

# P2P NETWORKS

APP

TRANS

NET

DLL

PHY



Client



Server

Peer

Peer

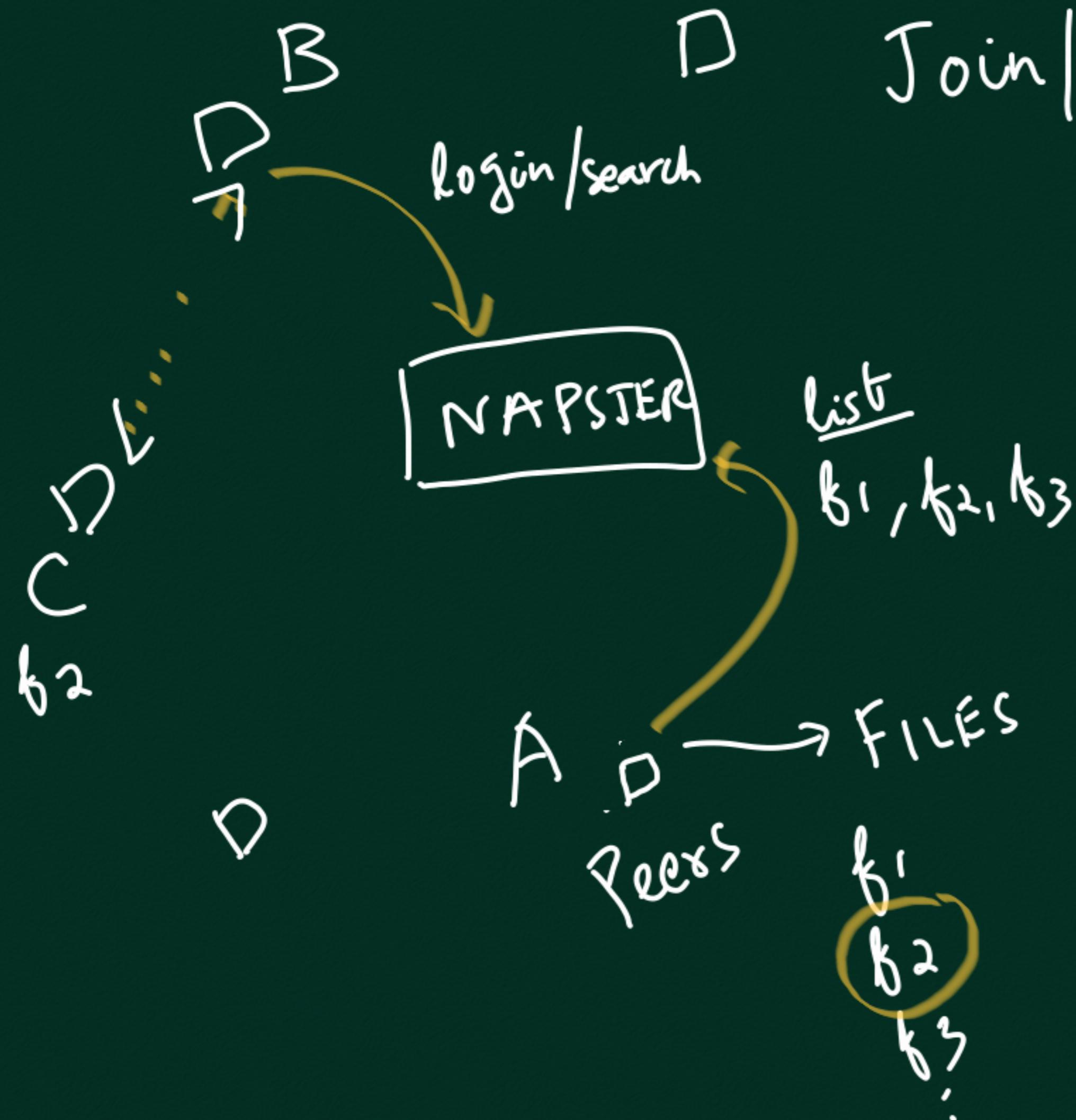
