

Protected and Effective Transmission of Data in Peer-To-Peer Network Using SGA

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ABSTRACT: Peer-to-peer system or framework picked up its importance as a result of its high versatility, high video spilling quality, and low data transmission necessity, distributed (p2p) framework now a days can be utilized as a part of records trade and conveying media content everywhere throughout the web. Be that as it may, p2p frameworks right now is experiencing "free-riding" as companions show their' egotistical nature. In this paper, we propose a credit based system that helps the associates participation in heterogeneous system that incorporates both wired and remote companions. The proposed system can give separated administration to peers with various credits through one-sided asset allotment. A Stackelberg amusement is utilized to figure the ideal evaluating and buying methodologies, by this technique the general income of the uploader and the downloaders can be boosted.

KEYWORDS: Game theory, Stackelberg game, network optimization, credit-based incentive mechanism, peer-to-peer networks, heterogeneous networks

I. INTRODUCTION

Now a days peer-to-peer (p2p) network has gained its importance in communication, p2p networks is medium in files exchange and multimedia content delivery all over the internet because of its lower bandwidth requirement, higher video streaming quality, and also high flexibility Current p2p network enormously depend on volitionary asset commitment from individual associates and don't uphold any necessary commitment from other peers. This directly leads to the well-known "freeriding" problem, which refers to the phenomenon that a peer consumes free service provided by other peers without contributing any its resources to the p2p network.

Due to this problem the performance of p2p systems decreases, particularly p2p interactive media data frameworks which have high necessities on time delay and information rate. Freeriding is common in p2p networks due to peers' selfish nature and the limited network resources. Most peers only want to maximize their own benefits without caring about the overall performance of the whole p2p community.

In this paper we also provide a security mechanism which will maintain the security issue to identify malicious peers in the p2p network. Here the peer are motivated to upload data chunks to each other to earn points or monetary rewards in a P2P system with incentive mechanisms. Without the ability to identify malicious peers, peers are more likely to forward polluted data chunks, consequently degrading the performance of the system.

II. EXISTING SYSTEM

The existing system for P2P networks are fundamentally intended to work in wired systems. For the heterogeneous systems with both wired and remote hubs(wireless networks), the current mechanism may not function well because of the contrasts between the wired hubs and the remote hubs(wireless). For instance, the processing ability of the remote hubs, (for example, advanced cells and tablet PCs) is typically weaker than that of the wired hubs, (for example, desktop PCs, and workstations). The reality of the matter is that there exist top of the line cell phones with top of the line is that core- processors in mobile devices vary. Be that as it maybe highly unpredictable are still not favored on these cell phones as the battery of mobile devices may drain out faster Also, the association transfer speed(connection bandwidth) of the remote hubs is normally not as much as that of the wired hubs. All these factors are to be taken into

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consideration when certain mechanism are to be considered. Security is also the major concern in the existing work. We cannot find any measures taken regarding the attack of malicious peers in the system.

III. PROBLEM SYSTEM

Current mechanism with high complexity nature may not be suitable for portable applications. Without a doubt there exist top of the line cell phones with different core processors. In any case, the system with highly complex nature are still not favored on these cell phones because of the batteries problem, that is draining of battery very faster. Likewise, the association data transmission of the remote hubs is normally not as much as that of the wired hubs and in addition the security issue and trust additionally ought to be contemplated

IV. PROPOSED SYSTEM

In this paper, A credit-based motivator system for heterogeneous systems with both wired and remote hubs. We consider a P2P gushing system where every associate can go about as both uploader and a downloader in the meantime. At the point when an information pieces is transferred by a companion to different associates, certain credits is earned for giving the administration. At the point when an information pieces(data chunk) is downloaded by an associate from different companions, certain measure of credits needs to paid for devouring the asset. The net contribution of an associate in the system is reflected by its collected credits. An Identity based Encryption (IBE) is also proposed to overcome the security issue in the current paper.

V. STACKELBERG GAME FORMULATION

Here,the uploader which has information lumps is considered as the leader, and the downloaders that demand for media information pieces as the followers. A companion which is considered as the leader has the most astounding commitment in the system The uploader or leader apply certain cost on every unit of data transmission that is provided by the uploader to each downloader. At that point, the downloaders or supporters compute their ideal download data transmissions gave by uploader to expand their utilities exclusively taking into account the transfer speed cost allotted by uploader.

VI. ARCHITECTURAL DIAGRAM

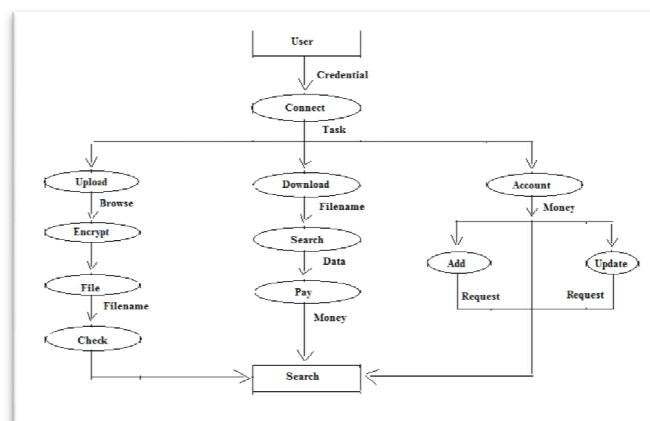


Fig 1: 3-tier Auto scalable web application architecture

The uploader uploads the file ,which will later be divided into chunks for storage purposes. After the file is divided it will be encrypted by using identity based encryption. Later data chunks are downloaded by the downloader and decrypted with the same algorithm that is identity based algorithm.

