Paper:

Coupons: A Multilevel Incentive Scheme for Information Dissemination in Mobile Networks

Authors:

Anargyros Garyfalos, Kevin C. Almeroth

Publication:

IEEE Transactions on Mobile Computing, vol. 7, num. 6, pp. 792-804, June 2008.

Familiarity:

Some knowledge (I am marginally aware of research work in this topic)

Recommendation:

Likely accept (top 15% but not top 5%, significant contribution)

Strengths:

Shows advancements in mobile network data dissemination. Specifically, introduces new protocol to increase the efficiency of data dissemination by increasing network efficiency (though the reduction of duplicate packets and congestion) and increasing spreading efficiency (% population gets data).

Weaknesses:

Coupons require rewards, because “there is little incentive for nodes in mobile networks to forward information”. Without rewards, why contribute to the system? Does not give good rewards for clients who participate in the coupons. Did not explain overhead of coupons and effects on bandwidth.

Detailed Comments:

Coupons is an attempt to “define, evaluate, and implement a set of algorithms” to allow opportunistic contact data sharing with an incentive scheme to make the system usable and encourage participation. Defines multiple current problems: little incentive for nodes in mobile networks to forward information, current data dissemination methods involve flooding which causes duplication of packets and congestion.

Compares three broadcast frequency algorithms, probability-based (with probabilities of both a low 10 percent and a high 25%), coupon traffic-based, and coupon acknowledgement based. These broadcast frequency algorithms then are used to test both network efficiency, the total number of times the same coupon is delivered to nodes, and spreading efficiency, the percentage of nodes that receive the coupon at least once during the simulation. These two metrics were used to describe the strengths of the different broadcast frequency algorithms. Bandwidth is never mentioned during the paper, does not go into depth about overhead of coupon system and the effects on bandwidth with a less traffic. Shows that traffic based distributes the coupons the quickest, but also produces the most traffic. Acknowledgment based distributes the coupons similarly to traffic based, but with much less traffic generated. Also, it is shown that with varying participation, traffic and acknowledgement based systems preform better. Strength and robustness in the acknowledgement based coupon system is seen when malicious behavior only reduces the results to those of traffic based.

Real world testing brought forth network monitoring methods to further reduce network traffic by monitoring MAC addresses of nodes and using that history to determine if new nodes arrive.

Paper:

BitTorrent is an Auction: Analyzing and Improving BitTorrent's Incentives

Authors:

Dave Levin, Katrina LaCurts, Neil Spring, Bobby Bhattacharjee

Publication:

SIGCOMM 2008, August 17-22, 2008, Seattle, Washington, USA.

Familiarity:

Some knowledge (I am marginally aware of research work in this topic)

Recommendation:

Likely accept (top 15% but not top 5%, significant contribution)

Strengths:

Identifies the weaknesses in the current BitTorrent algorithms and how they are being taken advantage of. Presents a modification to BitTorrent, PropShare, which peers reward one another with proportional shares of bandwidth, thus defeating current exploits. Users can benefit today from new algorithms.

Weaknesses:

Limited real-world tests. Does not state affects of PropShare on other clients.

Detailed Comments:

Paper clearly states and disproves common misconceptions about BitTorrent, focusing mainly on it's perception of using “tit-for-tat” when it actually models an auction more closely. Explains clearly that “tit-for-tat” was originally the idea, but to improve download speeds, the specification was relaxed, thus creating opportunities for exploitation. The two most widespread clients that exploit those weaknesses, BitThief and BitTyrant, are introduced and their exploits are explained throughly. PropShare is introduced that rewards peers with proportional shares of bandwidth, (Algorithm 4), which defeats the exploits and preforms on average better than the normal BitTorrent or BitTyrant. Multiple tests were conducted comparing the average download time of the different protocols.

States that PropShare can be introduced into public today, without widespread adoption. Does not go into the affects of PropShare on other normal clients, nor how PropShare preforms with solely PropShare clients. Gives an algorithm for bootstrapping piece exchange, or the starting of peers and building trust between peers.