Peer

MUSIC / FILM  
SHARING

Peer

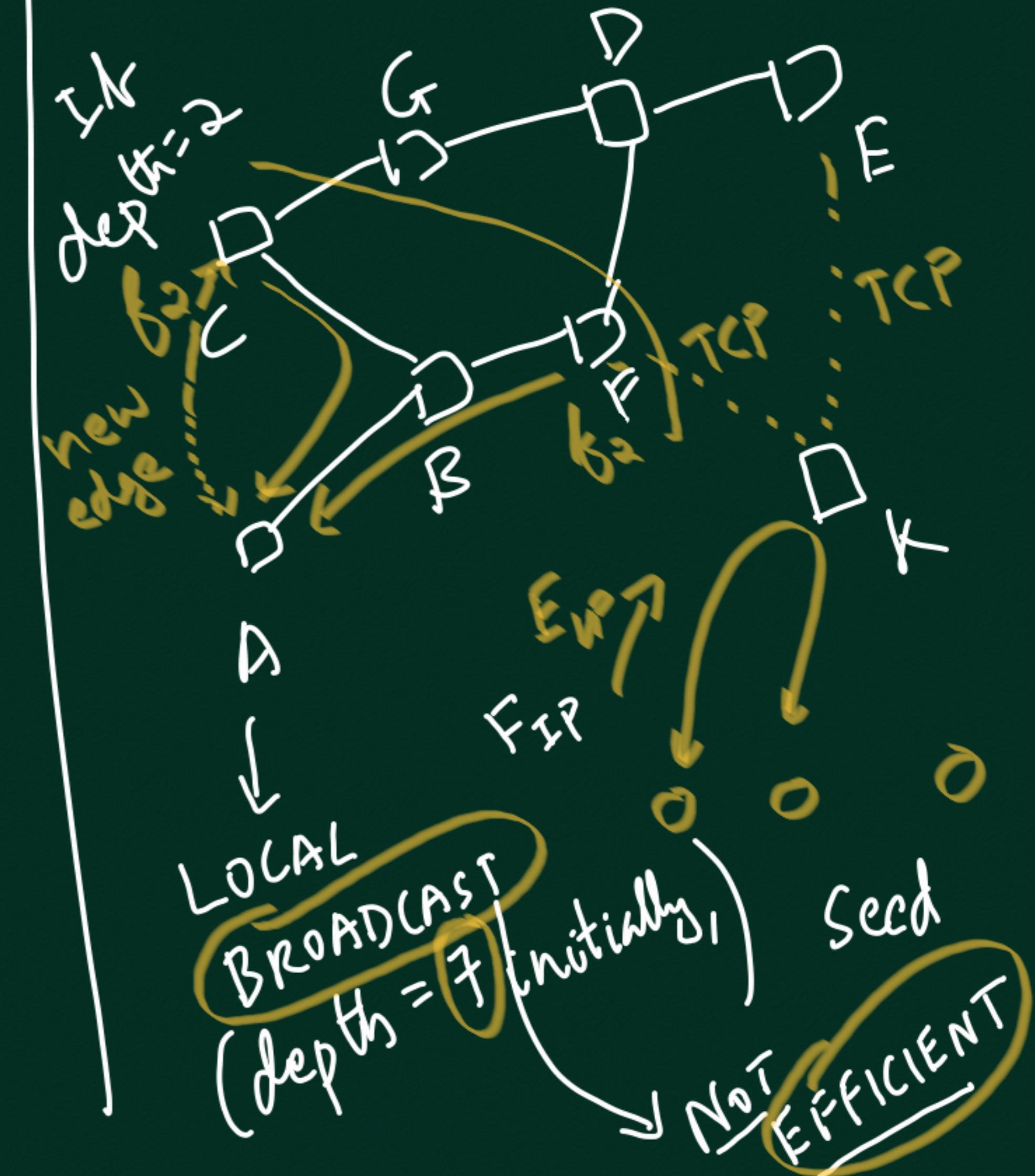
CRYPTOCURRENCY  
(late 2000s)

