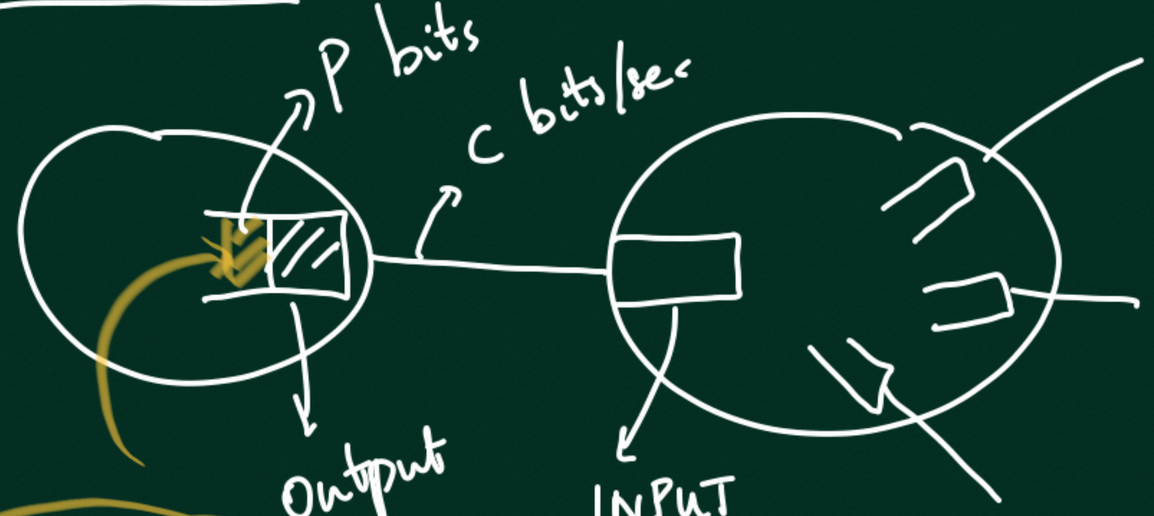
Wt
? = func (Speed of light + Queuing Delay + Trans. Delay)

