Study of Cluster Based Approach and Security Query Routing in Peer to-Peer Networks

Arivazhagu. U.V, Dr.Srinivasan .S

***Abstract*—** In Peer-to-Peer network, the previous work does not concentrate more on availability of nodes and peer status for searching the queries. Query routing process can be guaranteed to allow the resources in a secured way. Hence in this paper,we propose a study of cluster based approach and security query routing in peer to peer networks.Intially a node with high score value is selected as a cluster head. Query processing and routing can be done with all the elected cluster head. This paper explains how the query routing process can be done effectively and efficiently in a secured manner.

***Keywords* —** Clustering approach, Query Processing, Query Routing, Security management**.**

I. Introduction

PEER to Peer Network plays an important role to distribute the resources in a decentralized model and security aspects are more challenging than other P2P application. Peer nodes are moving from the initiating node to a neighboring node until it locates the requested resources. Query is routed to a number of relevant peers instead of being broadcast to the whole network. Peer to Peer network need to search the queries in a larger number of peers to locate the target file resulting in high message overhead.WWW requires infrastructure and it is difficult for individual users to share their files in an easy and independent way and the users have no direct control over the published file to make them available for immediate search. To overcome the above problem we have proposed cluster based searching technique. Peers are initially formed into clusters and communication can be done with their neighbor CHs to process all the queries. Every ant agent approaches the CH in search of resources by launching the semantic queries. The agent records the routes that have been selected and each time it finds a resource, the data is sent via the route established. Initially the agent verifies the current CH it has reached, for availability of resources. If resources is available, it updates the table and feedbacks via the available route.Otherwise,it enquires the neighboring CH and selects the matching peers. The peer with the higher rank will be selected for fetching the resources. During ranking methodology the ranking table does not enough information.

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Whether the node is active (or) any failure occurs only after searching the node it gets the information and it is a time consumption process. Here the study paper explains how the resources can be extracted from the clusters in a secured manner.

II. Related Work

CAI Biao et al., [2] have proposed a structured topology for trusts management in portable P2P network based on DHT (discrete hash table), in which includes trust management strategies and peer operations on certain DHT circle. And also the authors have proposed a trust-computing model for the structured P2P network and the main trust decisions in the structured network are introduced too. And the advantage of this approach is that it will have information, which peers can join or leave at anytime and anywhere to address the portability in a portable P2P network.

Mei Chen et al., [4] have proposed a cluster-based reputation model (CBRM). The model is consisted by reputation mechanism for realizing the security transaction and the network topology structure of CBRM adopts the cluster, so efficiency of reputation management is noticeably raised. In order to improve security, reduce the network traffic brought by management of reputation, and enhance stability of cluster, when we select reputation, the average historical online time, and the network bandwidth as the elementary components of the comprehensive performance of node.

Joonhyun Baeet al., [5] have proposed VegaNet, a peer-to-peer overlay network enhancing the performance and reliability of DHT routing using social links. The nodes in VegaNet are identified by the users' social identity, and it is structured by underlying DHT overlay exploiting social identities and social relationships. And also the authors have presented algorithms for handling churn and routing over the VegaNet in this paper. The advantage of this proposed approach is that the communication costs and device capacities are relatively limited.

III. Cluster Construction

Initially peers are clustered based on their semantic interest by geographical location. Here we are concentrated more on formation of clusters. Each peer broadcast a message to all the neighbor nodes with ID, score value. Each neighboring nodes identifies itself and also maintains the neighboring list. All the nodes compare the value of score and check whether it is

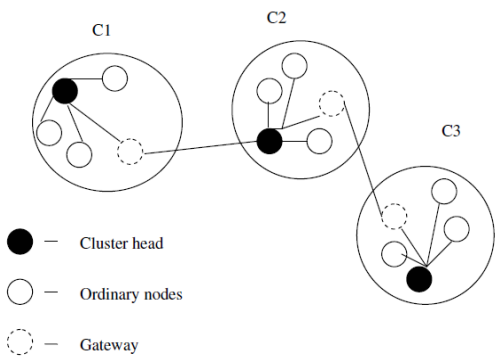

Fig .1 Clustering Approach

greater than their score. The nodes having more score value assigned as cluster head and the node send reply message to join as a member in the cluster.

IV. Secured Query Routing

Initially the node with maximum score value is chosen as cluster head. These cluster heads are designated as managers. Every peer has to maintain trustable table. The Score value of the node within the cluster is calculated and according to the success rate and failure rate secured node behavior is identified. With respect to the CPU time the cost value is evaluated as a score value to select the cluster head among all the nodes. During query routing, the literature work has not having enough idea about the status of the nodes whether it is active or inactive. Each peer maintains a table with the information of nodeid, keyvalue, IP address and status of the node. After completion of every process the table should be updated by all the peers. Each cluster head acts as manager which manages all the trust information of its cluster members. Any cluster node gets damaged or hacked, it can be detected and overcome by using echo time.

V. Comparative Study

In the previous work each CH intelligently forwards received queries to the neighbor CHs that are most likely to return query results based on the past queries answered via those neighbor CHs. Gateways only forward queries to the intended CHs indicated by the forwarding CHs. A query path terminates when the query results are found or when the TTL expires. Each CH also maintains a profile for each of its neighbor CHs, which stores the past queries answered via that neighbor CH. In case, a new user joins the network, the user can join the cluster based on his semantic interest. He should send the joining request to the cluster head and receive the join acknowledgement. A user can change his cluster by leaving the current cluster and joining the new cluster. In case of leaving a cluster, the user sends a notification to the existing cluster head. Every ant agent approaches the cluster head (CH) in search of resources by launching the queries. If CH receives a query, then the searching process is performed among CHs. If it is found that query is redundant type, then it is discarded at the receiver side using unique query ID .Each time an ant decides to move towards a node by the state transition rule, some pheromone is deposited at each node that has been visited to establish a trend towards the most frequently visited nodes. Ant agent records the routes that have been selected, and each time it finds a resource, it updates the table and feedback via the available route.