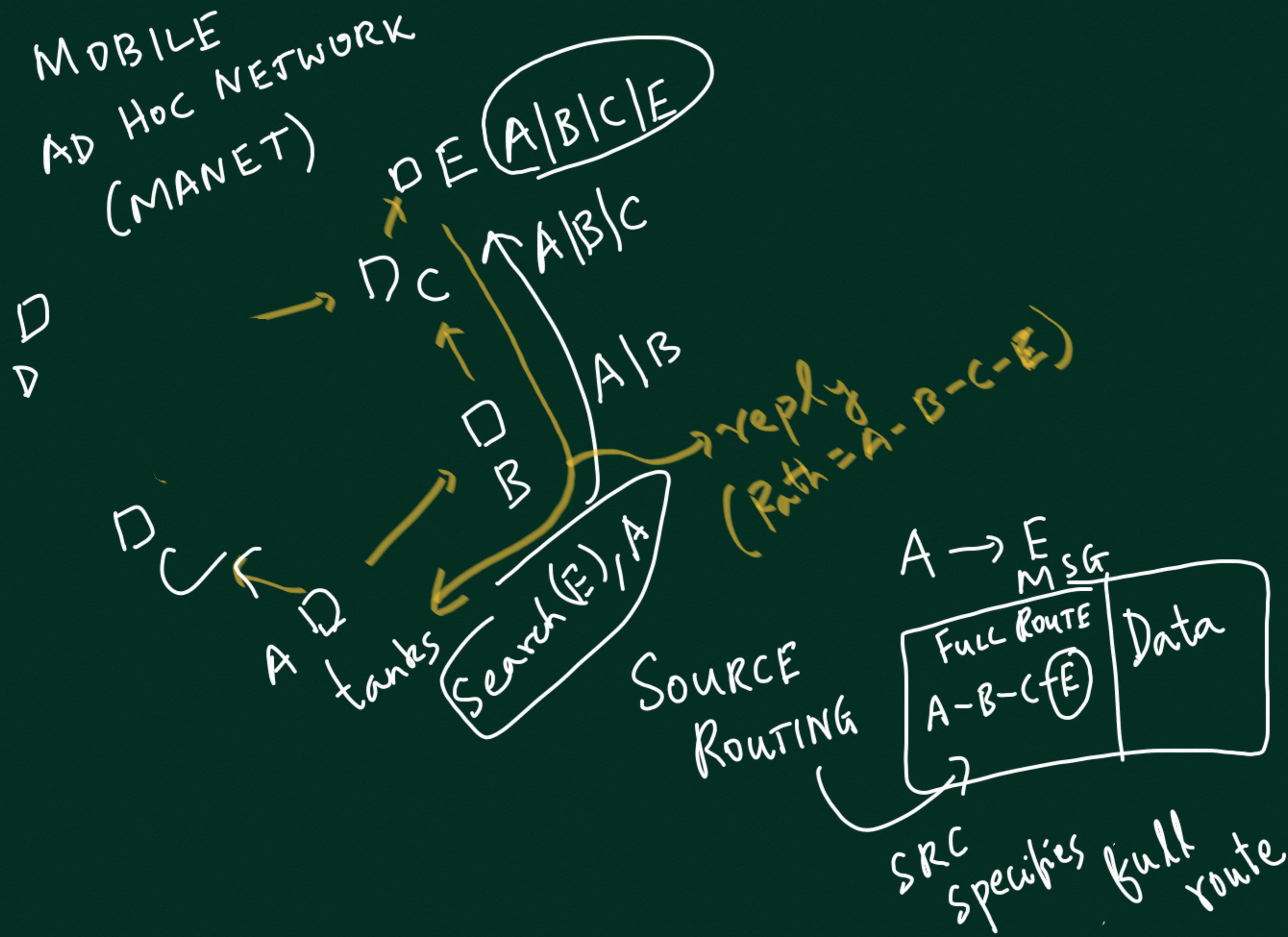
1st Gen



