

Lecture 9: October 12, 2018

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9.1 Client-Server File Distribution Time

- **Server Transmission:** Server must sequentially send N file copies
- **Client:** each client must download a file copy
- Thus, the time to distribute a file of F bytes to N clients using the Client-Server method where server upload capacity is u_s and client download capacities are d_i

$$D_{C-S} \geq \max \left(\frac{NF}{u_s}, \frac{F}{d_{\min}} \right)$$

9.2 P2P

- Intermittently connected clients are referred to as peers
- A server is often used to maintain a list of peers to connect to
- **Server Transmission** A server must at first transmit at least one copy of a file
- Each **client** must download a copy of the file
- **Clients** as aggregate must download NF bits where N is the number of peers and F is the file size
- Thus, the time to distribute a file of F bytes to N clients using the P2P where server upload capacity is u_s and peer download capacities are d_i

$$D_{P2P} \geq \max \left(\frac{F}{u_s}, \frac{F}{d_{\min}}, \frac{NF}{u_s + \sum u_i} \right)$$

- "Tit-for-Tat" is a common P2P setup where you keep a small list of best performing peers

9.3 CDN

- **Content Distributed Network (CDN)** is a set of servers distributed globally that physically connect multiple data centres through a dedicated link
- CDNs make content available throughout a wider geographic area. This raises the question of what content should be distributed and where servers should be placed