The drawback of the previous work is the ranking table doesn't have information whether the node is available or not or if any peer failure occurs, only after searching it gets the information, which is a time consumption process. Cluster heads are designated as managers. Each peer maintains a trust table which gets updated once it gets feedback from the trust manager about the resource requested peer. If the update denotes that the node is reachable and trusted, the routing is performed. Otherwise its echo time is verified again to decide the re-routing process. By simulation results, we show the comparison of the previous work with the proposed work, how effectively the query routing and processing can be done with the cluster based security query routing in peer to peer networks.

A. Simulation Setup

This section deals with the experimental performance evaluation of our algorithms through simulations. In order to test our protocol, the NS2 simulator [11] is used. NS2 is a general-purpose simulation tool that provides discrete event simulation of user defined networks.

We have used the BitTorrent packet-level simulator for P2P networks [12]. A network topology is only used for the packet-level simulator. Based on the assumption that the bottleneck of the network is at the access links of the users and not at the routers, we use a simplified topology (shown in Figure 2) in our simulations. In this topology, peer nodes form 5 clusters with elected cluster head (marked as CH). The clusters are connected by access routers. Each peer is connected with an asymmetric link to its access router. All access routers are connected directly to each other modeling only an overlay link. The source peer is varied with different set of queries and for each query, the best peer is selected. The requested information is fetched from the best peer by the source peer. Ant agents are deployed in each peer for intelligent searching. We compare our previous work Intelligent Semantic Query (ISQ) routing technique with Cluster based approach security query routing in Peer to Peer networks (CBSR) technique.

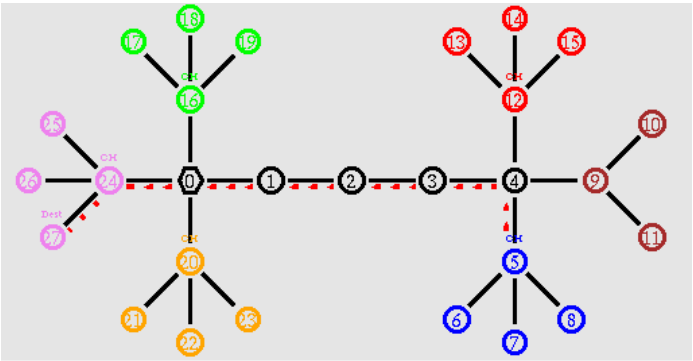

Fig 2: Network Topology

B. Based on Droprate

For the peer failure management, we apply exponential error model on the links between two peer. We vary the drop rate as 0.1, 0.2, 0.3, 0.4 and 0.5. The response and number of nodes, drop rate are measured. When the drop rate is increased, it increases the packet drop in that particular path. Due to these drops retransmission of failed packets increases, resulting in increased delay. Figure 3 and 4 give the result of Query vs drop rate and Nodes vs. drop rate .It can be seen that the Query, No. of nodes and drop rate of CBSR is significantly less than ISQ.

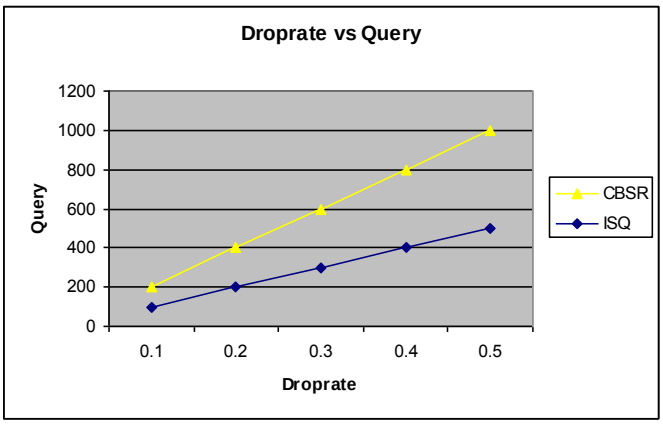

Fig 3: Droprate Vs Query

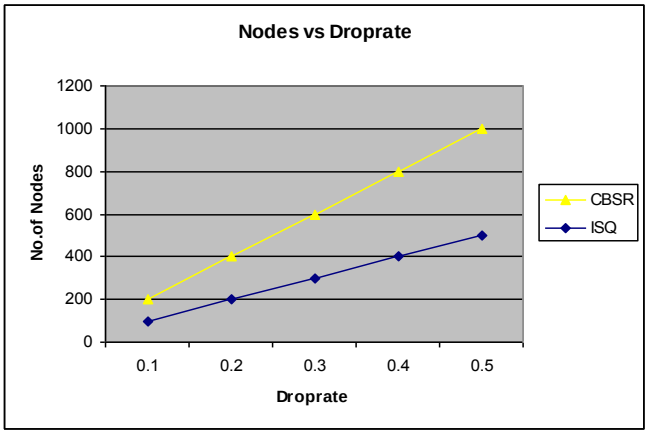

Fig 4: Droprate Vs Nodes

VI. Conclusion

In this paper we have proposed a study of cluster based approach security query routing in peer to peer network. Initially the node is having high score value is selected as cluster head and assigned as manager. Every peer has to maintain trust table with all the necessary information and the table will be updated for every process. From the table it denotes the node is reachable and trusted routing is performed otherwise rerouting process can be done. In our future work, by simulation results we show that our approach improves the efficiency of peer to peer networks

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