



Reputation and Security Based File Sharing Model using P2P Networks

Vimal S, Srivatsa S K

Abstract: The present system fails to utilize the trust in the social network which is based on Peer to Peer (P2P) file sharing systems. To overcome this issue, a trust management system named "Social Link" is used to utilize the social network and predefined transaction links. The Social Link manages the novel weighted transactions and networks. The link is constructed using the historical file transaction. Two friends can share their files and increased trust can be guaranteed with the help of Social Link. The Network of Weighted Transaction (NWT) can be calculating the successful transaction and it finds trust over the client on server. By this process, Social Link will reduce transaction misbehaving, avoids free riding and promotes nodes to transact data files to non friends. Whitewashing and collision can also be rectified using Social Links.

Keywords: Reputation, File Sharing, Trustworthy, Free-Riding, Social Link

I. INTRODUCTION

Trust Management system is one of the cooperation incentive method used in P2P systems in these recent years. This is implemented in [1] online market platforms to compute global trust nature for each and every user with the help of ranking systems. Thus, we need some cooperation incentives to encourage the cooperative behaviours and to eliminate the misbehaviours that are found in P2P systems. Recently, many methods are proposed to have trusty P2P system with the help of friends in cluster based networks. As a result of fewer members in social network, client may not find needed files from the friends because of restricted control over the file sharing. Trust Management system is focused on the social network to allow a node for receiving reliable files and will resist all attacks.

1) Between Non-Friends Node:

Social Link will maintain a network of weighted transaction. Whenever a client N_j wants a file from server, a new link will be created to show the trusted network paths between N_i and N_j along with weight which is same size of file. For example, if link of weighted $N_i \rightarrow N_j$ is W_1 and $N_j \rightarrow N_i$ is W_2 , then it is understood that N_i has the trust [2] and permission to provide file with size W_1 to N_j and similarly N_j has to provide file of size W_2 to N_i .

This type of information is used to ensure fairness and reliability of files. The free-riding is avoided only when the difference between upload and trust-flow is within a reasonable range.

2) Between Friends:

Social network has reliable users – frequently contacted nodes and real world friends to maintain a serial link. For a given number of servers, a user will choose friends directly if they are trustworthy. So, the file sharing will be efficient. In addition to this, Social Link will [3] avoid Sybil attack, Collision to a certain degree. Whenever a new account is created by whitewasher, file transfer from non-friends are prevented. So, whitewash will not allow free-riding. Though Collider boosts its own trust, it would require actual transaction with other nodes than its friends to build a link and receive files.

II. RELATED WORK

1) Social P2P File System:

Many of social network system likes "Friendship faster cooperation", "Online social networks reflect those in offline world" and "Average network properties will be stable relatively" are exploited in order to have reliable services in P2P network. This will construct an overlay on pre-existing trust relation of different social network users for sharing secured and personal data with "friend-to-friend" file exchange method. Tripler version of Bit Torrent will use social phenomena and existence of communities with same [4] taste to increase performance and usability. My Net in P2P will allow participating user to use and share their server and resources safely without contacting any central control. Social-Helpers will use social network for node trust evaluation. Social P2P will collect common nodes and form a cluster to connect socially close nodes within clusters.

2) Trusted System for Replication Management System:

The system is mainly based on Reputation Management Systems. Eigen Trust will minimize the influence of malicious nodes. Similarly Power [5] Trust will use a trust overlay model for managing trust relation among the nodes. Then it will find selected "Power Nodes" for increasing the common accuracy of process and speed. In this each node will earn a value whenever it uploads a file to others and at the same time, server will consider client's trust value in order to find whether it can satisfy client's request.

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* Correspondence Author

Vimal*, S Research Scholar, Sathyabama Institute of Science and Technology, Chennai, Tamilnadu

Dr. S. K. Srivatsa Retired Professor, MIT, Chennai, Tamilnadu

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III. DESIGNING A SYSTEM

The Social Link will provide trusty and effective P2P file sharing and also resists attacks. Social Link has two main components: A weighted transaction network and a social network that is based on server selection.

1) Selection of Server:

If the user is in online, then it includes off line and online connection. Similarly, friends in Social Link also include trustworthy online and offline acquaintances to share files with nodes frequently. Whenever a new node wants to join the system, it is possible only for trustable nodes to get added and will not consider whether the node is offline or online. Hence insertion and removal of nodes in Social Link is user dependent and user is the person who is responsible for this activity.

1.1 Construction of Social Network

Every user will create and maintain [6] friends. When a node N_i wants to add another node N_j into its friends circle, then it will send an invitation to N_j . Once the invitation reaches N_j , it will decide whether it should accept the invitation or not. The Social Link has bi-directional relationship (i.e.) whenever N_i deletes N_j from its circle, then N_i will be automatically removed from N_j .

