CLOUD COMPUTING CONCEPTS

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P2P SYSTEMS

Lecture B

NAPSTER

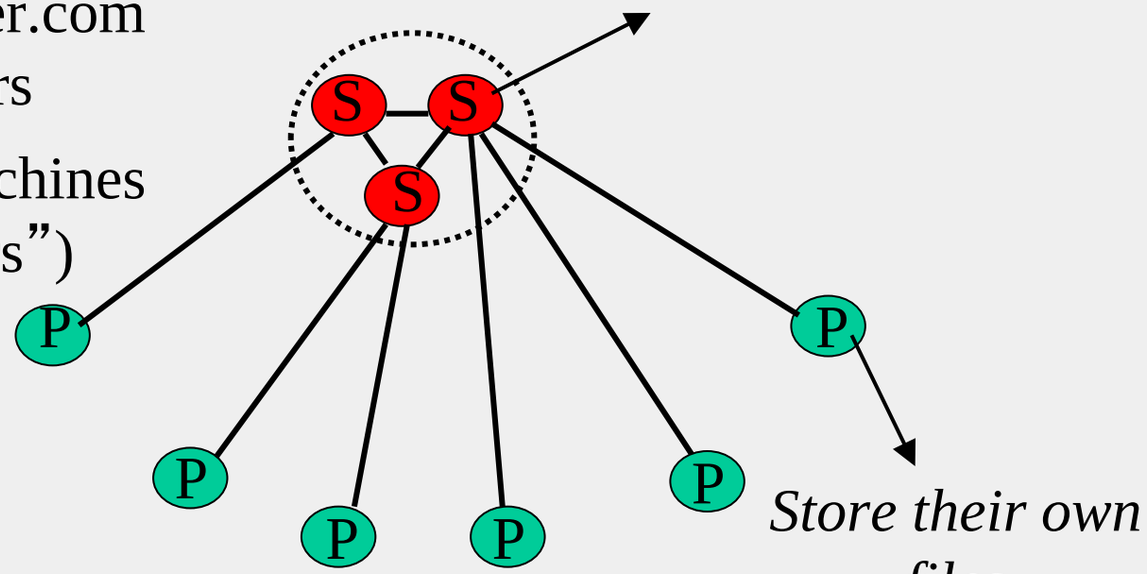
Napster Structure

Store a directory, i.e., filenames with peer pointers

Filename	Info about
PennyLane.mp3	Beatles, @ 128.84.92.23:1006 .....

napster.com Servers

Client machines (“Peers”)



Store their own files

Napster Operations

Client

- Connect to a Napster server
  - Upload list of music files that you want to share
  - Server maintains list of <filename, ip_address, portnum> tuples. **Server stores no files.**

Napster Operations

Client (contd.)

- Search
  - Send server keywords to search with
  - (Server searches its list with the keywords)
  - Server returns a list of hosts – <ip_address, portnum> tuples – to client
  - Client pings each host in the list to find transfer rates
  - Client fetches file from best host
- All communication uses TCP (Transmission Control Protocol)
  - Reliable and ordered networking protocol

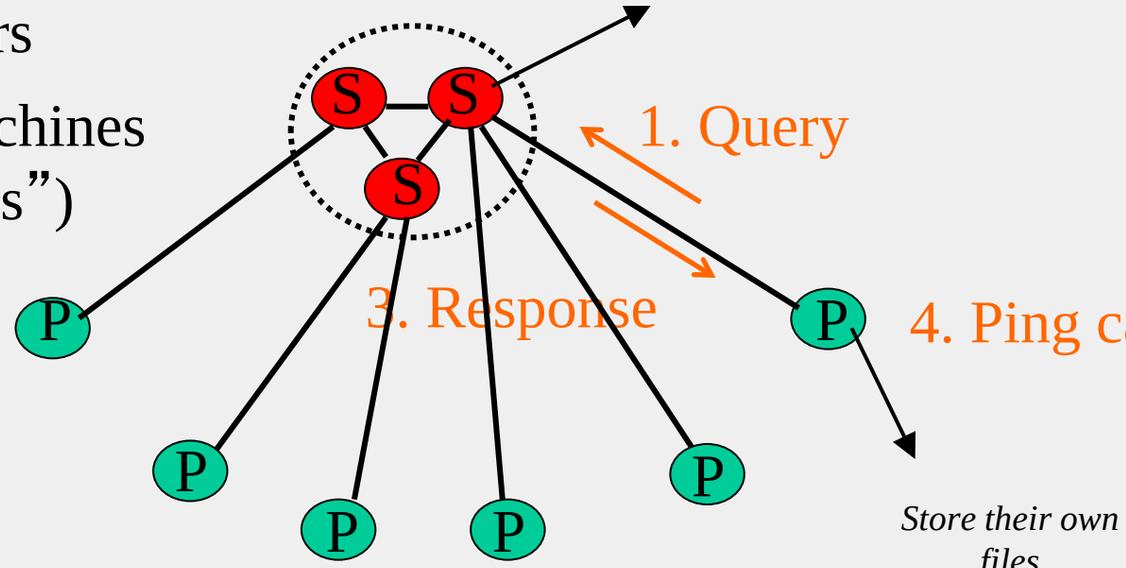
Napster Search

2. All servers search their lists (ternary tree algorithm)

napster.com Servers

Client machines ("Peers")

Store peer pointers for all files



1. Query

3. Response

4. Ping candidates

Store their own files

5. Download from best host

Joining a P2P system

- Can be used for any p2p system
  - Send an http request to well-known url for that P2P service - `http://www.myp2pservice.com`
  - Message routed (after lookup in DNS=Domain Name System) to introducer, a well known server that keeps track of some recently joined nodes in p2p system
  - Introducer initializes new peers' neighbor table

Problems

- Centralized server a source of congestion
- Centralized server single point of failure
- No security: plaintext messages and passwds
- Napster.com declared to be responsible for users' copyright violation
  - "Indirect infringement"
  - Next system: Gnutella