

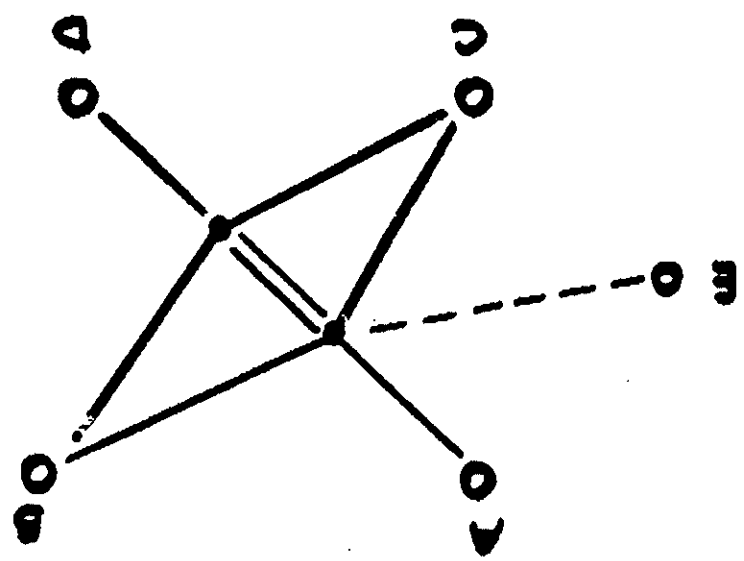
Models of Interconnection

Glenn Woroch

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Columbia Institute for Tele-Information  
Graduate School of Business  
809 Uris Hall  
New York, New York 10027  
(212) 854 4222

CALCULUS OF INTERCONNECTION  
(OR,  $1 + 1 > 2$ )



NETWORKS:  $N_1 = (A, B, C)$   $N_2 = (B, C, D)$   
SERVICES:

- BEFORE INTERCONNECTION  
 $N_1$  SERVICES: A, B, A, C, B, C  
 $N_2$  SERVICES: B, C, B, D, C, D

• AFTER INTERCONNECTION  
 $N_1, N_2$ : SAME

$N_2$  SERVICES: A, B, A, C, A, D  
B, C, D, B, C, B, C

# CLASSIFICATION OF EFFECTS

NEW SERVICE: AD

NEW COMPETITION:

• ENTRY INTO  $N_1$ : AB, AC

• ENTRY INTO  $N_2$ : BD, CD

• PARALLEL COMPETITION: BC, BC'

