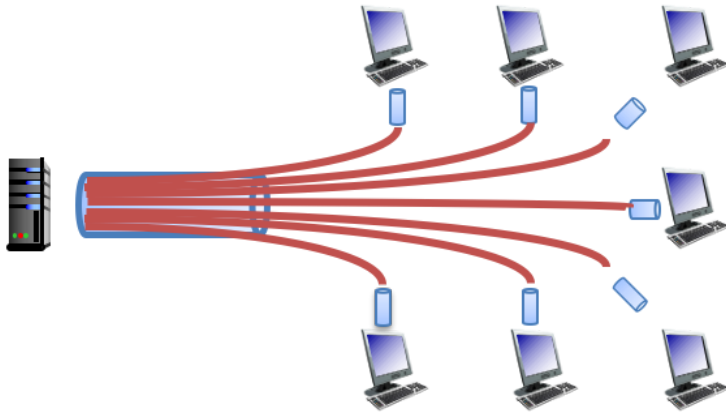


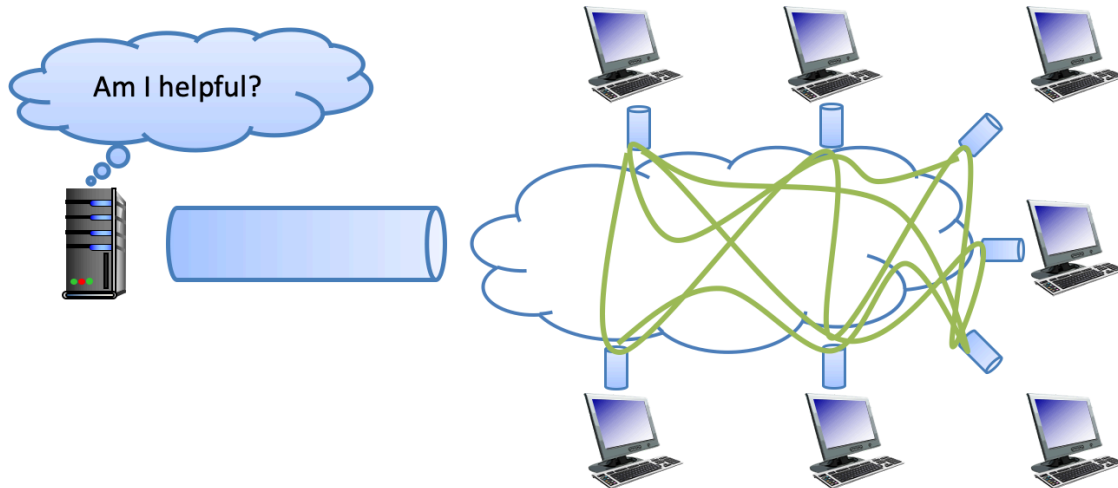
Worksheet Class 9: P2P Systems and Bit-Torrent

Q1. What is the biggest problem you run into with the traditional C/S model? Provide your reasons



- A) Scalability (how many end-hosts can you support?)
- B) Reliability (what happens on failure?)
- C) Efficiency (fast response time)

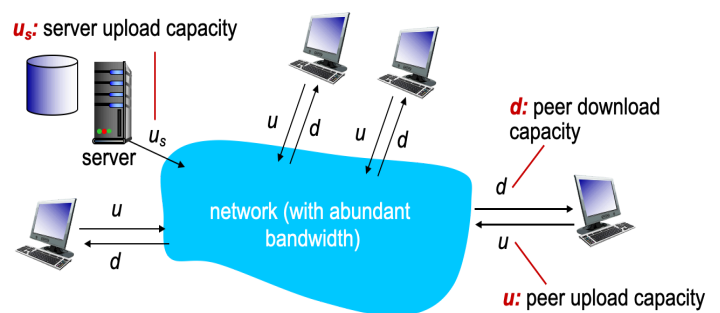
Q2. In a P2P system, do we need a centralized server at all? Would you use one for something?



- A) Unnecessary, would not use one.
- B) Unnecessary, would still use one.
- C) Necessary, would have to use it.
- D) Something else.

Q3. Compare the time needed to distribute a file that is initially located at a server to clients via either client-server download or peer-to-peer download. We have the following information about the system:

File size = 6 Gbits = 6000 Mb (megabits)
 Number of peers = 10
 Server upload rate of $u_s = 100$ Mbps (megabits per second)
 Peer upload rate of $u = 20$ Mbps
 Peer download rate of $d = 50$ Mbps



Q3. A. What is the minimum time needed to distribute this file from the central server to the 10 peers using a client-server model?

In a C/S architecture, you can assume the server needs to transmit one copy of the file to each of the clients. So the total number of bits the server needs to transmit is the file size times the number of clients.

- The time to upload a file from the server to the network = the number of bits/upload rate.
- The time to download a file from the network to each client = the number of bits/download rate.

The minimum time to distribute the file has to take into account both the upload time from server to the network and download time from network to the client.

Q3. B. What is the minimum time needed to distribute this file from the central server to the 10 peers using a peer-to-peer model?

In a P2P architecture, you can assume the server needs to transmit *at least one copy* of the file into the network, before other peers can also act as distributors. This provides the total number of bits the server needs to transmit. Apart from the first file transmission the server has to do, there's also the following factors to consider:

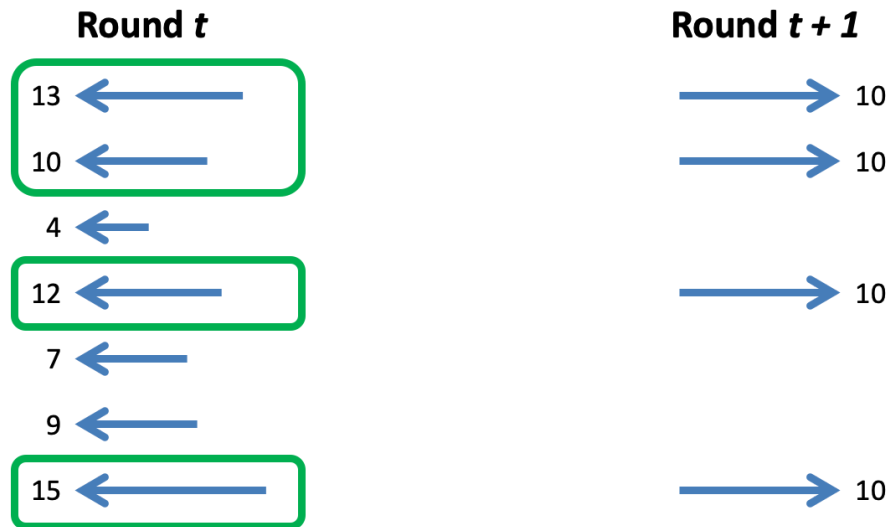
- The time to upload a file now depends on the upload rate of the server *and* the sum total of the upload rates of all of the peers.
- The time to download a file from the network to each peer = the number of bits/download rate.

The minimum time to distribute the file has to take into account the upload time from server to the network, the upload time of the peers to the network, and download time from network to the client.

Q4. In a P2P system, if you're trying to receive a file, which chunk should you request next? Provide your reasons.

- A) Random chunk.
- B) Most common chunk.
- C) Least common chunk.
- D) Some other chunk
- E) It doesn't matter.

Q5. We saw that a peer in Bit-torrent will optimally unchoke 4 peers to send data to. How might we abuse this system if you really want to download from someone?



- A) Send more data than the top 1 peer
- B) Send more data than the top 4 peers
- C) Send less data than the top 3 peers
- D) Send some other combination