



A Minimal Share Approach to Overcome Free Riding in Peer To Peer Network

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Abstract: Peer to peer is the popular file sharing method used nowadays. It is based on the principle that the user should download as well as share the content. But there is no way to ensure that the user shares the content. One of the main issues of P2P networks is free riding. Free riding is when the user downloads content and doesn't share it. In this paper we propose a minimal share approach to overcome it. Our system ensures that content is shared atleast up to the size of the download. When unhealthy files are encountered we ensure that the upload time is atleast equal to the time it took to download the file.

Keywords: Networks, Peer to peer, download, free riding and minimal file share.

I. INTRODUCTION

Peer to peer networks are used for many applications. The most popular use is being file-sharing. The basic principle P2P file-sharing is that "if you want to get something from others you have to share it with others". P2P file-sharing systems provide reliable and free ways to share multimedia files. P2P shares data from end users rather than centralized servers. This is the reason why P2P file-sharing is free.

The main problem of P2P file-sharing system is free riders who download files from other peers but don't share it with them. In the Gnutella v0.4, 70% of users are free riders and nearly 40% of queries are responded by the top 1% of the participants (Adar & Huberman, 2000). In the Gnutella v0.6, 42% of users are free riders and 16% of all hosts are distributed among the top 2 backbone providers (Asvanund et al., 2003). Since 2000, the number of free riders has increased markedly (Hughes, Coulson, & Walkerdine, 2005).^[1] Free riders significantly decrease the performance of P2P file-sharing systems and the will to share resources with other peers.

In our paper we propose a minimal share approach to deal with free-riding in an effective way. We introduce a small amount of centralized architecture by making a group manager who acts as a pseudo server. In this approach we make it compulsory for a user in P2P to share the data that he has downloaded. The amount shared must be atleast equal to the size of the download for the peer to be able to access the content.

This approach upholds the basic principle of file-sharing in P2P networks.

II. RELATED WORK

In a previous system allocated to solve the free riding problem in peer to peer network, reputation system^[1] is used. Reputation system gives a reputation value to each user and according to that reputation the user can download files. A user's reputation value depends on the amount he uploads, if the user uploads more his reputation increases and if he uploads less his reputation decreases. Users can download files according to his reputation. For files with larger sizes only high reputation users can download those. The disadvantage in this system is that for new users they get assigned a default reputation level and these users cant download larger files. In another system to improve the efficiency of P2P file sharing, traffic is modified as to download the most data from the user with the highest data transmission.^[2] This ensures efficiency but it is very complex to implement and for the user with the highest data transmission speed, large amounts of data will be downloaded from that user. P2P systems use robust number generation to create more honest peers and less adverse peers.^[3]

III. SYSTEM ARCHITECTURE & WORKING

Peers are combined into groups based on their IP range or by the type of files they share. For example if two peers download and share only music files, they are put into the same group. Each group can have upto n group managers where $n < \text{total no. of peers in the group}$. Group manager can be either the founder of the group or the peer who shares the most. We allow multiple group managers to help manage the group as sometimes the no. of peers in a group may be very high. Peers search a file in his group and select some good providers with the desired files to download. If a peer does not find the desired files in his group, he requests the group manager to extend the search in other groups for the file. Each group manager maintains a table of the download/share size of the peers in his group.

The group manager encrypts all the files with a unique key without which the user cannot open the downloaded file.

After a peer downloads a file, the group manager checks how much the peer has shared that particular file from the table. Only if the shared content is atleast equal to the size of the downloaded content, the group manager will provide that peer with the unique key to open the downloaded file. For unhealthy files the user has to upload the file as long as it took to download it.

Algorithms:

System Algorithm

```

Get the  $U_{id}$ ,  $U_{ip}$ 
Formation of group using ip range
Initially group manager is selected randomly
Select a file for download
Prompt to enter  $N_S$  and  $N_L$ 
If  $N_S > N_L$ 
{
Condition Used :
 $U_{p_{amt}} = F_{size}$ ;
If( $U_{p_{amt}} = F_{size}$ )
Give key to access file
Else
! access file
}
If  $N_S < N_L$ 
{
Condition Used:
 $U_{p_{time}} = D_{time}$ 
If( $U_{p_{time}} = D_{time}$ )
Give key to access file
Else
! access file
}

```

Group Manager Algorithm

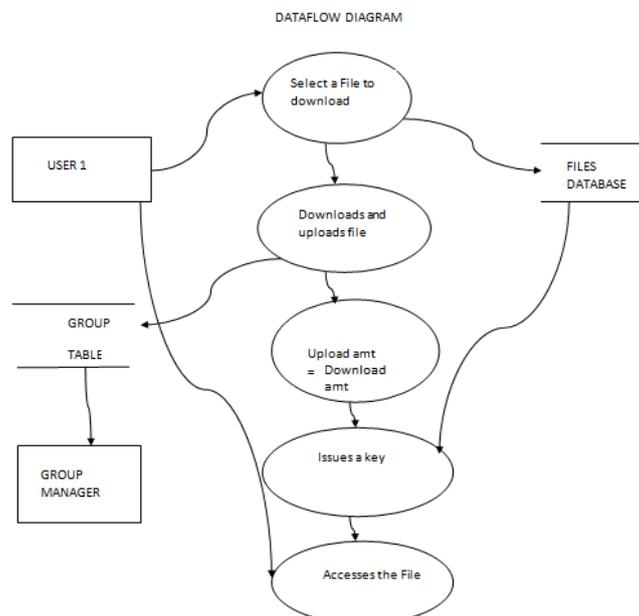
```

User $_{G1}$ . $U_{p_{amt}} = A$ 
User $_{Gn}$ . $U_{p_{amt}} = B$ 
If( $A > B$ )
User $_{G1} = G_{manager}$ 
Else
User $_{Gn} = G_{manager}$ 

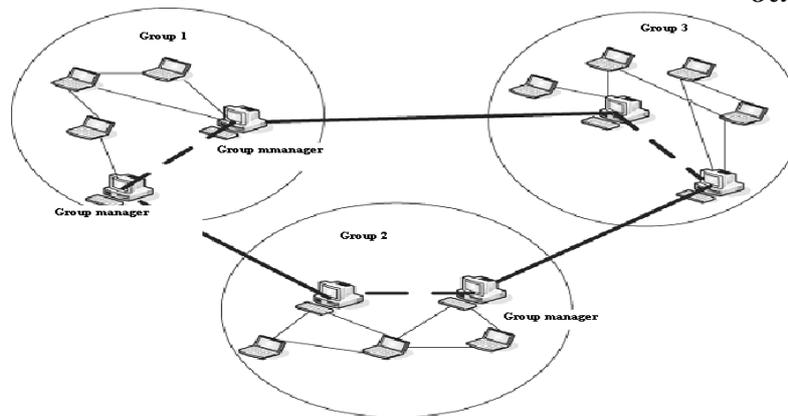
```

User Table

User id	Download size			Share size		
	File 1	File 2	File N	File 1	File 2	File N



System Architecture



IV. CONCLUSIONS

Thus, our system ensures effective way of file sharing system using peer to peer process. The system proves to be a minimal share approach to deal with free-riding. System provides reliable and free ways to share multimedia files It also addresses scenarios with unhealthy files.

REFERENCES

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