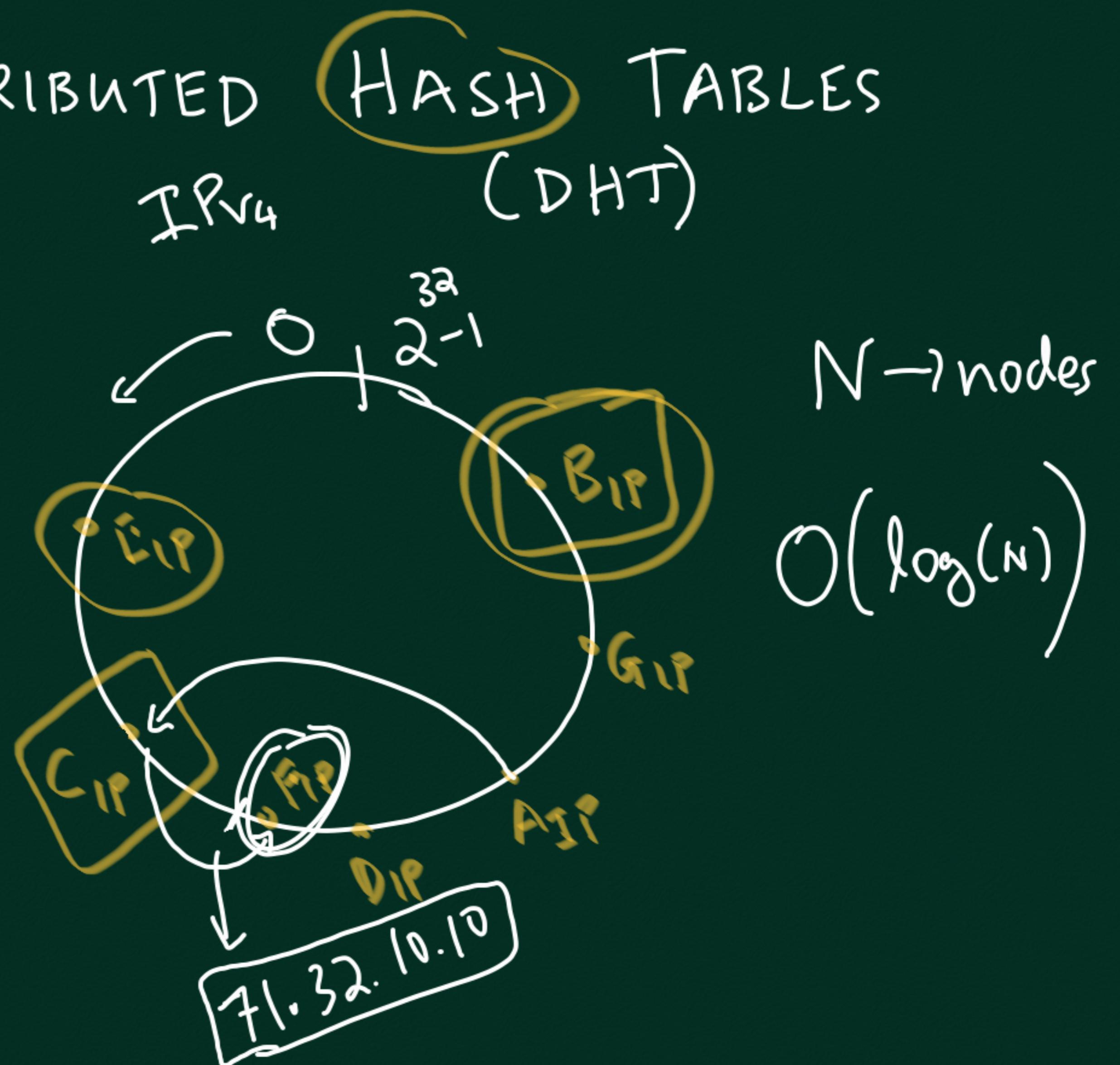
