



FREEBAND

## Future of P2P

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## Bio

- P2P measurement expert
  - Initial Kazaa measurements (2001)
  - Largest Bittorrent trace
  - 250,000 computers
  - First leaks :
    - Matrix Revolutions
    - Lord of the Ring III
  - Improve/attack
- P2P team @ Delft
  - Modular architecture
  - Video streaming





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## *Commercial: read my paper?*

- Google: "*bittorrent measurements and analysis*"
- Two years of research (At Delft & MIT)
- Suprnova.org & Bittorrent downloading (June '03)
- 6 pages, 7 figures
- 100,000+ Files
- 200 Gbyte of raw data
  - 36 trackers (Aug '03)
  - 30 Gbyte per month
- Analysis:
  - Download speed
  - Availability
  - Integrity
  - Flashcrowds



IMAGE BANK  
IMAGE BANK



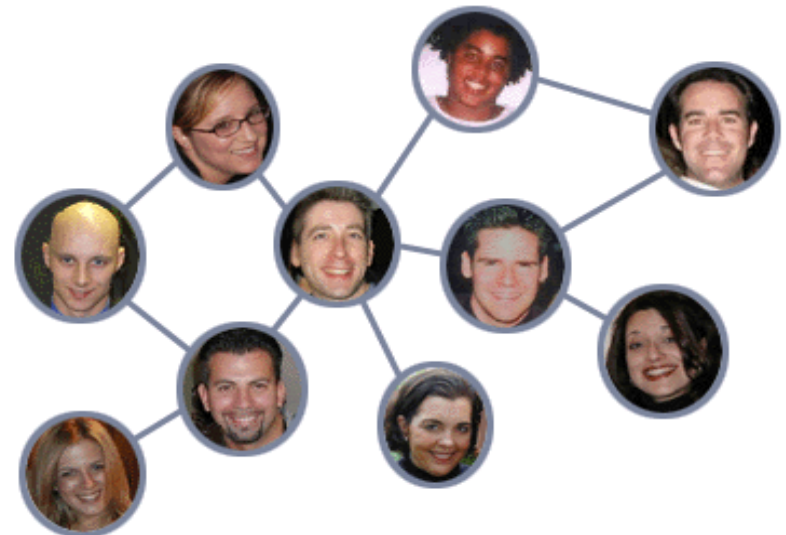
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## P2P future

- Interlock File sharing & P2P
- Black scenario
- 24 hours after release on P2P  
(Games, Movies, TV shows, music)
- Communication
  - Voice (Skype)
  - Video (Webcam/TV station)
- Cheap information  
distribution/storage/manipulation
  - Backups
  - Web services
  - Market for CPU power

## Innovation Driver

- P2P file sharing drives innovation
  - 18 months cycle
  - Near-zero cost technology
  - Free source code
  - Many applications
- Cost efficiency versus Client/Server
  - Efficient pooling of resources
  - No maintenance
  - No intermediaries
  - High reliability
- New technologies
  - Social-aware
  - Electronic trust



## Ecosystem & Black scenario

- Technology follows social demand
- 85,000,000 addicted users
- 24 Hours (songs/games/TV shows/movies)
- Restrict File Sharing by restricting freedom
- **Legal/Technical measures are irrelevant**
  - **Insufficient knowledge at content providers**
  - **Not a single operational DRM system**
- Adjust to near-zero cost technology or change attitude (iTunes Music Store)
- Artist to consumer

## Near-zero cost technology

- Economically important
- Superior to Client/Server
- Skype (**Communication**)
  - Millions of users
  - Superpeers
  - NAT circumvention/Firewall avoidance
  - Expand to video (Webcam/TV channel)
- Wikipedia.org (**Information**)
  - People collaboration
  - Joined knowledge
  - Expand to Scientific knowledge (E-Journals)
- “unlock the knowledge of humanity”,  
Vannevar Bush, 1945



Questions?