

CONFU©O on BitTorrent – Liable File Sharing with Swarming

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Background

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- Peer-to-Peer (P2P) networks are commonly used
 - closed systems
 - completely open exchange systems

- Problem: Illegal content exchange

- Consequences for
 - content and rights owner
 - users
 - service providers and software developers

Requirement: Legal and Trusted P2P

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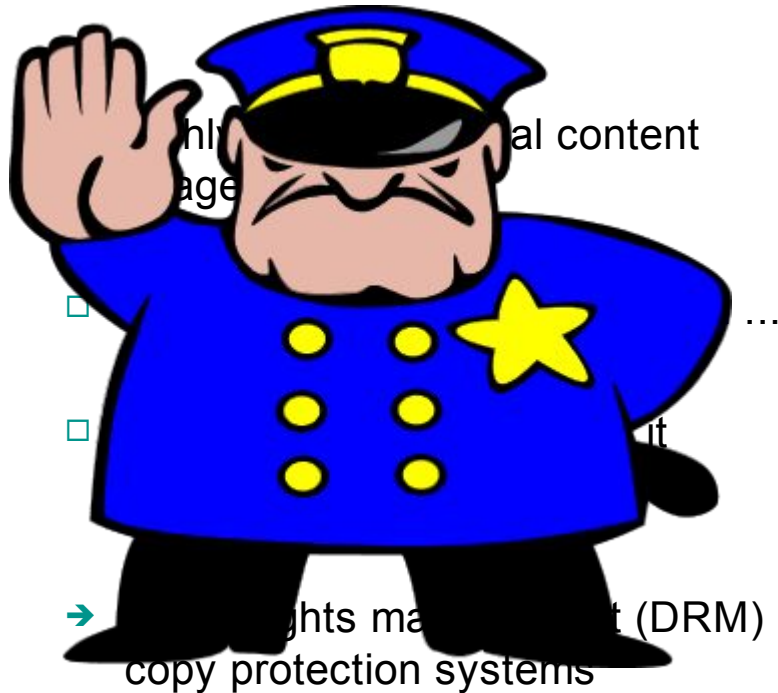
- To protect content and rights owners
- To protect technology developers and service providers
- To protect users



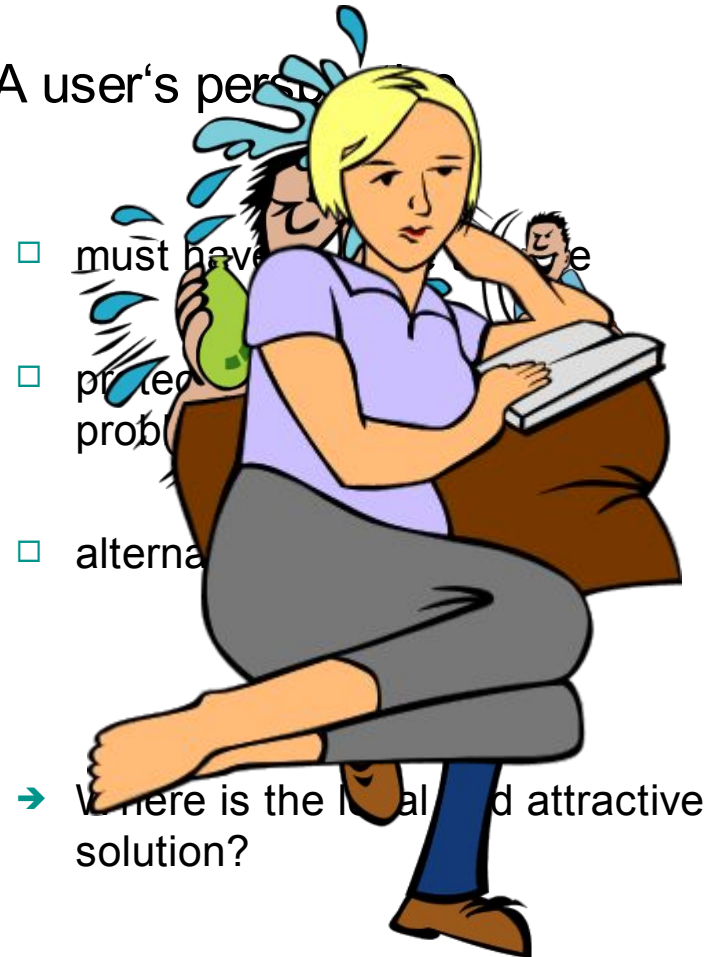
Contradicting Requirements?

