Evolution of the Download

Gautam Srivastava

Original File Sharing Protocols

- Client–Server Model
  - mp3 off i-Tunes
  - ebooks off Amazon
  - videos from YouTube
  - movies from NetFlix

1990s: A Change in Guard

▸ P2P File Sharing – revolutionized the way we share files
  ◦ each computer: both server and client
  ◦ upload and download simultaneously

Benefits of P2P vs Client-Server

- users enjoy high level of anonymity and privacy
- large files can be distributed more efficiently
- more resilient to failure
- de-centralization

Bad Reputation!!

- P2P has received a bad reputation
  - copyright materials often shared
  - Linux
  - World of Warcraft
  - Internet TV

History of P2P

- Napster
  - Originated in 1999 – Peaked in 2001
  - wasn't the first, but became the most popular
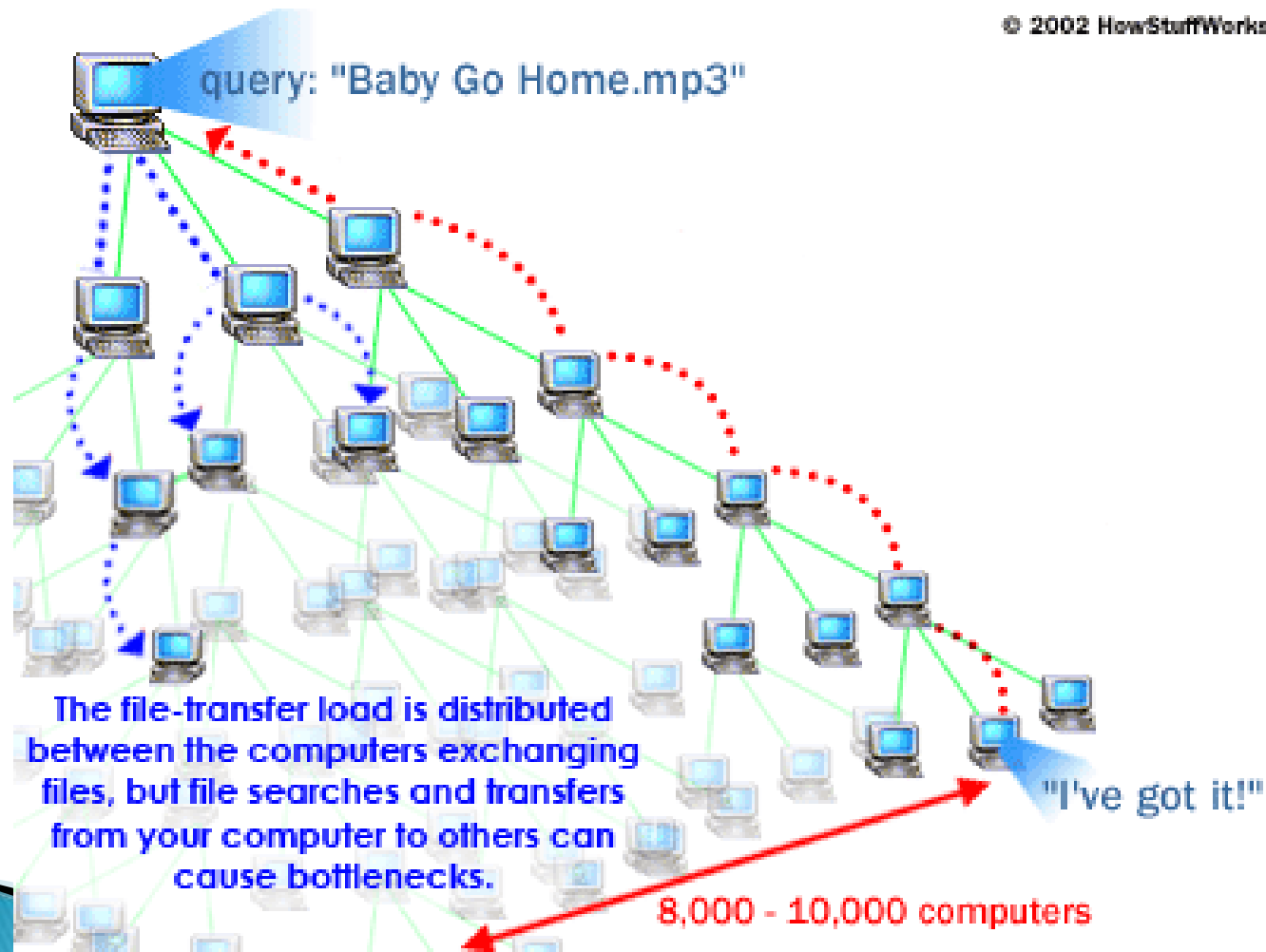 - Napster Database
  - Shut Down July 2001

Post-napster

- Many clients have tried their hand
  - Gnutella
  - FastTrack
  - eDonkey
  - LimeWire
  - Kazaa
- Difficult to shut down!!

