APPLICATION

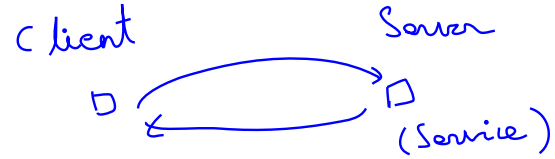
TRANSPORT

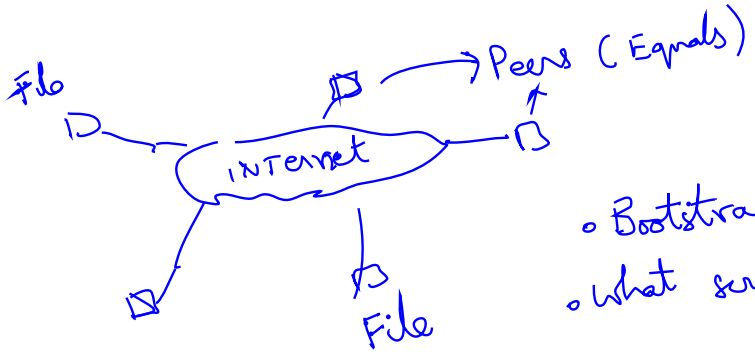
NETWORK

DLL

PHY

P2P PEER-TO-PEER NETWORKS

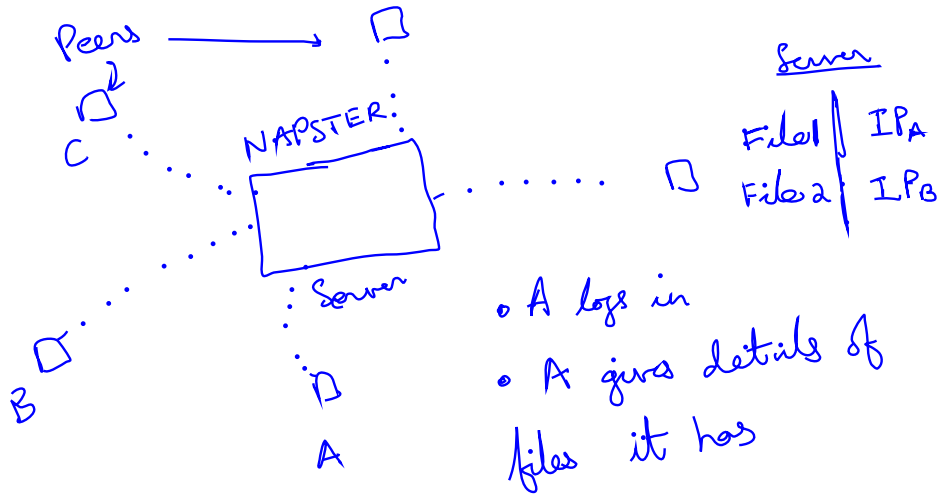




- Bootstrapping
- What service?

1990's — Share digital content

NAPSTER

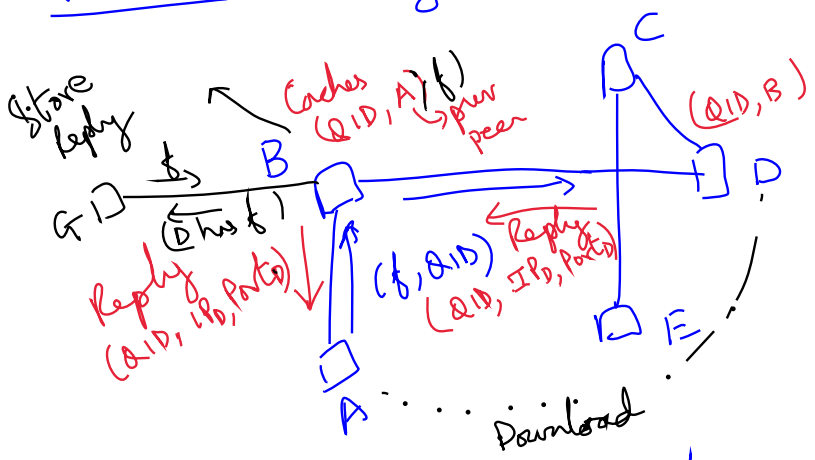


- A logs in
- A gives details of files it has

- C logs in
- Search for song
- match with File1, (File1 ↔ IPA) given to C
- C can connect to A and get File1

Drawbacks: Centralised → Single point of failure (not fault tolerant)
→ legally easy to take down

GNUTELLA (Next generation)



Bootstrapping

(1) Application may have IPs of some other peers

(2) Lookup IPs from one or more websites

Suppose A wants to search for "f"

- LIMITED BROADCAST (Initial TTL = n, TTL-- at every hop, TTL == 0 ⇒ don't forward query)

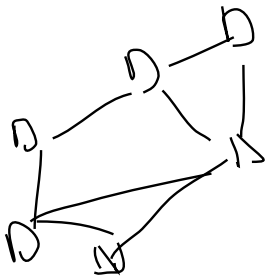
Suppose n = 2

First method: QUERY had "f", QID (Unique ID for query)
Reply over the path which the QUERY traversed