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■ A rights owner's perspective



■ A user's perspective



Goal: Liable File Sharing

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- Exchange control instead of usage control
 - unprotected content

- Cost efficiency through a Peer-To-Peer System

- Properties
 - only legal exchange must be possible!
 - users are responsible for their actions
 - users are aware of their actions' legal status

Mutual Observing Peers

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- Problem: “customers are unaware”
 - fingerprinting technology identifies content
 - user who inserts content is responsible

- Problem: “the police is always needed”
 - each peer observes the peers it is exchanging content with

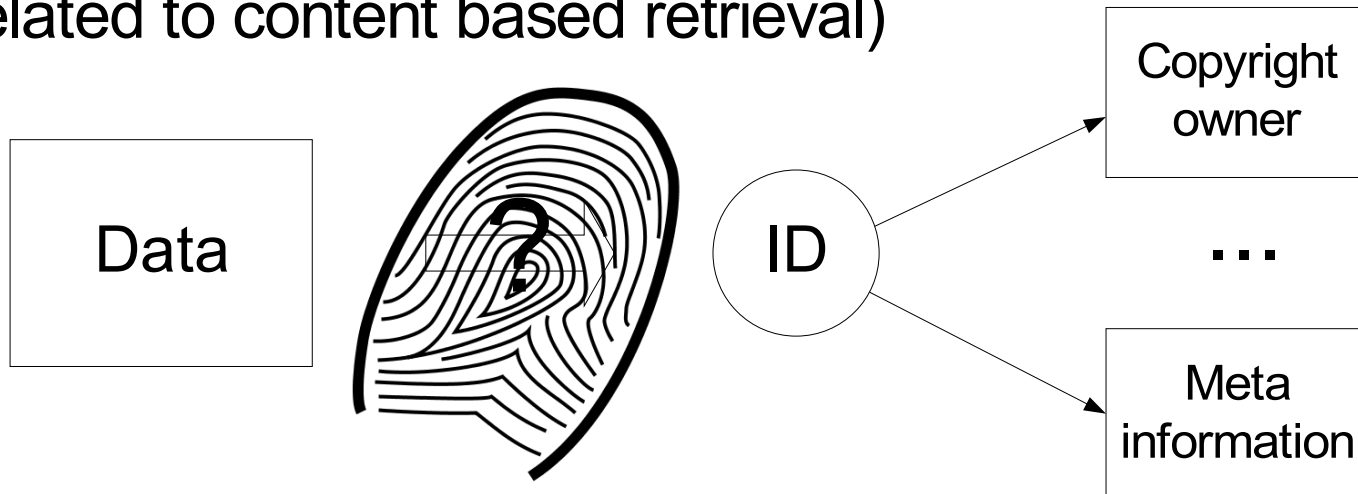
- Misuse
 - public keys for provable identification of misuse



Perceptual hashing/fingerprinting

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- Meta data: problems of “spelling mistakes”
- Content identification based on content characteristics (related to content based retrieval)



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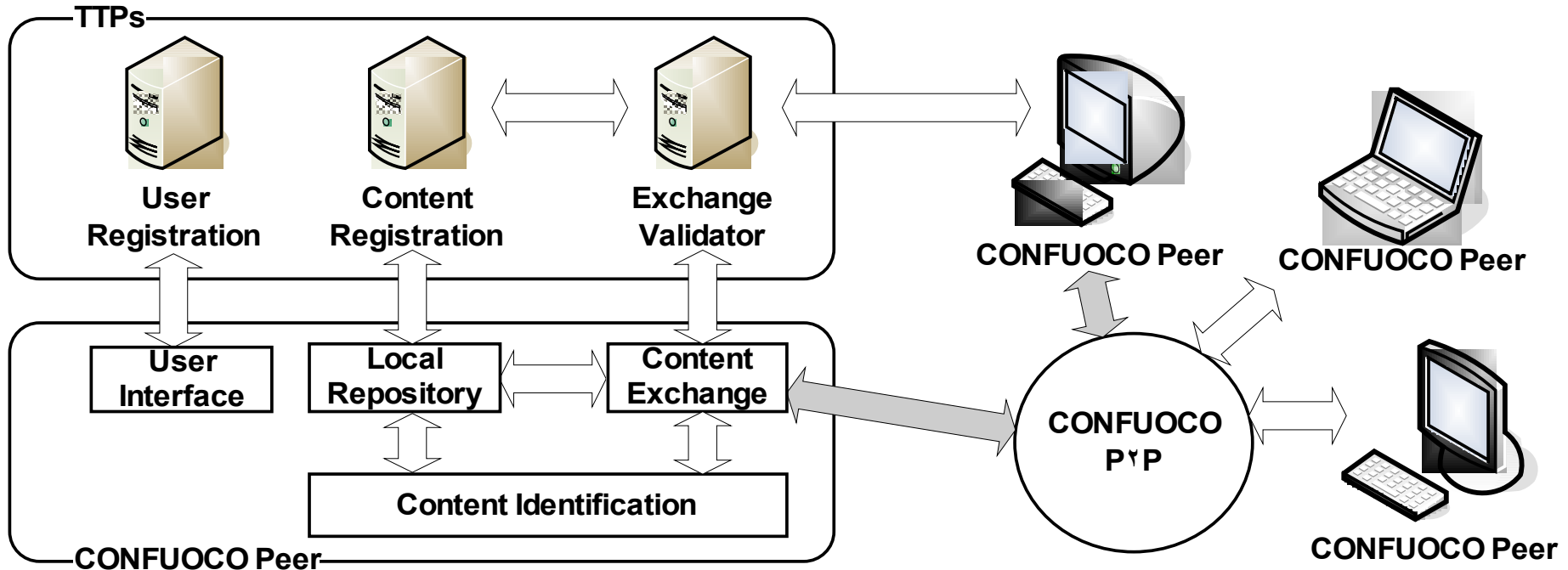
User awareness