1.2 Selecting a Server

In order to identify fast server selection, Social Link exploits friends to reduce reputation queering cost. Usually, whenever a request to a file is issued, a client will ask from its friends. Thus, efficiency of sharing is [7][11][12] increased by saving the query cost. If multiple friends are present in the list, then the friend with highest reputation is chosen. If there are no friends available, node will use network of weighted transaction network to choose the server..

2) Network of Weighted Transaction:

We know that Social Link [8][10] is used to represent the trust for sharing files in between the restricted friends in the link. Also it avoids the free-riders to share the files in the network.

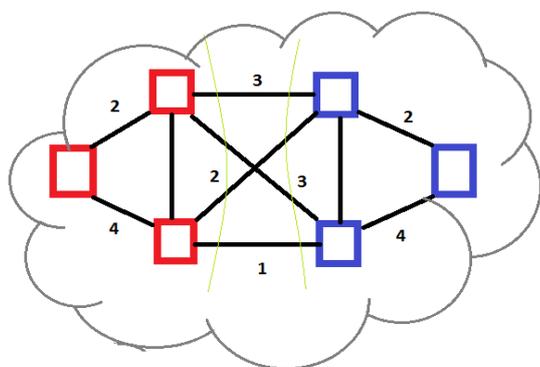


Fig.1.Network of Weighted Transaction in Social Link

To have these objectives, the Social Link will build a NWT network based on past record between node

transactions. If the system started to trust information among nodes cannot be evaluated, as there is no transaction among them. Since many transactions occur, weighted links (Fig.1) will be also constructed with other nodes in the network to provide N_j , weights on path are used to decide fairness and reputation of transaction, the ranking will be given based on the size of the file. .

3) Network Link Weight:

The two non-friends link will be denoted as L_{ij} for the link between N_i and N_j , means servers as N_j 's trust on N_i 's to have file sharing. Also, these two nodes are always not connected. They will [9][13] have multiple link based on trust mechanism for finding the ability of providing file in reputation. First, when N_i provides file to N_j for first time, L_{ij} is initialized with weight which is equal to sharing file size. Next the path includes L_{ij} , it has been used in order to represent the reputation, and weight of L_{ij} updating depends on the transaction rating.

3.1 Positive feedback

Whenever the client wants the positive feedback, client must have the successful file transaction. Then the trust is depends on the every link weight which is linked by the size of file. The established link will be created with the equal size of file when the client and the server not interconnected.

4) Attack Resistance and its Extensions:

Social Link will be working on different behaviours of the system to avoid the various malicious attacks.

4.1 White washing

This can't enable malicious node [15] to proceed in providing faulty files in social Link. First, a link is created in weighted transaction network after successful transaction whenever white-washer has the link to friends. Then they will create the fresh account.

IV. PERFORMANCE EVALUATION

To measure performance in social network (Fig 2) from the trace, random distributions for all parameters are assumed. We have used over 500 files with various sizes with multiples of replicas. In this process, friendship threshold is set to 200 and we use simulation in 100 no of times. Each and every node will generate the different file request. All the files which is requested will be selected on the storage. Different feedbacks are given to server based on the type of client and the quality of received file. These nodes are having permission to share the reached file to all the different nodes in the network.

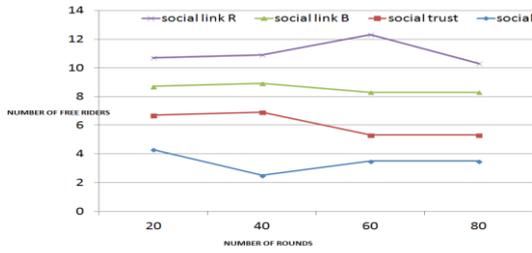


Fig 2 Accumulated no. of free riders

Social Link is compared with a (Fig 3) reputation system, in which the trust will be depends on every node which is defined as the path of maximum length in order to find different querying files. We also compare Social Link with Social Trust which is also a social network that is focused on the trust based mechanism. In Social Trust, trust value is initialized to 0 for each node and increased or decreased by 1 for each positive and negative feedback respectively. The interaction of social network will be based on Social Trust (Fig 4) to facilitate server selection. We know the Social Link that focused unwanted transactions is blocked. In this case, these two methods are denotes the use of Social Link-B and Social Link-R.