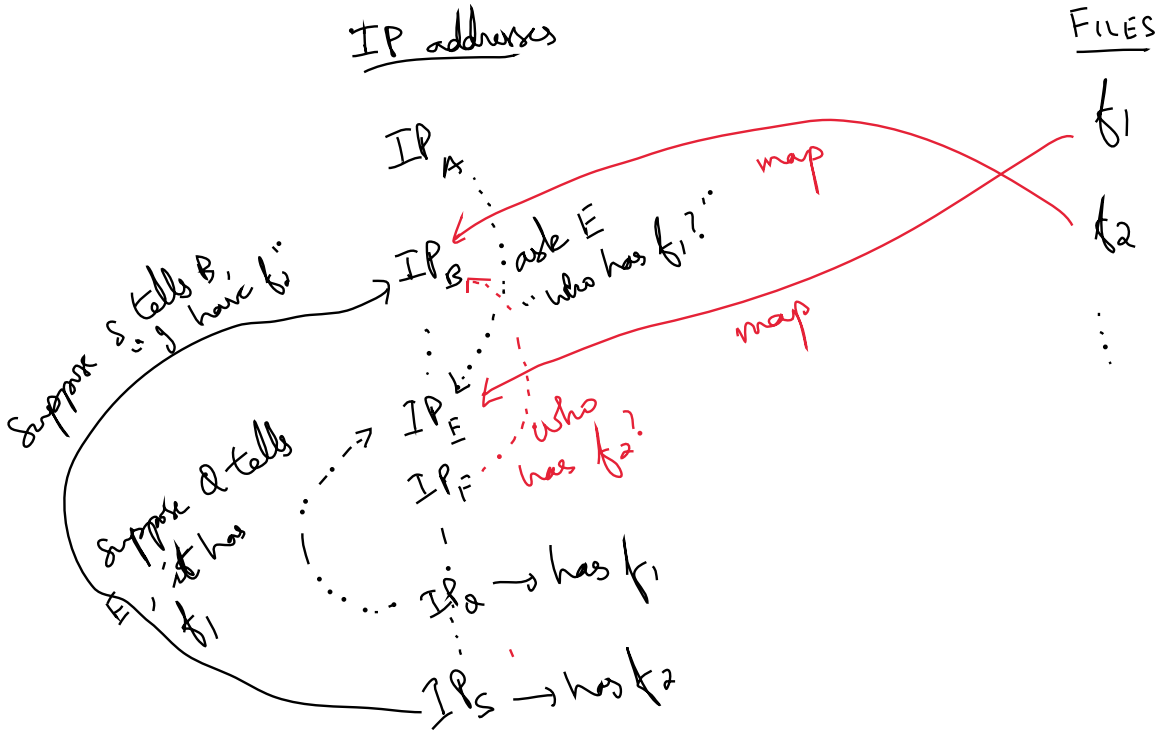
SECOND Method: Query has IP_A as well
Reply directly to A

V 0.4 → max. TTL = 7

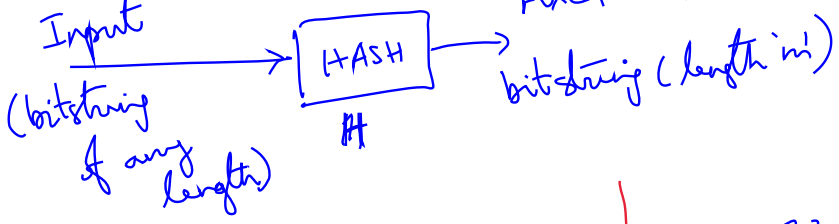
V 0.6 → max. TTL = 4

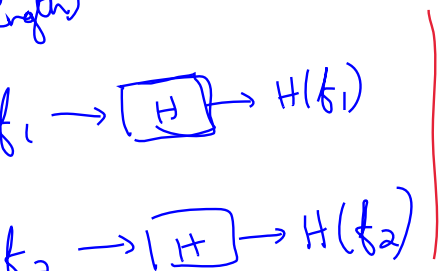


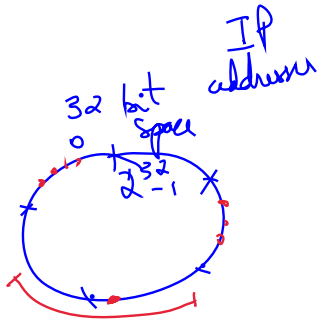
Question: If N nodes in network, can I query only $O(\log N)$ nodes to find where data is stored?



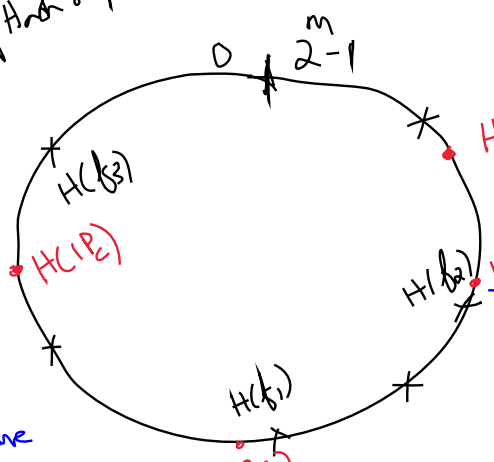
Use Hash function for mapping







m → length of Hash output



B must have info. about where f_2 is stored

Q: I have f_1 → E
A: who has f_1? → E
E has f_1

Hint, so E must store info. about where f_1 is stored