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Overall Architecture: based on JXTA

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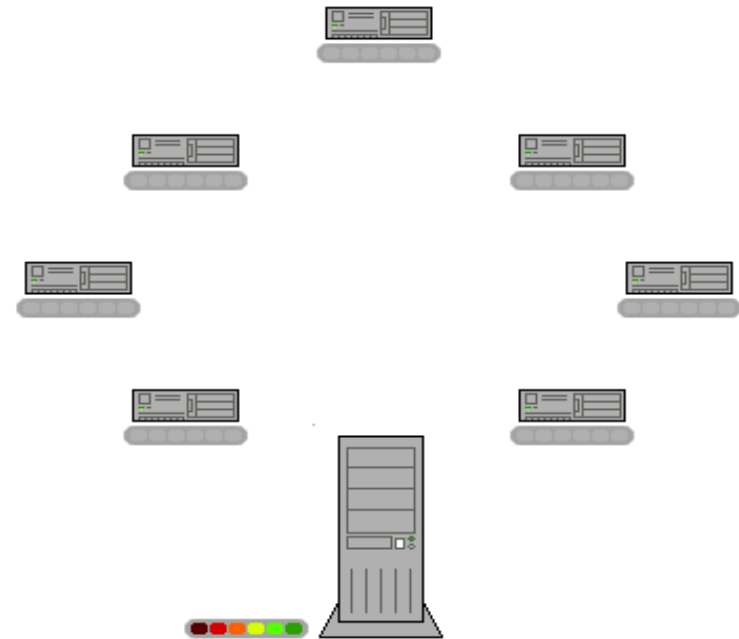


Problem: Swarming is not support

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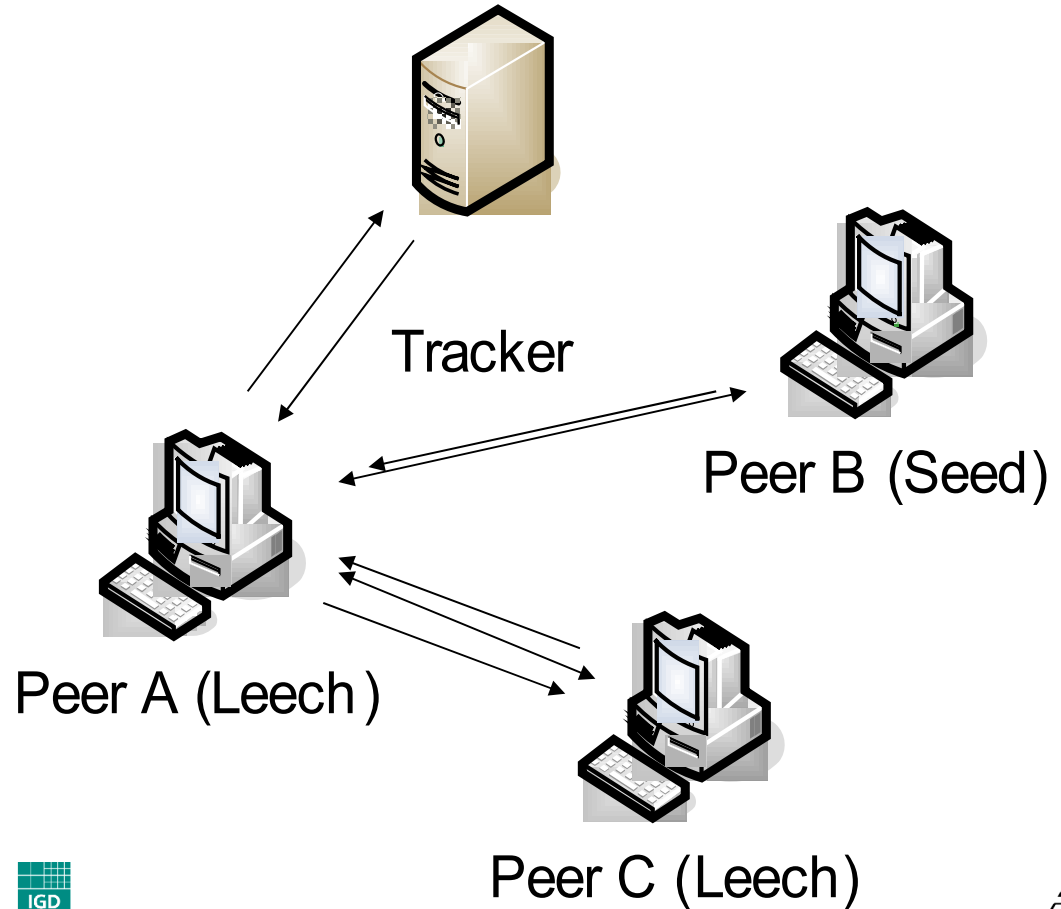
- Swarming:
multiple source download

