

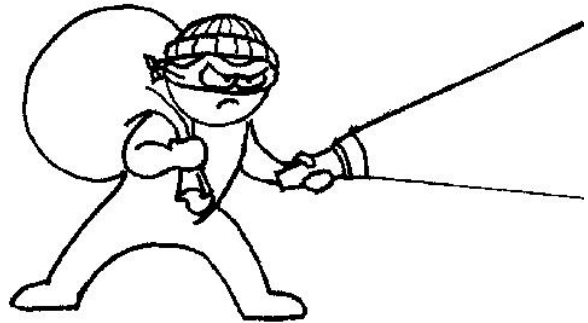
SA/MA: Enhance BitThief – Make BitTorrent Strategy Proof

Motivation and Informal Description

As pure peer-to-peer (p2p) systems are completely decentralized and resources are shared directly between participating peers, all p2p systems potentially suffer from free riders, i.e. peers that eagerly consume resources without reciprocating in any way. Not only do free riders diminish the quality of service for other peers, but they also threaten the existence of the entire system. For that reason, it is crucial for any system without centralized control to incorporate a rigorous incentive mechanism that renders freeloading evidently unattractive to selfish peers.

Unfortunately, many solutions so far either could easily be fooled or were unrealistically complex. Bram Cohen's BitTorrent protocol heralded a paradigm shift as it demonstrated that cooperation can be fostered among peers interested in the same file, and that concentrating on one file is often enough in practice. The fair sharing mechanism of BitTorrent is widely believed to strongly discourage freeloading behavior (cf [2]).

Contrary to such belief, Locher et al. showed in [3] that BitTorrent in fact does not provide sufficient incentives to rule out free riding. The large degree of cooperation observed in BitTorrent swarms is mainly due to the widespread use of obedient clients which willingly serve all requests from other peers. We, the DCG group, have developed our own free riding BitTorrent client BitThief [1] that never serves any content to other peers, but still achieves download rates as high as the official BitTorrent client. Analyzing the incentives in p2p networks and designing cheating proof protocols is still subject to much research work. Improving BitThief is an ongoing project with the goal of establishing a truly cheating proof and efficient p2p protocol.



Offered thesis

As part of our long-term goal of designing an efficient and cheating-proof p2p-system, your thesis should explore further possibilities to increase BitThief's efficiency. One of which might include a mechanism that adapts to the features found in a particular swarm.

Ideally, you would study existing p2p systems, come up with some improvements and implement them in the BitThief client and conduct some simulations.

You should have some basic programming skills(Java), interest in peer-to-peer computing and game theory. Good results are likely to become part of a publication (paper).

Contact us for more details!

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References

- [1] <http://dcg.ethz.ch/projects/bitthief/>.
- [2] B. Cohen. Incentives Build Robustness in BitTorrent, 2003. <http://www.bittorrent.org/bittorrentecon.pdf>.
- [3] T. Locher, P. Moor, S. Schmid, and R. Wattenhofer. Free Riding in BitTorrent is Cheap. In *5th Workshop on Hot Topics in Networks (HotNets)*, Irvine, California, USA, November 2006.