higher for SAT links

Higher for slow (9.6kbps) links

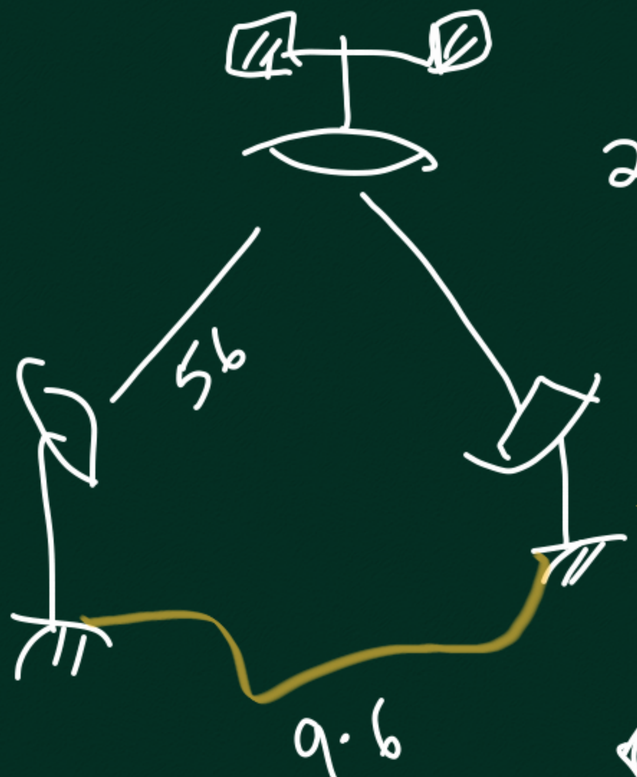
ARPANET

SAT → 9.6kbps, 56kbps
TERR. → —"— —



Issues 1) SAT links penalized too much

obs: High Speed SAT link has more weight than slow TERR link



2) Oscillations in weights due to Queing Delays

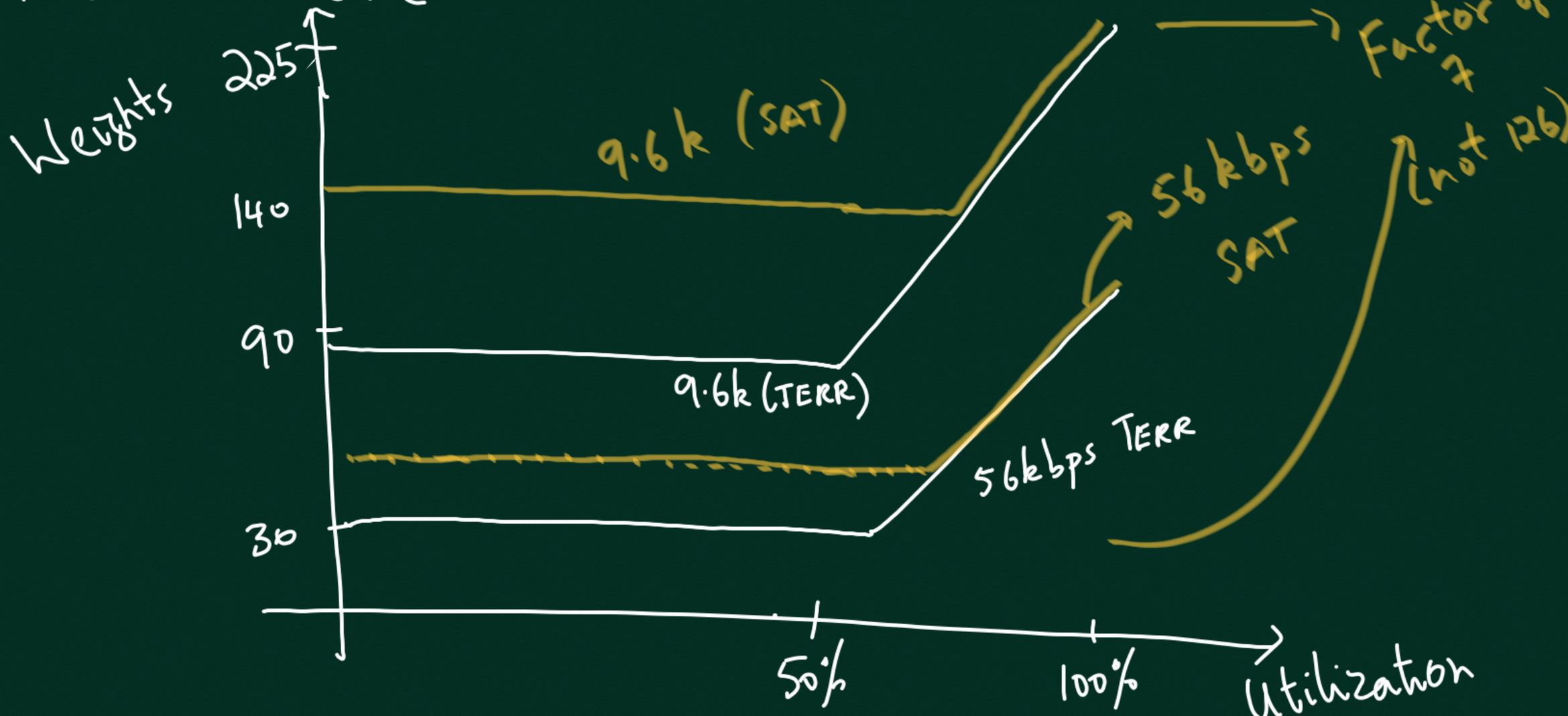
(LSP: LS Adv.)

3) Low Speed (9.6 kbps) penalized too much compared to High Speed (in same category: SAT/TERR)

