SHORTEST PATH ALGORITHM FOR QUERY PROCESSING IN PEER TO PEER NETWORKS

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Abstract

Peer-to-Peer network implements a new environment in database by query processing system. Nowadays, a key challenging for processing the queries and query answering technique. In this paper we propose a research work on how query processing can be done in a P2P system efficiently by discovering the network topology, how the query can be processed in a database by using shortest path problem. Cryptographic algorithm is implemented for routing the queries in a secured manner. Compare to the previous work our proposed approach minimize the delay, fast access of queries and query routing process provide more security.

***Keywords*:** Peer-to-Peer Network; Query Processing; Shortest Path Problem; Query Routing.

1. Introduction

Recently, peer-to-peer systems have become a very active research area today and their potential use in future applications. The Peer to Peer network is completely independent in which no central server are present and used to connect the database with other peer database in a decentralized manner. An important problem is the routing of queries which contain relevant documents in the nodes. In Query routing and processing each node should have knowledge about the neighbor node by discovering the network topology to check the status of the peers. An interesting approach is to determine a shortest path in a networks of all documents, and to acquire knowledge about which node contains how many documents falling into each cluster. The query can then be routed precisely to nodes containing relevant data and it can easily identify relevant peers instead of broadcasting query requests on the network. Query routing is responsible for finding the relevant to a query peers from the database. Already the below works has some drawbacks in a P2P system which is related with our topic. In peer–to-peer databases, the data placement problem and retrieval of data are implemented, but does not achieve the strong semantics of traditional databases [3]. LRM proves the viability of the conceptual design and declaratively illustrates how a query within a system based upon the LRM operates and the Piazza. Light weight coordination between the peers as their data evolve[11][1].Data sharing and Querying for Peer-to-Peer data management system, large portion of previously mapping tables remains unaffected by the updates[9].Section 2 describes the Architecture in P2P systems. Section 3 describes about how the query can be processed with experimental issues. The aim of the current work is the research of innovative technique for the development of Database System in Peer-to-Peer system.

2. Architecture of Query Processing

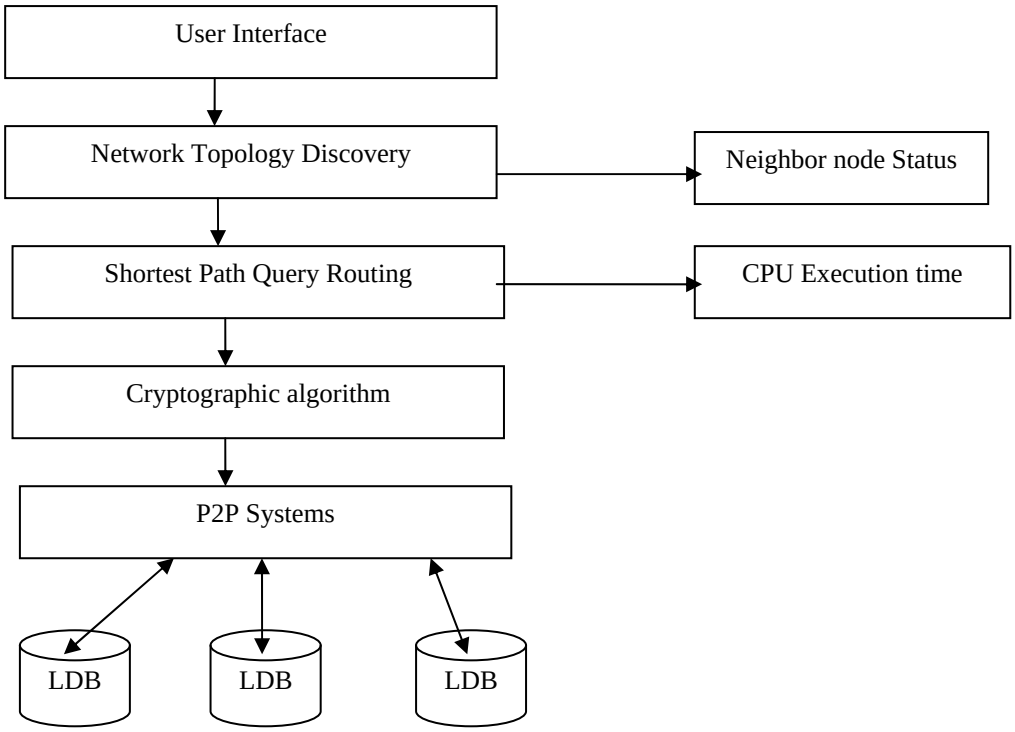

Figure 1 : Architecture of Query Processing

2.1. *Network Topology Discovery*

During Query routing the peer start the process of network discovery. All the other nodes will only run the Query and process answer when they are requested. Network Topology Structure should be designed before processing the queries. All the peers should have knowledge about the neighbor node and check whether all the peers are connected and know the status is active.