- Tracker



BitTorrent: File exchange

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BitTorrent Modifications

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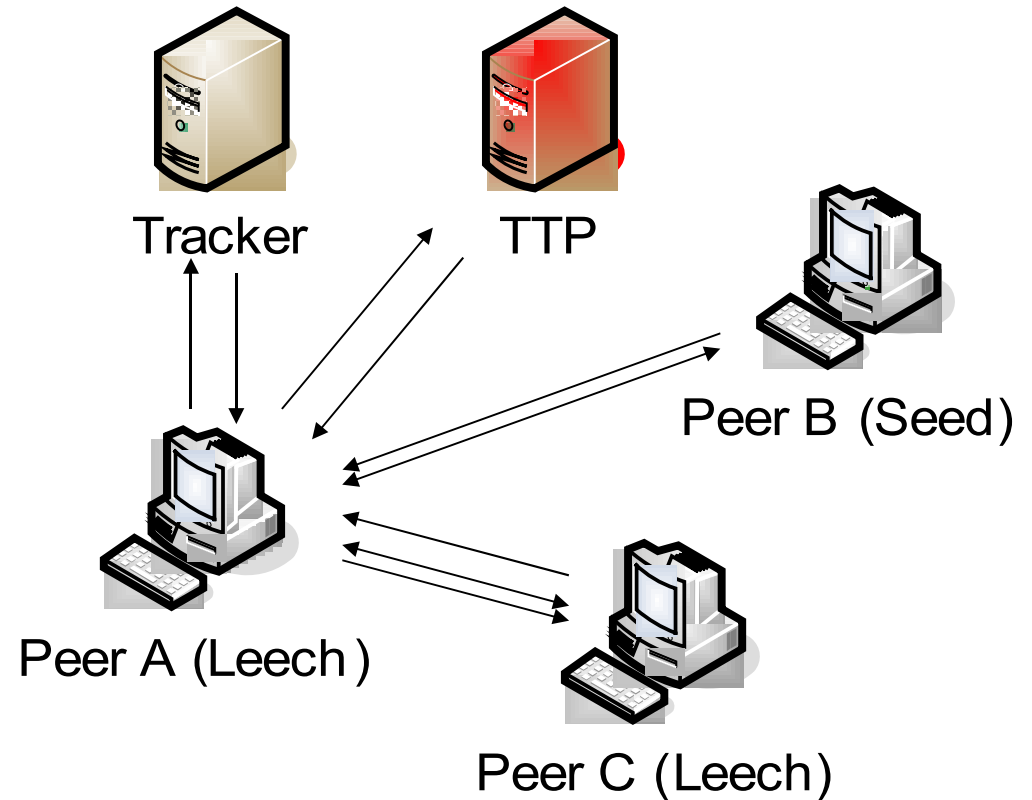
- Signed torrent files
 - comment file for storing the TTP's signature

- Exchange is based on tickets
 - personalized download permissions

- Verification of the received pieces
 - existing functionality as hook for notification system

