CLOUD COMPUTING CONCEPTS

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P2P SYSTEMS

Lecture D

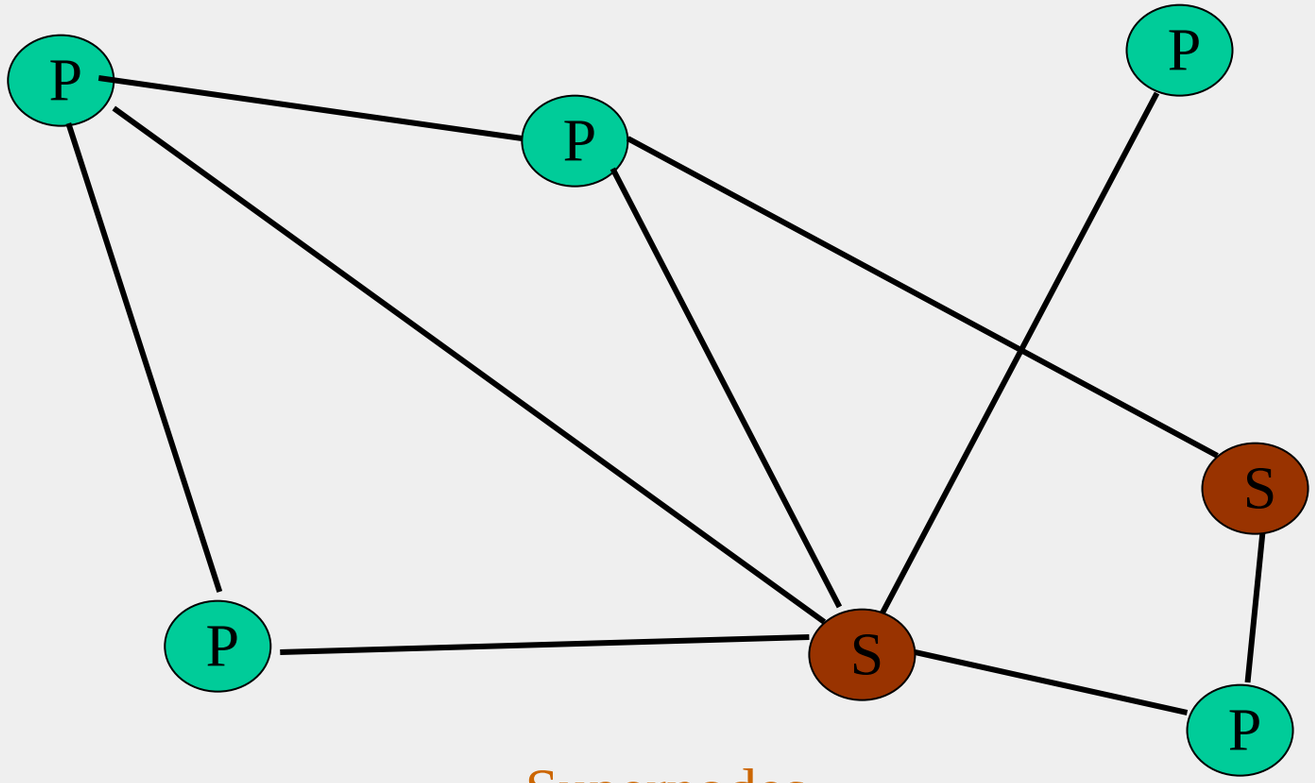
FASTTRACK AND BITTORENT

FastTrack

- Hybrid between Gnutella and Napster
- Takes advantage of “healthier” participants in the system
- Underlying technology in Kazaa, KazaaLite, Grokster
- Proprietary protocol, but some details available
- Like Gnutella, but with some peers designated as *supernodes*