Gnutella

- very similar design to Napster
- To join network
  - user must connect to a known peer
  - peer sends out a query message
  - message bounces from peer to peer
  - peer with file replies to query message
  - they connect and file is shared

Gnutella

© 2002 HowStuffWorks

query: "Baby Go Home.mp3"

The file-transfer load is distributed between the computers exchanging files, but file searches and transfers from your computer to others can cause bottlenecks.

"I've got it!"

8,000 - 10,000 computers

Free Riding

- no central server, users are not monitored
- thus every interaction looks identical
- inherent problem with P2P networks

- *an agent is free riding when he consumes resources without contributing back to the community*

A New P2P: BitTorrent

- key difference: a client that downloads a file, uploads pieces of THAT SAME file simultaneously
- Use software compatible with the BitTorrent protocol to download files
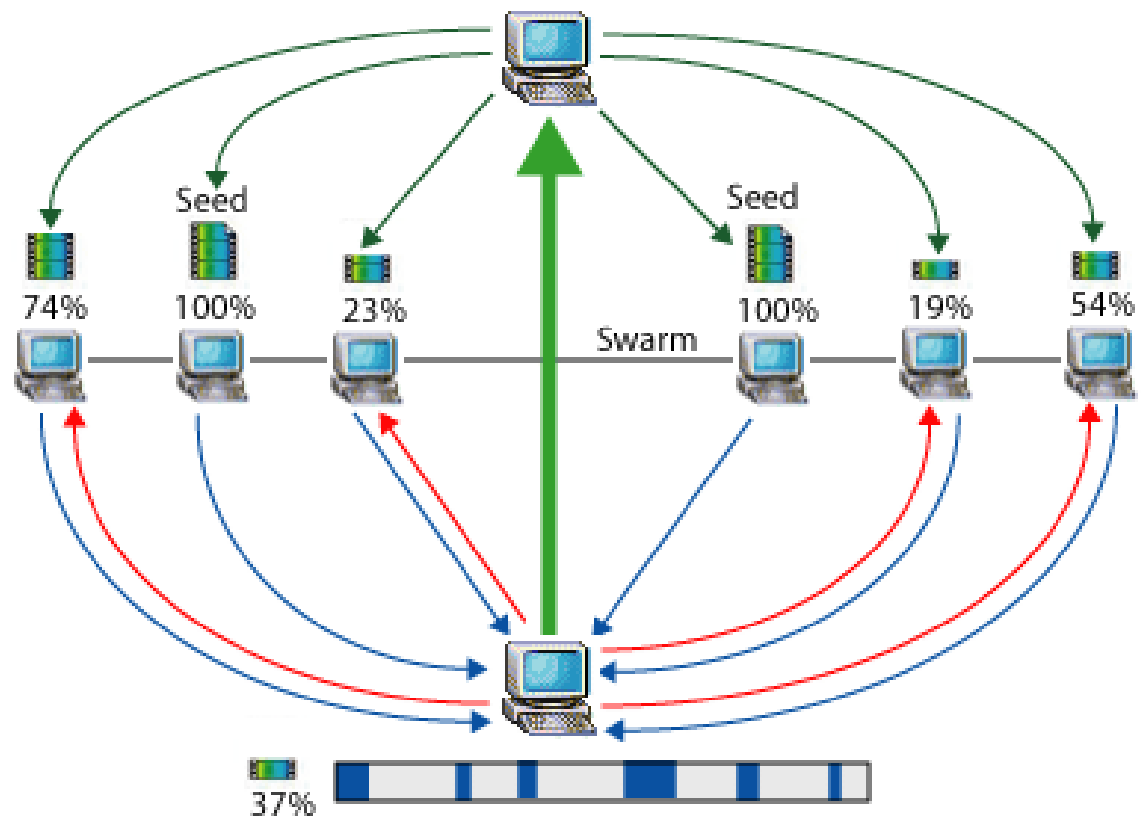
The BitTorrent Protocol

- A "file" is broken into pieces, which are broken into blocks (usually 64-512 KB per block)
- a .torrent file contains all relevant info for a given "file".
- user downloads a .torrent file, user then announces on the network to all other peers he is downloading the file
- by doing so connects to other users and begins process

Terminology

- swarm
- seeders
- leechers
- neighborhood
- choking

BitTorrent

BitTorrent tracker identifies the swarm and helps the client software trade pieces of the file you want with other computers.

Seed   Seed

74%   100%   23%   Swarm   100%   19%   54%

37%

Computer with BitTorrent client software receives and sends multiple pieces of the file simultaneously.

©2005 HowStuffWorks

Tit for Tat

- A client only unchockes (uploads to) other clients in his neighborhood that he has downloaded from
- Motivation to upload what you take
- Motivation to avoid free riders

Types of Files

- Audio
  - .mp3
  - .flac
  - .wav
  - .aiff
  - .wma
  - etc

Video standards

- Video
  - .mpg
  - .avi
  - .mkv
  - .mp4
  - .wmv

Methods of Fault Tolerance

- WinZip and WinRar
- SFV File Checker