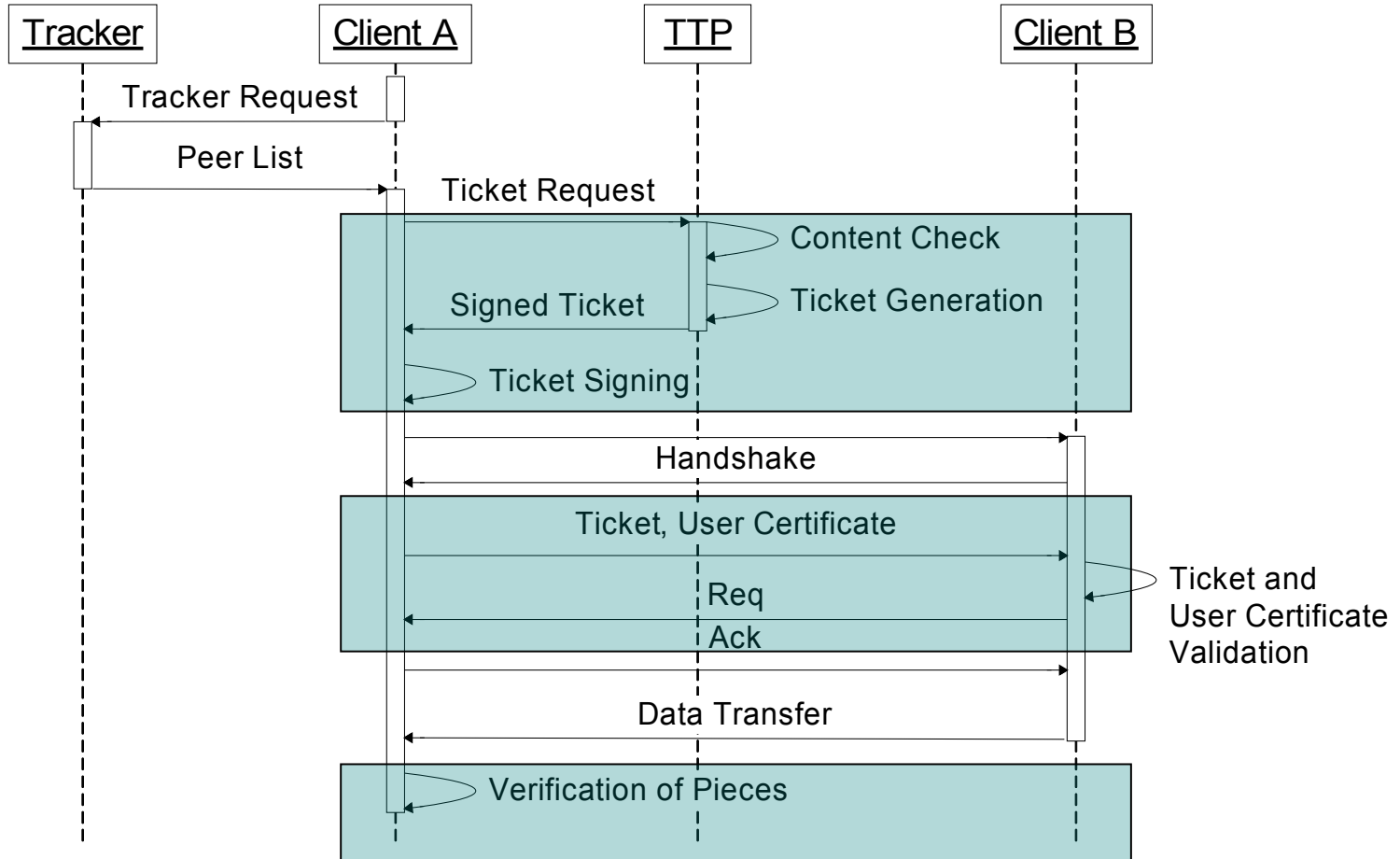
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Extended Protocol

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Summary

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■ Liable file exchange for multi-source downloads

- advantage: multi-source download
- advantage: liability and exchange control

■ Ideally suited for audio and video data

- costs are transferred to participants
- increased usability → “back to the roots”

■ Support of various business models

- including rights collecting societies
- including “flat rate” models



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References

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- CONFUO©O,
<http://www.igd.fhg.de/igd-a8/en/projects/watermarks/confuoco/index.html>
- DarkNet, <http://crypto.stanford.edu/DRM2002/darknet5.doc>
- DBin, <http://www.dbin.org>
- DirectShare, <http://www.laplink.com>
- Edutella, <http://edutella.jxta.org>
- NetGain - Expanding Markets Through Virtual Communities, John Hagel III and Arthur G. Armstrong, Harvard Business School Press, 1997
- Odlyzko, A.: “Content is not king”,
http://www.firstmonday.dk/issues/issue6_2/odlyzko/