



Peer-to-Peer Networks

16 P2P in the Wild

Christian Ortolf

Technical Faculty

Computer-Networks and Telematics

University of Freiburg

- File sharing & transmission
 - Bittorrent, eMule, FastTrack, DirectConnect, Gnutella, Skype, Maidsafe
- Chat
 - Skype, Tonic, OMessenger, PoPNote, LAN Messenger, WireNote, Mossawir LAN Messenger, Squiggle, CDMessenger, Softros LAN Messenger, ...
- VoIP, Video-Chat
 - Skype, Zello, Brosix, Google Hangout
- Synchronization & backup
 - Bittorrent Sync, SyncThing
- Money
 - Bitcoin, Maissafe
- Software distribution & update
 - Windows 10 updates, Steam
- Anonymize
 - I2P, Freenet, TorChat, Tribler, Bitmessage, DigitalNote XDN, Osiris, Syndle, Perfect Dark, Netsukuku, DigitalNote XDN, Tahoe-LAFS
- Media Streaming
 - Vuze, Tribler, Miro Media Player, PPLive
- Programming platforms, Frameworks
 - JXTA, GNUNet, Windows Peer Networking
- Web search
 - Yacy, Faroo

- Problem
 - Synchronize two file systems
 - Differential backups
- Standard solutions
 - rsync
 - network protocol and tool
 - transmits only the differences of files
 - for upholding copies of file systems
 - no versioning
 - Cloud services
 - e.g. Google drive, Dropbox, BWsync&share, etc
 - synchronizes directories to server
 - only differential update
 - versioning

- Idea
 - rsync but for many peers
- Bittorrent Sync
 - uses Bittorrent for updates
 - closed group of servers
 - symmetric cryptography AES-128
 - versioning
 - no conflict handling
- SyncThing
 - open source
 - secure, authenticated, TLS
 - versioning
 - no conflict handling



- Peer-to-Peer Money transactions
 - open source digital currency
 - decentralized currency
 - Public-key cryptography
 - Digital signatures
 - Double Spending Attack
 - Anonymity if TOR is used?
- Peer-to-Peer network for transactions
 - Distributed computation tasks determine the order of transactions

- Lots of commercial/open software
 - Skype, Tonic, OMessenger, PoPNote, LAN Messenger, WireNote, Mossawir LAN Messenger, Squiggle, CDMessenger, Softros LAN Messenger, ...
- Motivation
 - Harness the power of the Internet for direct communication
- Features
 - often group features
 - secure communication
 - cheap server less solutions

- Bittorrent
 - dominates traffic
 - with DHT or tracker hosts
 - extra infrastructure for search
- eMule, FastTrack, DirectConnect, Gnutella
 - less traffic since 2003
 - security issues
- Other P2P tools like Skype
 - offer also file transmission

- A lot of former P2P Streaming
 - Peercast, peerstreamer, QQLive, Joost, Zattoo, Moved to Client-Server
 - Octoshape, Zattoo
- Survivors:
 - Bittorrent-related: Vuze, Bittorrent
 - streamer (p2p radio)
 - Miro Media Player (malware financed)
- Big in China
 - PPStream, PPTV, Funshion

- I2P (Invisible Internet Project)
 - darknet
 - anonymous peer-to-peer distribution communication layer
 - Garlic routing
 - combining small onions in one message
 - allows any traditional internet application
 - email, IRC, file sharing, web hosting, HTTP
- File sharing
 - Bittorrent, iMule, I2Phex
- Email
 - I2P-Bote
- Instant Messaging
 - I2P-Messenger, I2P-Talk



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