Heavily loaded 9.6 kbps link had same weight as 126 lightly loaded 56kbps links

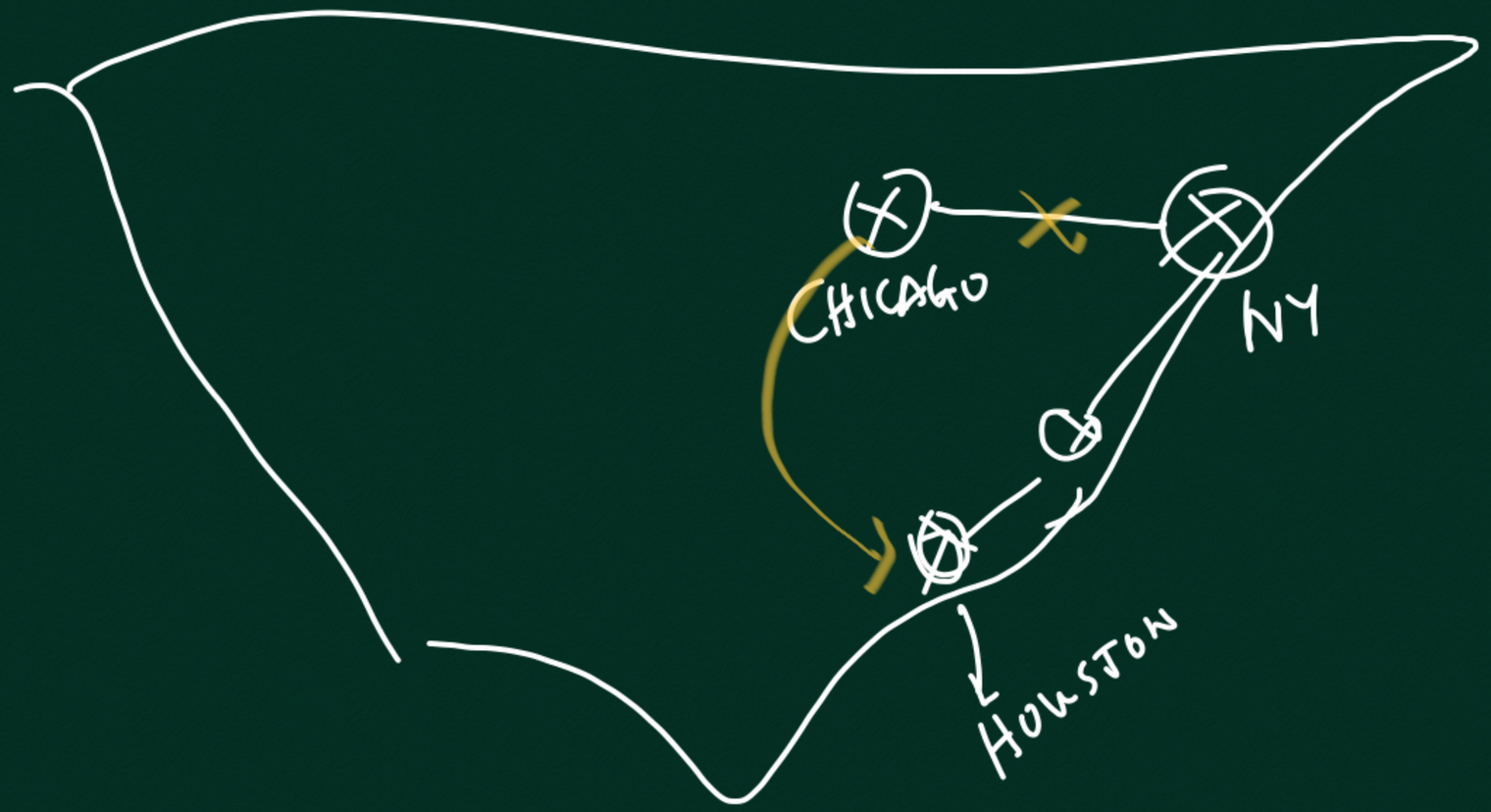
Utilization = % of bandwidth being used

New Scheme


Weights
225
140
90
30
9.6k (SAT)
9.6k (TERR)
56kbps SAT
56kbps TERR
Factor of 7
(not 126)
50%
100%
Utilization

NoC

<30%



INTER-DOMAIN ROUTING (BGP)

SLA

AS-PATH

AS50 AS100

ATTR

72.25.3/24

A.S 50

BGP speakers

A.S. 100

Adv.

eBGP

72.25.3/24

Prefix AS100 (ATTRIBUTES)