2.2. *Shortest Path Problem*

Finding a shortest path between the nodes to process the relevant queries. We transform the single-source into the single-destination shortest-path problem. It is responsible to identify the CPU execution time of each system in network. CPU execution speed varies from one system to another system dynamically in network. Based on the CPU execution speed the path will be selected and changed accordingly to send a file from one peer to another peer. Intermediate module identifies the system having higher CPU execution speed and use that system as an intermediate to send the file via that system. CPU Execution time varies dynamically and intermediate system will also dynamically changed. In Query routing technique, ensure the design of the network structure and check the status of the nodes. Peer sends a query request to all the nodes, which node can answer for the appropriate query will send a response to the requested peer. For Query routing process ,the node has to visit to receive the answer. By the shortest path problem, we can identify the path with the CPU execution time of the peer as a cost and easily receive the response of the query.

$$Distance[v] = minimum(Distance[v], Distance[w] + cost[v,w])[Cost = CPU\ Execution\ Time]$$

2.3. *Security*

All the nodes can be checked whether the peers are in active status and the query is routed by finding the path to process the query .The path is found among all the nodes by the CPU execution time assigned as a cost value. In Query routing and processing the queries can be processed in a secure manner by assigning a key value. Peer 1 sends the request to all the acquainted peers. Among all the peers, which is able to answer the queries and send response to the Peer 1 .After the receiving the response it sends the acknowledgment along with the calculated

public key and the query are processed and sends the answer for the requested query with its public key and both Peer1 and Peer2 generates the secret key[15]. Peer 1& 2 check whether the response is from the authorized peer to maintain secret among all the peers. Finally with the secret key Peers knows the query are generated with the protection and authentication.

Peer 1 Generate the Key

Select Private Key=P1

Calculate Public Key $PB_1=P_1X\ S$

Peer 2 Generate the key

Select Private Key=P2

Calculate Public Key$PB_2 =P_2XS$

Calculation of secret key by Peer1

$C=P_1\ X\ PB_2$

Calculation of secret key by Peer2

$C=P_2\ X\ PB_1$

3. Experimental Setup

Peers can communicate and share data with each other after they are acquainted. An acquaintance is an abstraction of a communication channel between peers. Peer can establish acquaintance within and across interest groups. Once two peers are acquainted with each other, they can share and exchange data by using each other's services, we demonstrate how queries and updates propagate in the system by checking the status of acquainted peers.

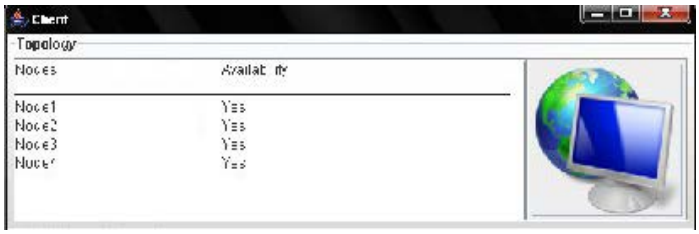

Figure 2: Status of Network Nodes

CPU Execution time varies dynamically and intermediate system will also dynamically change. A Peer sends the specified query to process to get the answer from other peer. It sends the query through the selected intermediate system. Intermediate system will pass that query to that particular node through specified path. It will receive the query send by the sender node through intermediate system. The path will be changed based on the intermediate system with the shortest path computations.