MARKET EXPANSION: E joins  $N_1$

•  $N_1$  SERVICES: add AE, BE, CE

•  $N_2$  SERVICES: add BE, CE, DE

MARKET CONTRACTION: A LEAVES  $N_1$

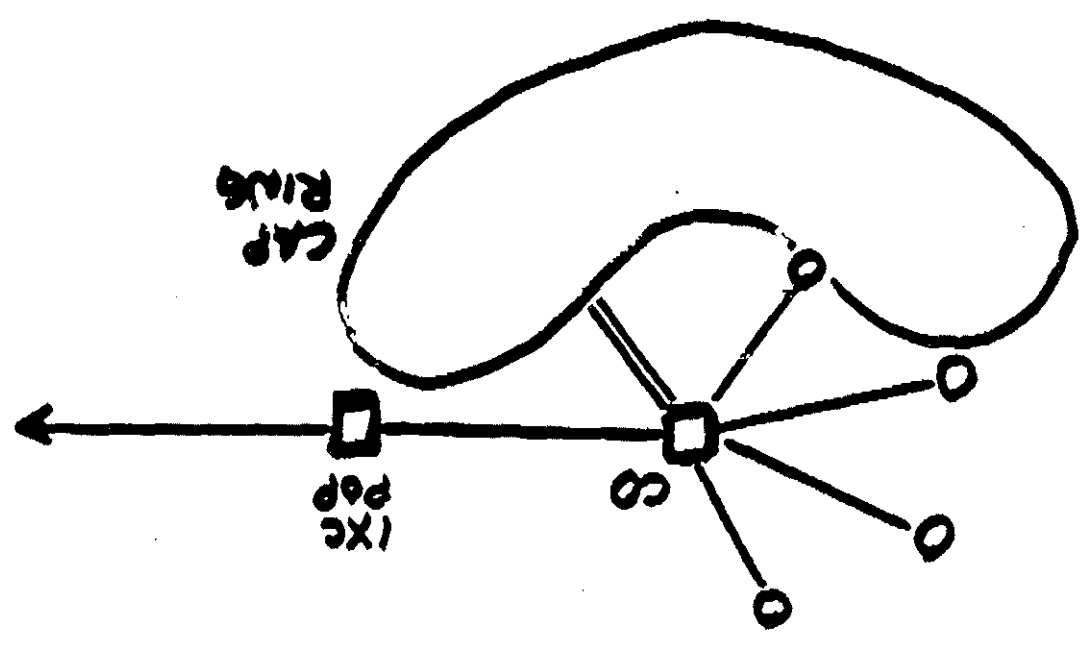
•  $N_1$  SERVICES: drop AB, AC

•  $N_2$  SERVICES: drop AB, AC, AD

• FCC'S NLRM

REGULATORY DEVELOPMENTS  
• COLLOCATION AGREEMENTS IN 5 STATES

- ACCESS TRAFFIC
  - COLLOCATION
  - PHYSICAL
  - VIRTUAL
- TYPES OF INTERCONNECTION



EXAMPLE: IXC-CAP INTERCONNECTION

• MERGER / ACQUISITION

- BYPASS

- CONVERTERS

• SELF SUPPLY

• MULTIPLE SUBSCRIPTION

## SUBSTITUTES FOR INTERCONNECTION

FRINGE / CELLULAR / ATM NETWORK

• CREATING A NATIONWIDE

• PRIVATE-PSTN LINK

• LEC-LEC, LEC-IXC, IXC-PT, etc.

## OTHER EXAMPLES

# VALUE INTERCONNECTION

## POTENTIAL BENEFITS

- 1) EXPANDED SERVICE OFFERS
  - FOR CURRENT USERS
  - FOR NEW SUBSCRIBERS

- 2) INCREASED PRICE + SERVICE COMPETITION

- 3) COST SAVINGS

## POTENTIAL COSTS

- 1) ADDITIONAL COSTS
  - COST OF INTERCONNECTION
  - DUPLICATION OF FACILITIES

- 2) COORDINATION FAILURES

- RESPONSIBILITY FOR RELIABILITY, QUALITY
- INVESTMENT DISINCENTIVES

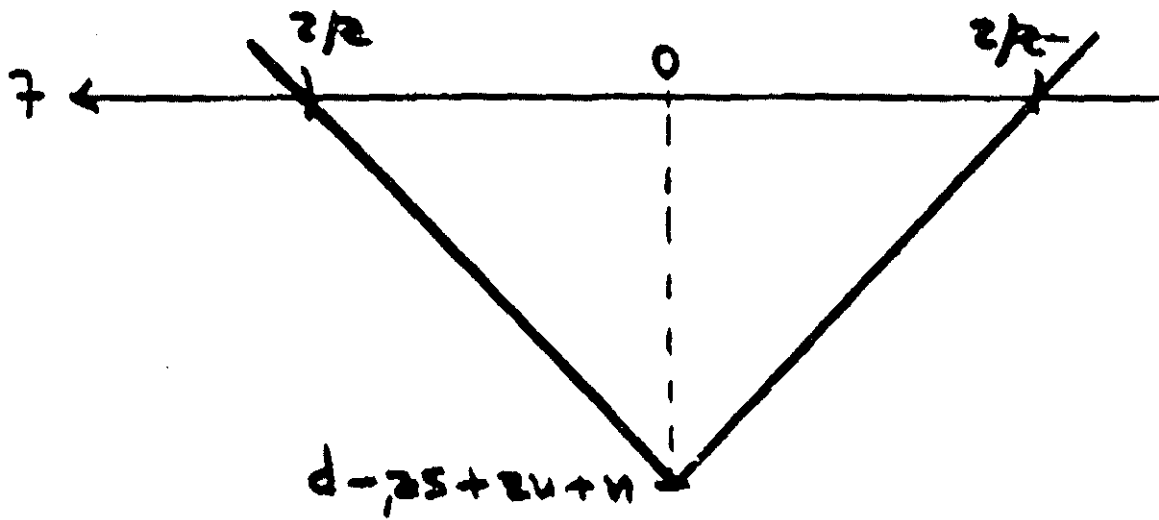
Q. HOW WILL THE MARKET PERFORM?

# A 3-STAGE GAME

- (1) NETWORKS BARGAIN OVER INTERCONNECTION
  - WHETHER TO INTERCONNECT
  - NEGOTIATE TERMS

- (2) NETWORKS SET PRICES FOR ACCESS + SERVICE

- (3) USERS MAKE SUBSCRIPTION CHOICE
  - WHETHER TO SUBSCRIBE
  - SELECT ONE (OR MORE) NETWORKS



join w/ I  
 join w/ O I  
 don't join

$$u = \begin{cases} n - |t| + n2 - p \\ n - |t| + n2 - p \\ 0 \end{cases}$$

UTILITY

- t - user type
- z - network size
- p - subscription price
- n - externality parameter
- s - spillover parameter

## SUBSCRIPTION CHOICE