International Journal of Cloud Computing and Services Science (IJ-CLOSER)
Vol.1, No.2, June 2012, pp. 75~79
ISSN: 2089-3337

Minimization of Delay for Query Processing in Peer to Peer Networks

U.V.Arivazhagu*, Dr.S.Srinivasan**
* Department of Computer Science & Engineering, Sathyabama University
**Department of CSE & MCA Professor&Head, Director-Affiliation, Anna University of Technology

Article Info

Article history:

Received May 30th, 2012
Revised Jun 6th, 2012
Accepted Jun 10 th, 2012

Keyword:

Topology Discovery
Peer to Peer System
Query Processing
Mapping Tables

ABSTRACT

Most of the research has been concentrated on sharing of files in Peer to Peer System .Our framework avoids the centralized structure of database management system and proposed the use of decentralized nature in a network. In the existing system, searching of neighbouring nodes is complex and provide more delay in communication of queries with no updation of mapping tables.This paper explains about the topological discovery of peers and creation of the acquaintances and mapping tables.Our objective is to implements a new environment in database by Query Processing system and explains how the execution and updation of query can be done in all the peers. In this paper, it deals with the effective query processing done with all the peers with respect to CPU execution time, creating an acquaintance, mapping tables with no communication delay in a large peer to peer system.

Corresponding Author:

U.V.Arivazhagu,
Research Scholar,Departement of Computer Science & Engineering,
Sathyabama University,
Sholinganallur, Chennai, Tamilnadu, India.
Email: arivu12680@gmail.com

1. INTRODUCTION

P2P system is an open-ended network of distributed peers, where each peer can exchange data and services with a set of other peers. The peer to peer database management systems is used to connect its database with other peer database on the network. Our framework avoids the problem of local database updates in a network for data exchange. The PDMS are completely independent in which no central server are present .Peers are mostly independent from other peers. In this system, among all the peers the network topology discovery is done and identify the neighbouring nodes as acquaintances and each node should have knowledge about the neighbour node and evaluate the CPU execution time.According to the CPU execution time the query is processed and mapping tables are updated with all the peers , respect to the request. Section 2 deals with the related works of peer to peer database system. Section 3 briefly explains about the peer architecture and section 4 explains about the experimental evaluation of the peer to peer system .Finally the paper concludes and directed to the future work

2. RELATED WORK

The paper, “What can database do for P2P” [13] is the earliest paper which discuss about the database management system in P2P environment. It indicates the two main problems as the data placement problem and retrieval of data which does not achieve the strong semantics of traditional Database. The “Piazza management System”, [6] suggests a technique for the data placement to materialize views at different points in the network in order to improve performance and availability. The Piazza allows peers to define semantic mappings between pairs of peers. The Schema mappings between peer database that allows

both GAV and LAV to map between peer schemas[7].The mapping between two peers P_A and P_B creates an acquaintances between them. P_B is called the acquaintance of P_A.

The "Local Relational Model"[12] proves the viability of the conceptual design and it illustrates how a query processing is done within a system based upon the LRM, Light weight coordination between the peers as their data evolve.In "Queries and Updates in CoDB P2PDS"[2],a network of databases possibly with different schemas are interconnected by means of GLAV coordination rules (or)mappings .Each node can be queried in its schemas for data, which the node can fetch from its neighbours ,if mapping is involved.

In "Efficient and Effective Query answering in a PDMS with SUNRISE"[3] ,it explains more about the semantics based description of peers contents and relationships having the capability of selecting small subset of semantically relevant peer to forward a query. It offers several routing policies designed around different performance priorities in order to minimize the information spanning over the network.

From the above related work, we analyzed the data placement and retrieval of data is complex.Mapping tables are not updated regularly according to the query request and response.It takes more time to perform mapping tables, creating the acquaintances for query processing. The topology of the network was not discovered properly and not having any parameter for processing the queries.In this paper, we present a architecture that creates databases in each peer and mapping tables and acquaintances are created. With all the peers, the topology for a large peer to peer network was discovered and evaluates the framework for query processing.

3. PEER ARCHITECTURE

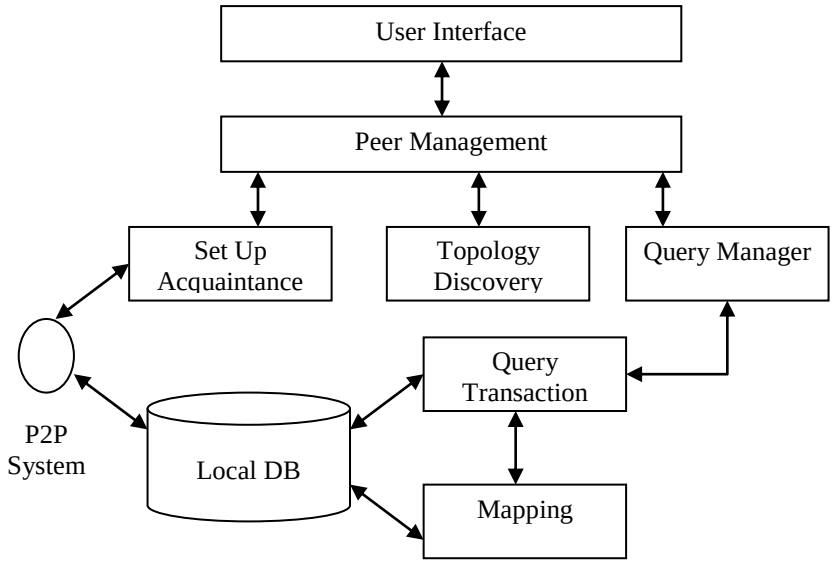

Figure 1: Peer Architecture

It describes the architecture of a peer and it consists of the following components:

3.1. User Interface

The User Interface acts as an interface between the user and the peer management. According to the requirement, the user submits the request to the management system and sends the query request to all the peers and the processing of query can be done by discovering the network, getting knpwledge about the peers and CPU execution time helps for the transaction of peers.