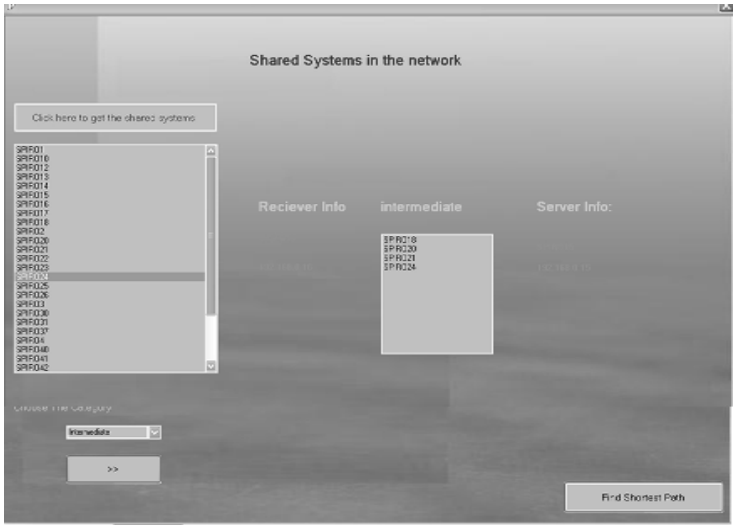

Figure 3: Identifying the Shortest path

4. Conclusion

We have classified the problem and solution to current network the topology of the network is discovered and allows the data to other node for the query answering. To avoid the mechanism of doing manually when nodes join and leave the system. We proposed to calculate the shortest path for query processing in network systems. We conducted experiments to evaluate their performance, in terms of both the CPU execution time and the total number of operations. The purpose of this study is to understand how these algorithms behave to process the queries according with the request of the peers. In future work , the number of peer should be increased and the practical solution to be evaluated.

References

[1] Alex Sung L.G., Nabed Ahmed, Rolando Blanco, Herman LI, Mohammed Ali Soliman and David Hadaller," A Survey of Data Management in Peer-to-Peer Systems 2004

[2] Arenas.M,Kantere.V,Kementsietsidis.A,Kiringa.I, Miller.R, and Mylopoulos.J. "The Hyperion project : From data integration to data Coordination",2003

[3] Del Vecchio, .Son,S.H,"Flexibleupdate management in peer-to-peer database system".

[4] Efficient Skyline Computation in Structured Peer-to-Peer Systems, Bin Cui; Lijiang Chen; Linhao Xu; Hua Lu; Guojie Song; Quanqing Xu *Knowledge and Data Engineering, IEEE Transactions on* On page(s): 1059-1072, Volume: 21, Issue: 7, July 2009

[5] Giunchiglia.F and I. Zaihrayeu, "Making peer databases interact – a vision for an architecture supporting data coordination," 6th International Workshop on Cooperative Information Agents (CIA-2002), Madrid, Spain, September 18 -20, 2002.

[6] Karl Aberer, Manfred Hanswrith ,"An overview on Peer –to-Peer Information Systems".

[7] Kementsietsidis.A,Arenas.M,and Miller.R,"Data mapping in peer-to-peer system",ICDE,2003

[8] Kementsietsidid,A.,Arenas,M.,Miller,R.J."Data sharing through query translation in peer-to-peer system", Submitted for publication (2004)

[9] .Philip. A. Bernstein, Fausto Giunchiglia, Anastasios Kementsietsidis ,John Mylopoulous, Lucino Seraffini ,Illya Zaihrayeu, "Data Management for peer to peer computing

[10] Secure query processing against encrypted XML data using Query-Aware Decryption Volume 176, Issue 13, 3 July 2006, Pages 1928-1947

[11] Vasiliki Kantere,Illuju Kiringa,John Mylopoulos,Anastasios Kementsietsidis and marcelo Arenas,"Coordinating Peer Databases using ECA Rules",[2004].

[12] Wei-Shinn Ku and Roger Zimmermann, "Nearest Neighbor Queries with Peer-to-Peer Data Sharing in Mobile Environments," *Pervasive and Mobile Computing*, Vol. 4, Issue 5, pp. 775-788, Elsevier, 2008.

[13] U.V.Arivazhagu,Dr.S.Srinivasan"Query Translation and Topology Discovery in Peer To Peer Database System", Proceedings of the International Conference on Information and Advanced Computing ,Bharath University,Chennai,pp.137-141,July 2008

[14] U.V.Arivazhagu,Dr.S.Srinivasan "Intelligent Semantic Query Routing Technique in Peer to Peer networks" Proceedings of the National Conference on "Recent Trends in Data Mining and Distributed Systems held at Sathyabama University on 15th & 16th September 2011.

[15] U.V.Arivazhagu,Dr.S.Srinivasan **"**Efficient Ant Agent System for Query Routing in Peer to Peer Networks"**,** Proceedings of the International Conference on Computer Science and Intelligent Systems conducted by Coimbatore Institute of technology October 21st & 22nd, 2011.

[16] U.V.Arivazhagu,Dr.S.Srinivasan "Study of Query Processing by Clustering Approach in Peer to Peer Networks", Proceedings National Conference on Computer science and Informatics at Anna University of Technology, Madurai on 23rd&24thApril 2012

[17] U.V.Arivazhagu,Dr.S.Srinivasan Ant Agent Semantic Query Routing in Peer to Peer Networks CIIT International Journal of Networking and Communication Engineering ,ISSN 0974 – 9713, October 2011

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