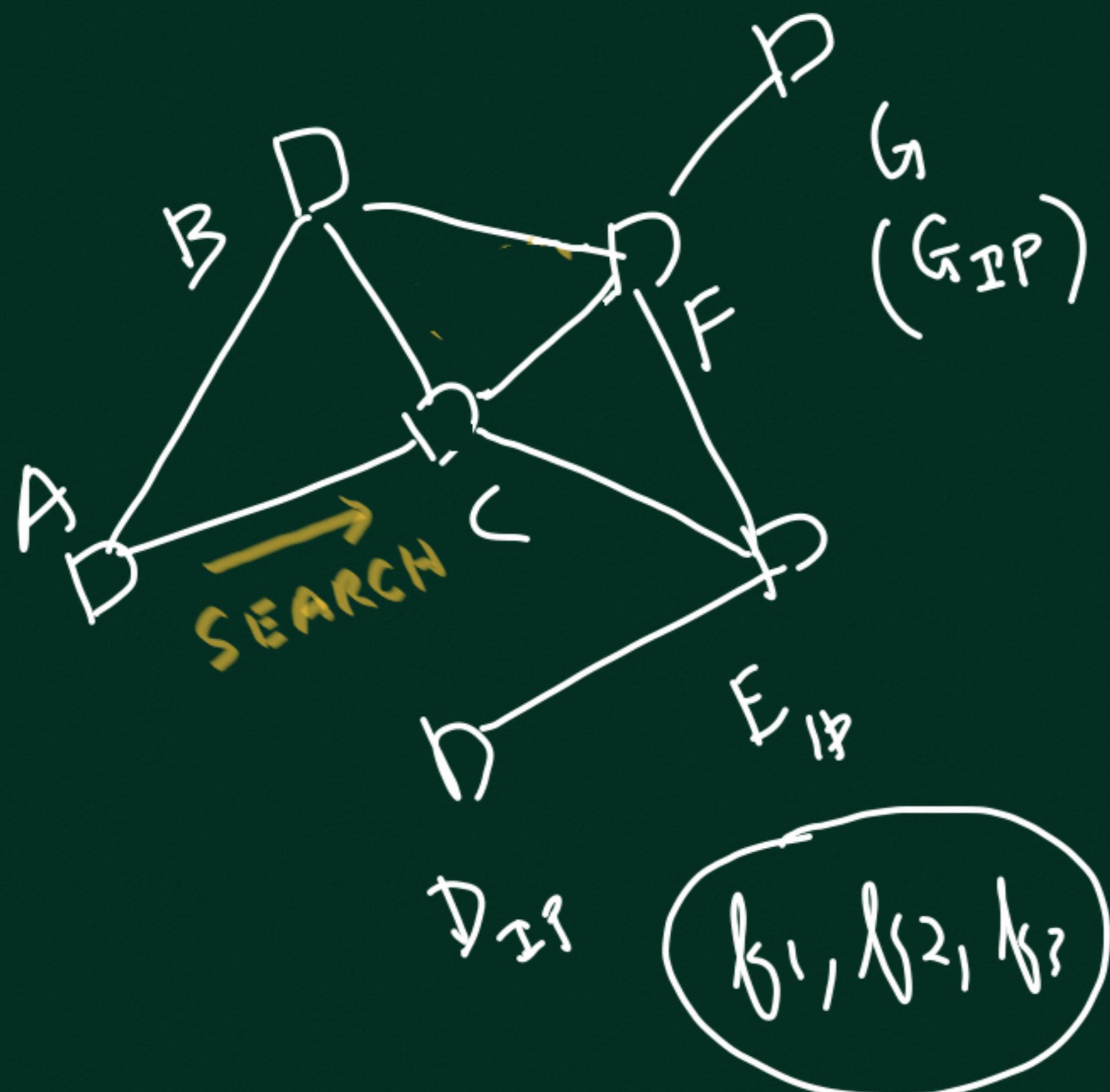
Join | leave