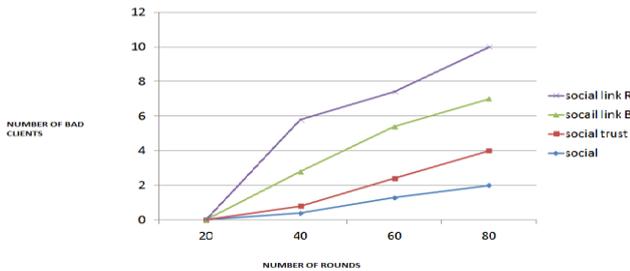


Fig 3 Accumulated no. of bad clients

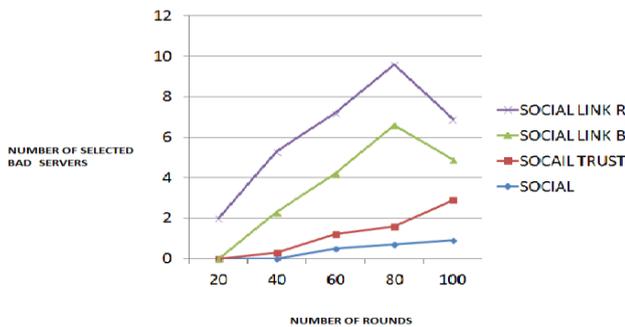


Fig 4 no. of bad servers

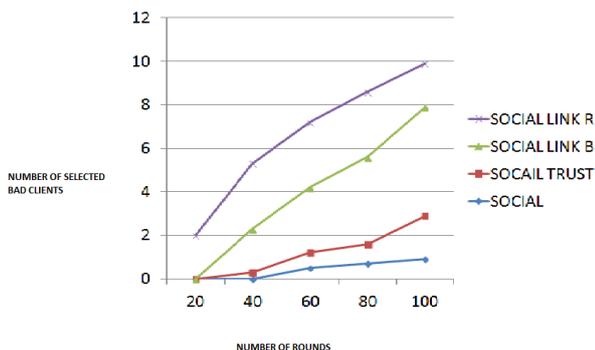


Fig 5 No. of bad clients

We found that result of Social Link (Fig 5) between the Social Trust over different rounds in experiment. The accumulated number of selected bad client will follow Social Link-B < Social Link-R < Social Trust (Fig 6).

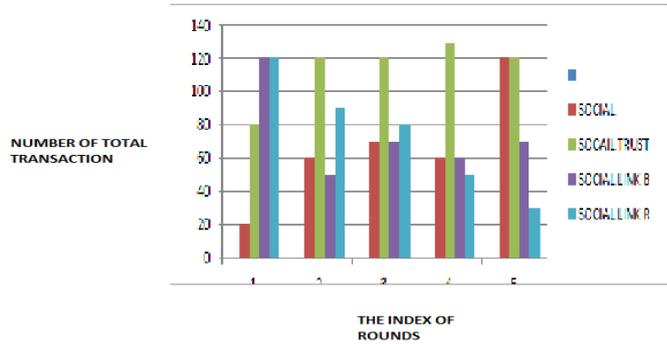


Fig 6 No. of total transaction

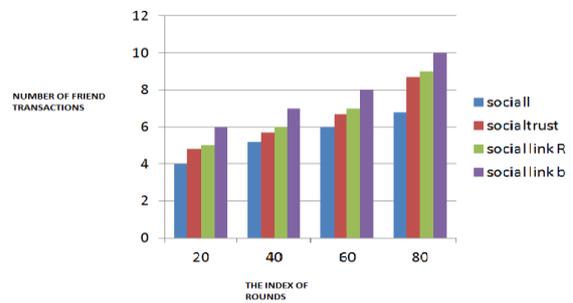


Fig 7 No. of friend transaction

Social Link-B the entire nodes link will be removed when new node arrives in the network. Social Link-R will conduct suspicious transaction with reputed score of the unwanted nodes which are selected by server with the applied values.

V. CONCLUSION

In this research we have proposed the trust based social network system called Social Link to have efficient and secured system for P2P file sharing which is based on reputation. The social link allows all the friends to share files without any special permission. This social link system designs the new network of weighted transaction which manages the trust with all friends and non friends node based on the record of earlier transaction. The weight of all the files will be identified by their size; it avoids the collision among the network system. These types of design will also focussing on the Sybil attack and whitewashing. At the end the experiment shows the efficiency of the social network.

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AUTHORS PROFILE



Vimal S Vimal S received his B.E degree in Computer Science and Engineering from Anna University and the M.Tech Degree in Information Technology from Sathyabama University Chennai. He is currently a Ph.D. student in the Department of Computer Science And Engineering at Sathyabama University and working as an Assistant professor in Jeppiaar Engineering College, Chennai.



Dr. S. K. Srivatsa Dr. S. K. Srivatsa Retired Professor, MIT, Chennai. He published more than 200 National and International journals and Conferences. He also Guided many Research Scholar.