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VII. IMPLEMENTATION

1. Uploading Game Design.

Under the Stackelberg game model, for the uploader, on the off chance that we signify a cost on every unit of data transmission giving to each downloader then the measure of transfer speed the downloader expects to buy is diminishing in the transmission capacity cost. The income of the uploader is the entirety of results of the transmission capacity cost and individual associate's bought data transmission. In this manner, the uploader should precisely outline its data transmission valuing system with a specific end goal to augment its revenue

Algorithm for uploading game:

- Input: Uploader K , Price μ , Download Bandwidth x_1 , Set of Peers S_k , Download Bandwidth U_k
 - Output : Maximum revenue
- ```

 x_i - Download Bandwidth of peer i
 U_k - The total available Upload Bandwidth
For ($i=0$; $i < S_k$; $i++$)
 $X = \text{Sum}(x_i)$
End for
If ($X \leq U_k$)
For ($i=0$; $i < S_k$; $i++$)
Max_revenue = $\text{Sum}(\mu x_i)$
End for
Else
Exit;
End if
Return Max_revenue

```

### 2. Downloading Game Design.

This Module is being done by the downloader that demands information pieces from the uploader. The execution fulfillment component mirrors the level of fulfillment or the "satisfaction" of the downloader under the got data transfer capacity.

The level of fulfillment increments with the expansion of the got data transfer capacity. It is additionally watched that the utility capacity of the downloader comprise of two sections: one is the credits that associate is willing to pay for the administration it got insect the other is the cost that companion needs to pay for getting the data transmission.

**Algorithm for downloading game :**

- Input : Peer  $P_i$ , Credit  $C_i$ , Price  $\mu$ , Download Bandwidth  $x_1$ , Download capacity  $d_1$
  - Output : Maximum Utility  $U$
- ```

For ( $i=0$ ;  $i < S_k$ ;  $i++$ )
 $S_i = \log_2(1 + \frac{x_i}{d_i})$ 
If ( $x_i \leq d_i$ )
Credit =  $C_i S_i - \mu x_i$ 
End if
 $U = \max(\text{credit})$ 
End for
Return  $U$ 

```

3. Optimal Pricing Strategy.

The structure of this specific module depends on the procedure for ideal appropriation of cost to the dispersed companions utilizing the Stackelberg balance. Here the cost of every record will be distributed among the associates who are putting away the information lumps and the separated cost will be credited into their account.

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Algorithm for Optimal Pricing

- To calculating the pricing strategy :

$$x_i^* = \begin{cases} d_i, & \text{if } \mu \leq \frac{c_i}{2d_i \ln 2}, \\ \frac{c_i}{\mu \ln 2} - d_i, & \text{if } \frac{c_i}{2d_i \ln 2} < \mu \leq \frac{c_i}{d_i \ln 2}, \\ 0, & \text{if } \mu > \frac{c_i}{d_i \ln 2}. \end{cases}$$

- The threshold of the two peers may have the order:

$$\frac{c_1}{d_1 \ln 2} > \frac{c_2}{d_2 \ln 2} > \frac{c_1}{2d_1 \ln 2} > \frac{c_2}{2d_2 \ln 2}.$$

4. Breaking and Merging of Chunks.

In this module the entire file will be broken into the data chunks which will be forwarded to the number of peers that the uploader has selected to distribute.

When the downloader requests for a particular file to download then the number of chunks will be fetched from the selected peers and then it will be sent to the downloader where the chunks will be merge together to form the original file.

5. Identity Based Encryption

While a conventional PKI framework requires to keep up for every distributor or endorser a private/open key pair which must be known between conveying elements to scramble and unscramble messages, personality based encryption gives a promising distinct option for decrease the measure of keys to be overseen. In personality based encryption, any legitimate string which interestingly distinguishes a client can be people in general key of the client. A key server keeps up a solitary pair of open and private expert keys.

VII. SIMULATION AND RESULTS

- Bandwidth allocation versus price under same connection types.

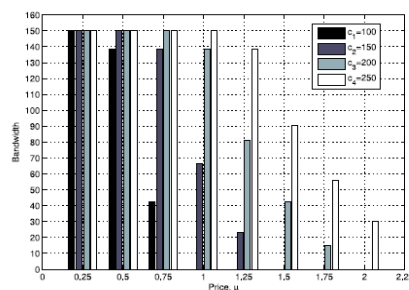


Fig :Bandwidth allocation versus price under same connection types

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- Bandwidth allocation versus price under same contribution values.

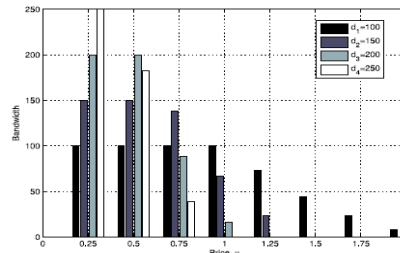


Fig: Bandwidth allocation versus price under same contribution values.

IX. CONCLUSION

In this pa.per, a credit-based system that allows the participation between peers in a P2P system is proposed. Taking the peers' heterogeneity and selfish nature into thought, a Stackelberg game is intended to give motivations and administration separation to peers with various credits and association sorts. The optimal pricing and purchasing systems, which can together boost the uploader's and the downloaders' utility capacities, are inferred by the Stackelberg games. The Stackelberg game is appeared to be one of a kind and Pareto-optimal. At that point, two completely dispersed execution plans are proposed and contemplated. It is demonstrated that each of these plans has its own points of interest. It is demonstrated that the proposed instrument can adjust to element occasions, for example, peers joining or leaving the system. Security issues are solved to some extent by using identity-based encryption.

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