2nd Gen: GNUTELLA





# 3rd GEN P2P : DISTRIBUTED HASH TABLES (DHT)



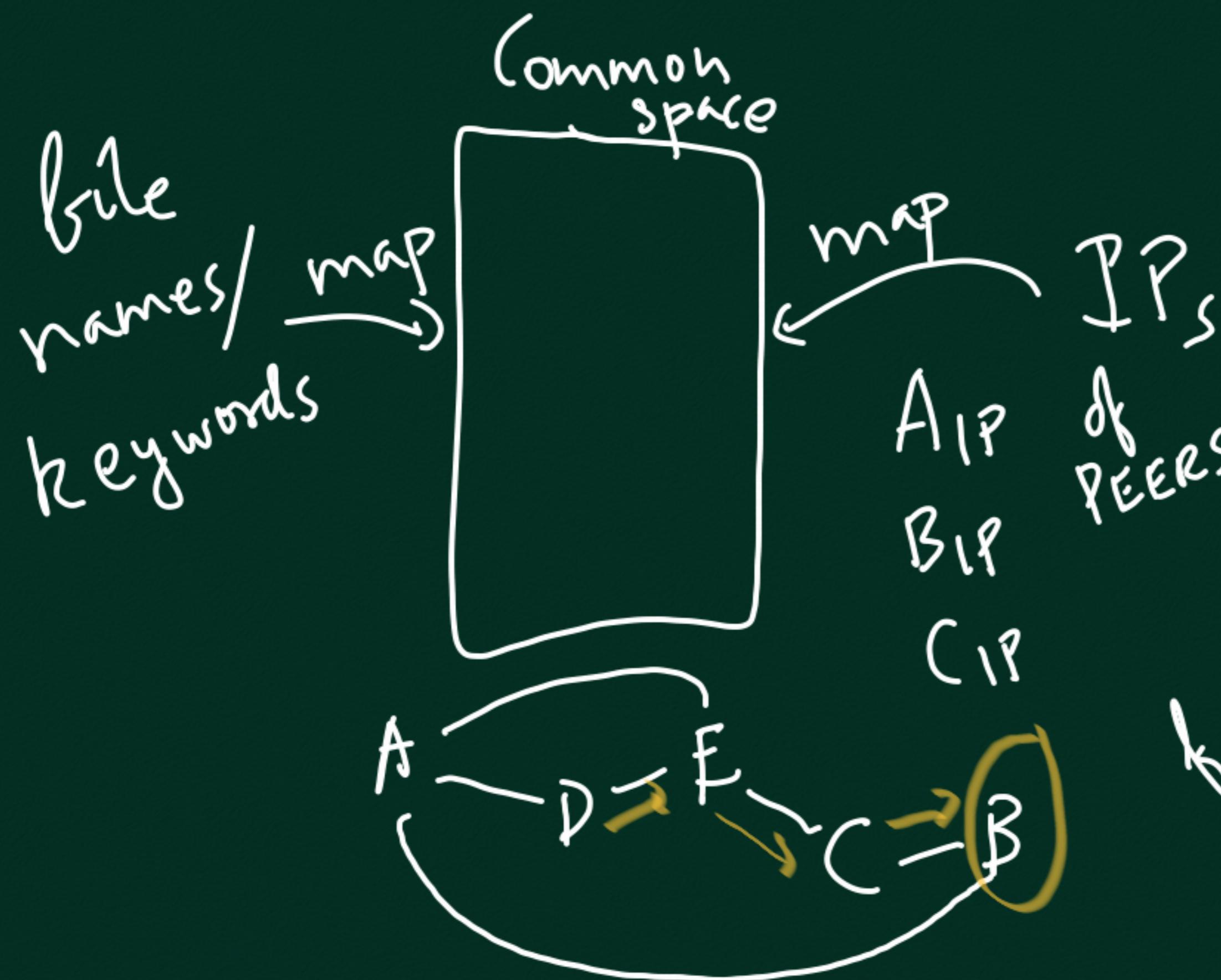
Idea: file  $\xrightarrow{\text{map}}$  IP  
names  
/ keywords

# Hash function H

128-bit

keyword →

$\beta_1, \beta_2, \beta_3, \beta_4$



## HIGH LEVEL

Suppose node A has file 'f'

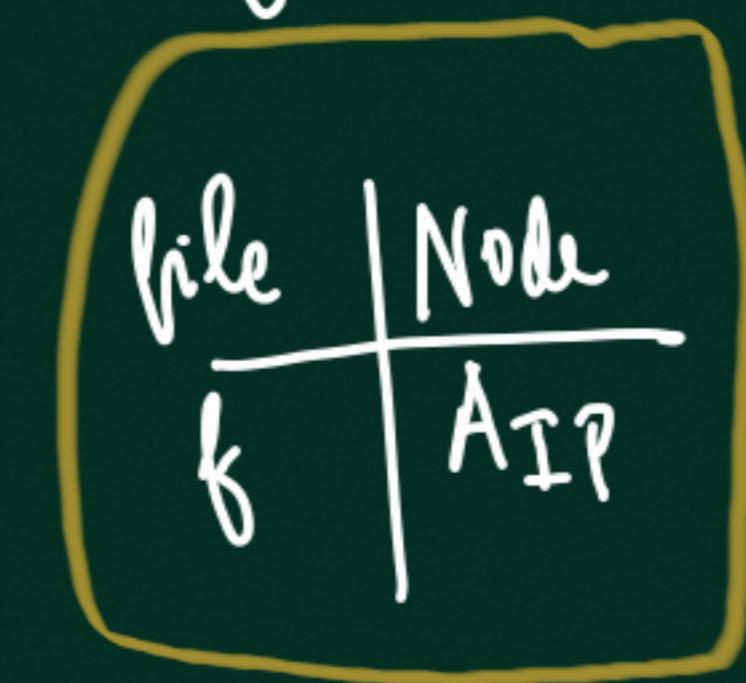
- A finds node (say B) whose IP is closest to f

in common space

$$\hookrightarrow \text{Means } \text{dist}(H(f), H(B_{IP}))$$

$$\leq \text{dist}(H(f), H(X_{IP}))$$

- A tells B that it has 'f'



\* nodes X in  
network

Suppose C wants file 'f'  $\rightarrow O(\log(M))$

- C finds node closest to 'f' in common space

$\rightarrow$  (this is B)

- C asks B: "Who has f?"

- B gives AIP to C

- C connects to A and downloads file