A.S.20

Dest: Z

eBGP

Peering Link

AS30

A

B

C

Z

Dest	Cost	Next Hop
B		C

ICANN

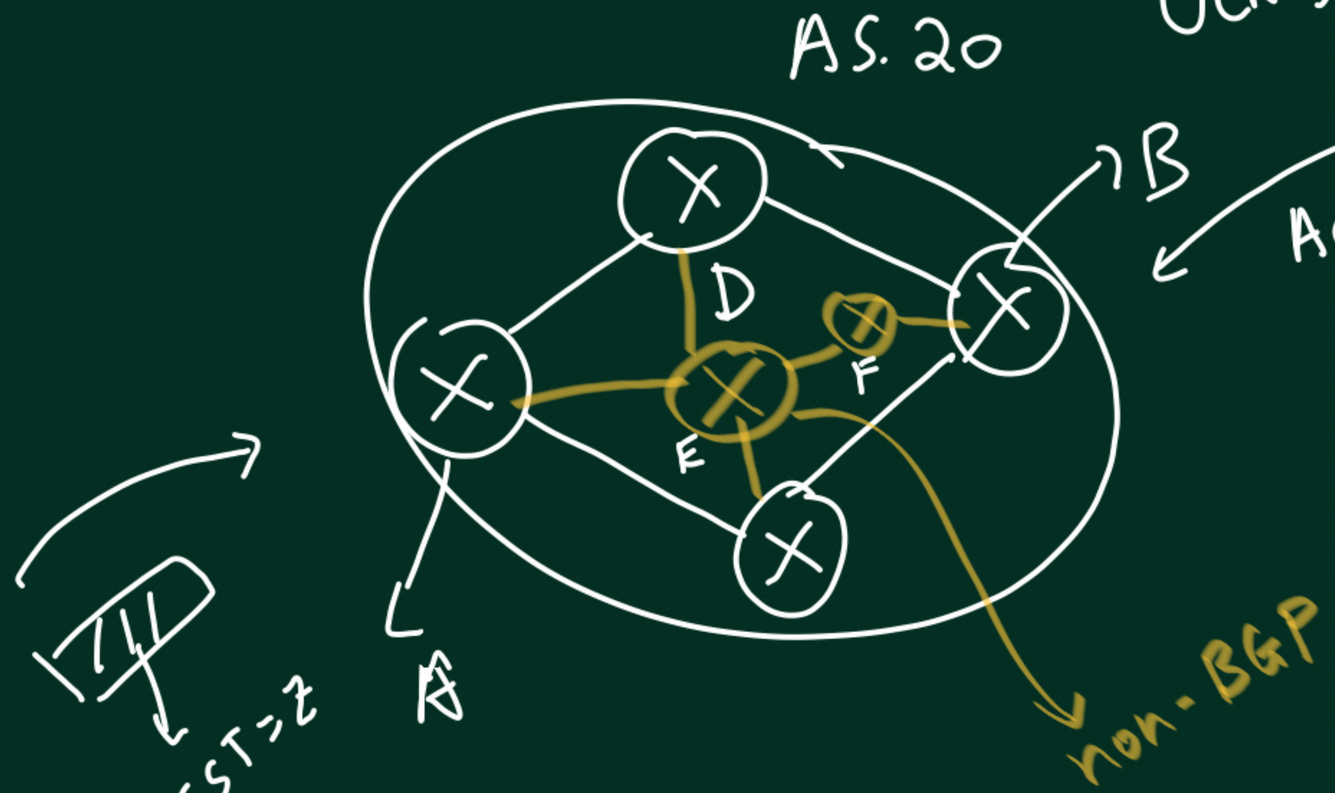
x.y.w.z/n

IP Prefix

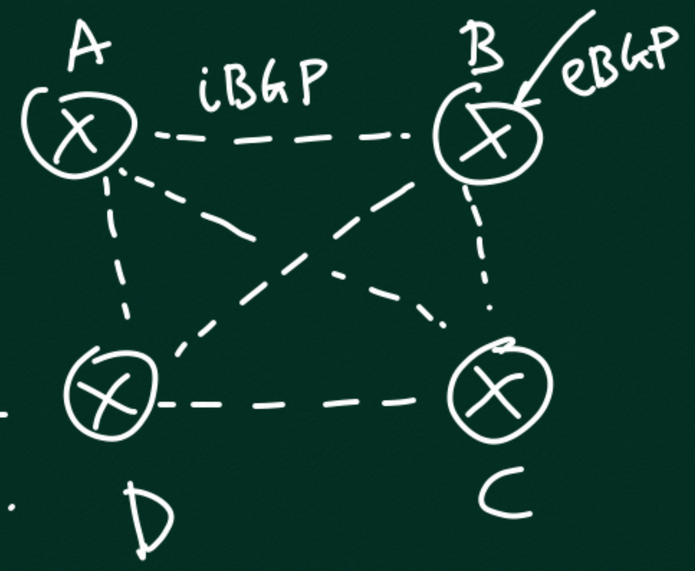
72.25.3.0/24 ≈ 2^8 hosts

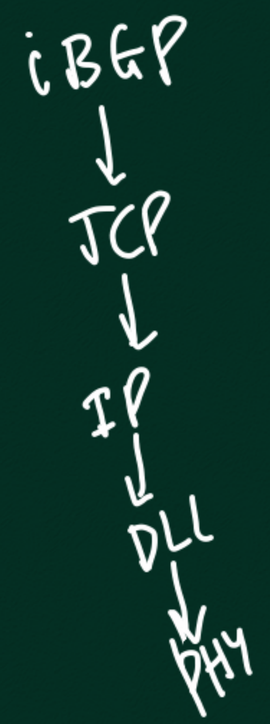
67.100.0.0/16 ≈ 2^{16} Hosts

iBGP : Interior BGP



N
$O(N^2)$





Procedure To Share Info

1) Use eBGP to share AS level paths known to your A.S. with neighbouring ASes
2) BGP speakers share eBGP learned info with other BGP speakers in own AS using iBGP
3) BGP speakers within AS select paths to various IP prefix destinations using ATTRIBUTES of Adv.
4) BGP inserts external routing info into IGP routing tables.