Reading Summary

On the performance and fairness of BitTorrent-like data swarming systems with NAT devices

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The main problem in this paper is that NAT peers tend to be less easily to connect to the P2P network than the public peers. Thus, the appearance of NAT peers will decrease the efficiency and downgrade the fairness metrics of the whole system. With the world- wide spreading of P2P system, this is an essential problem at all time.

The author found the problem on the old BitTorrent unchoke mechanism based on analytical models test result. He also presented a new tunable optimistic unchoke strategy. The NAT peers in the old mechanism have a share ratio gap between public peers because of the inaccessible NAT peers. The optimistic unchoke strategy let public peers unchoke the NAT peers with a probability p0 by affecting the high uplink utilization of peers. Additionally, a higher value of p0 leads the public peers more likely to send data to NAT peers.

There are three major points in this paper. Firstly, it explored the optimal strategy mainly depended on share ratio and Jain's fairness Index, it also researched in both homogeneous and heterogeneous NAT peers existence situations. Therefore it filled in the gaps of related researches. Secondly, simulation verified that author's idea improved the fairness of the system, at P0= 0.3, the public and NAT peers had almost the same share ratio and the Jain's Fairness reached the maximum. The entire system is optimal at p0= 0.3. Last but not the least, this paper developed the mathematically tractable models to improve their ideas. With sufficient outcomes, the proposal appeared to be effective and easy to apply without apparent losses of the public peers.

There are few points which paper did not cover. The assessment did not study the steady state and as well as analyze free-riders' influence to the system. Besides, the mathematically models won't show the impact of multiclass and lingering peers. Furthermore, the simulation alway recognizes the system as reliable and it discards packet errors. Most importantly, the optimal P0 changes according to the number of NAT peers. With fewer-NAT peers, P0 optimal value was within 0.2 to 0.3. While in a more-NAT system, the P0 optimal value reached to 0.9. There is not a fixed value suitable for all systems.

The idea in this paper contributes a great impact on the network researches nowadays. I propose to study deeper on this research. We need to find a certain algorithm which adjust p0 to the optimal value when either NAT peers leaving the system or joining in.