A FastTrack-like System

Peers

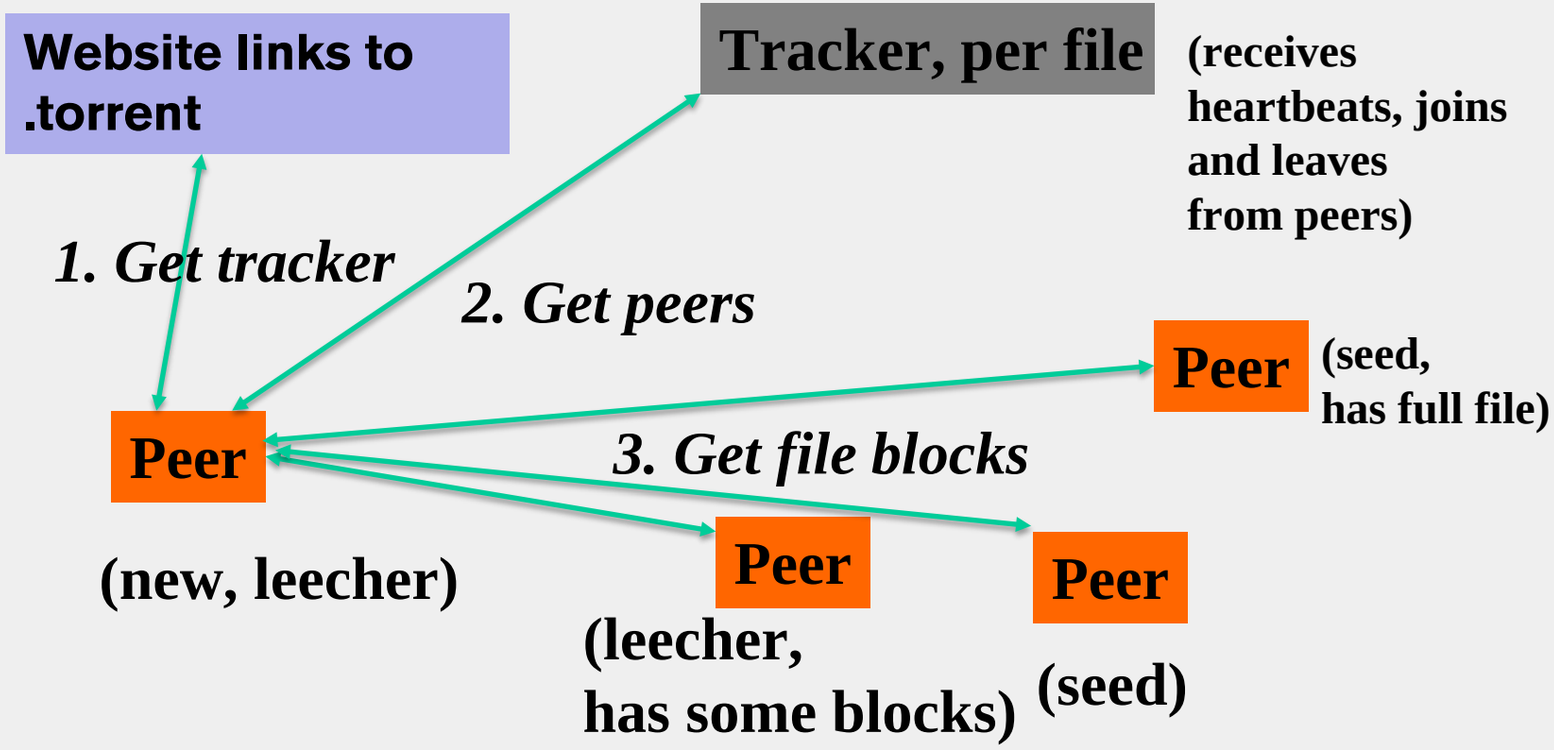


Supernodes

FastTrack (contd.)

- A supernode stores a directory listing a subset of nearby (<filename,peer pointer>), similar to Napster servers
- Supernode membership changes over time
- Any peer can become (and stay) a supernode, provided it has earned enough *reputation*
  - Kazaalite: participation level (=reputation) of a user between 0 and 1000, initially 10, then affected by length of periods of connectivity and total number of uploads
  - More sophisticated Reputation schemes invented, especially based on economics (See P2PEcon workshop)
- A peer searches by contacting a nearby supernode

BitTorrent


Website links to .torrent
Tracker, per file
(receives heartbeats, joins and leaves from peers)
1. Get tracker
2. Get peers
Peer
(seed, has full file)
3. Get file blocks
Peer
(new, leecher)
Peer
(leecher, has some blocks)
Peer
(seed)

BitTorrent (2)

- File split into blocks (32 KB – 256 KB)
- Download Local Rarest First block policy: prefer early download of blocks that are least replicated among neighbors
  - Exception: New node allowed to pick one random neighbor: helps in bootstrapping
- Tit for tat bandwidth usage: Provide blocks to neighbors that provided it the best download rates
  - Incentive for nodes to provide good download rates
  - Seeds do the same too
- Choking: Limit number of neighbors to which concurrent uploads <= a number (5), i.e., the “best” neighbors
  - Everyone else choked
  - Periodically re-evaluate this set (e.g., every 10 s)
  - Optimistic unchoke: periodically (e.g., ~30 s), unchoke a random neigbhor – helps keep unchoked set fresh