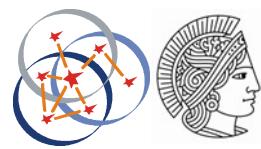




P2P Networks – Exercise # 5

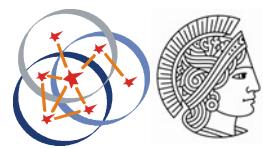
Ikram M. Khan, P2P Networks,
TU Darmstadt

Date: Nov. 22nd, 2011



Doodle Poll for P2P Networks Course Exams

<http://www.doodle.com/eg3cdf7sg56h2cya>



BitTorrent

Solution for 3rd Exercise



1.1 BitTorrent (P. 2/16)

- How does a client join a torrent network if it has no knowledge about the existing swarm?
 - Search for .torrent that contain tracker details
 - Lengths
 - Name
 - Hashing information
 - Tracker URL



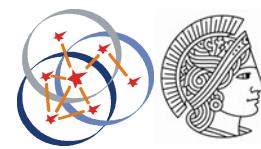
1.2 BitTorrent (P. 5/16)

- Explain how data is identified and sectioned in a torrent network? How does the piece size affect the download performance?
 - Chunks or 'pieces'
 - Hashes of each chunk
 - 'Smaller is better' - bandwidth is used optimally



1.3 BitTorrent (P. 9/16)

- When the client is connected to the swarm, how will it choose what to download, from the first byte till the last byte of the data is downloaded?
 - Strict priority
 - Request all sub-pieces of a piece before starting to download other pieces from the same peer
 - Rarest first strategy
 - Download the rarest pieces in the peer set
 - Random first piece
 - Download all the pieces at random until the download of the first piece is completed
 - End-game - request for all subpieces
 - Request the missing pieces from all other peers



1.4 BitTorrent (P. 12/16) (1/2)

- Explain how a BitTorrent client chooses the peers that it will transfer data to it. How does this behaviour change when the client itself has successfully received all the data?
 - Pareto efficiency
 - State, in which a party can only gain if another party loses
 - BitTorrent: local optimization to achieve global optimization w.r.t the amount of distributed data by the tit-for-tat paradigm
 - Choking algorithm
 - Chock: temporal refusal to upload to another peer
 - Unchock only the 4 best uploaders from the peer set
 - Based on the current download rate
 - Recalculate which peer to unchoke every 10 seconds



1.4 BitTorrent (P. 12/16) (2/2)

- Explain how a BitTorrent client chooses the peers that it will transfer data to it. How does this behaviour change when the client itself has successfully received all the data?
 - Optimistic unchoking
 - Unchoke a random peer every 30 seconds
 - Independent of the current download rate
 - Anti-snubbing
 - Choke all peers that have not uploaded a chunk the last 60 seconds
 - Upload only
 - When become a seeder, start uploading to the peers with best download speed



1.5 BitTorrent (P. 16/16)

- Explain at least two possibilities for a peer to exploit the BitTorrent protocol that will raise the download rate of a single peer. How are the other peers affected?
 - Fake sub-pieces
 - Integrity check is inclusive
 - Uncooperative peer
 - Claim that you have all the pieces but don't upload them to others
 - Manipulate piece rareness
 - Pretend possession of rare pieces that lead to their extinction from swarm
 - Eclipse attack
 - Intercept cooperative nodes



Best of luck for 5th exercise