3.2. Network Topolgy Discovery

Peer to Peer Network should have a well known knowledge about the neighbor nodes. Peer (Node) sends the process request to all the neighboring nodes. After all the neighboring nodes accepts the request and process the answer and that particular node was joined in the network. The above process is continued for all the nodes. Topology discovery algorithm stops when a node is reached twice. Topology was initiated and all the peers are interconnected.

3.3. Setup Acquaintances and mapping Tables

In an acquaintance the logical connection that is established through mapping between two peers. The acquaintances is established either with data level mapping (or)Schema level mapping .Each peer has a local database system and a set of mapping tables. Each peer may generate more than one mapping table for a single acquaintance. All the services can be executed in local database with the updating of mapping tables and query can be processed.

3.4. Query manager

Manager serves all types of services between local and remote peers. The query translation can be done both in local peer and remote peer. If we want to execute the queries in the local peer, the query processing (or) answering can be done directly with the local database system. If we want to execute remotely the query manager should interact with other external components.

3.5. Query Transaction

Query transaction explains about the query translation between peers. This module is used to send and receive queries in the network. When a peer want to send some queries to an acquaintances. To identify the CPU execution time of each system in the network.CPU execution speed varies from one system to another system, dynamically in the network. Based on the CPU execution speed the path will be selected and the queries can be send.

4. EXPERIMENTAL SETUP

It explains and evaluates the creation of acquaintances, mapping tables in a peer database system with a large size of network within a limited period of time. Topology was discovered with the peer system in a large network size

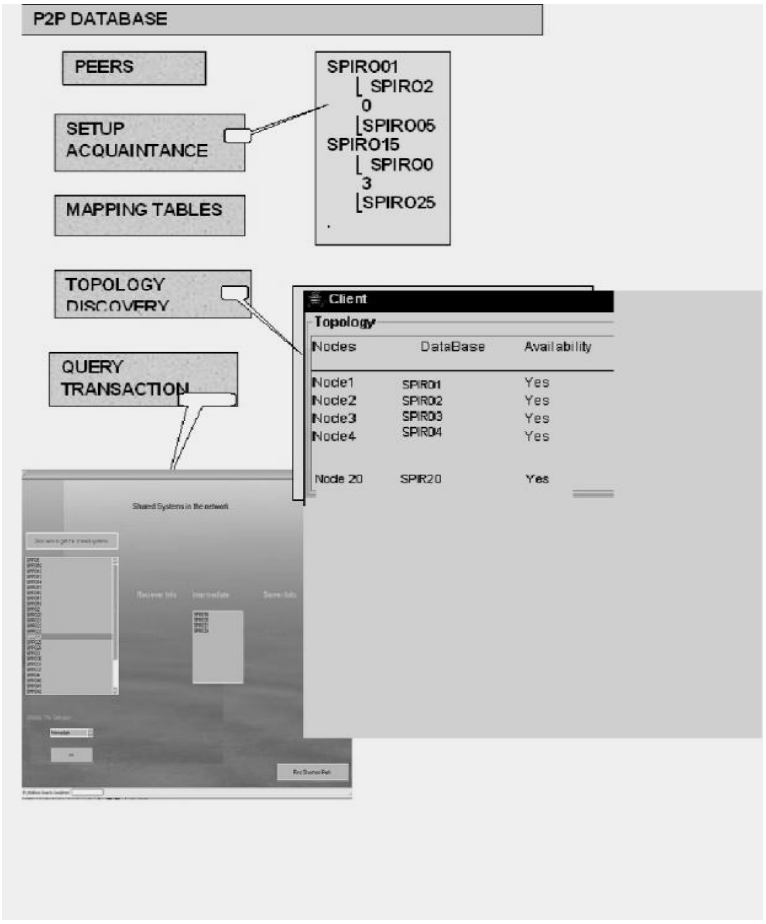

Figure 2: Experimental Result in Query Processing

In peer to peer database system, network topology should be discovered, acquaintances and mapping tables was created and the query processing should be done with all the peers. Query time is the time taken between the request query and the response of the query from the peer. No communication delay. Query transaction deals with sending a request query to the local peer and remote peer. When a peer wants to send a query request, the corresponding query reached the node which is having high CPU execution speed and it receive the request and corresponding queries are processed with the peer and the results are sent back to the peer.

Consider about 10 to 20 peers in a network. All the nodes should gain knowledge about the neighboring nodes to create the acquaintances. With all the 20 peers or nodes interconnected with each other, and the topology were designed, if the peers are connected to the topology and the availability is displayed. Out of 20 peers the query request is sent to the peer whose execution of CPU speed is more. Out of 20 peers according to the CPU execution speed it is listed and the requested query was send and received the query answer from the peer. Intermediate peer identifies the system which is having higher CPU execution speed. The peer who sends a query request to any peer in the network, each peer implements a CPU execution speed in each peer for sending and receiving messages. When a peer wants to send a query request, the corresponding query reached the node which is having high CPU execution speed and it receive the request and corresponding queries are processed with the peer and the results are sent back to the peer.

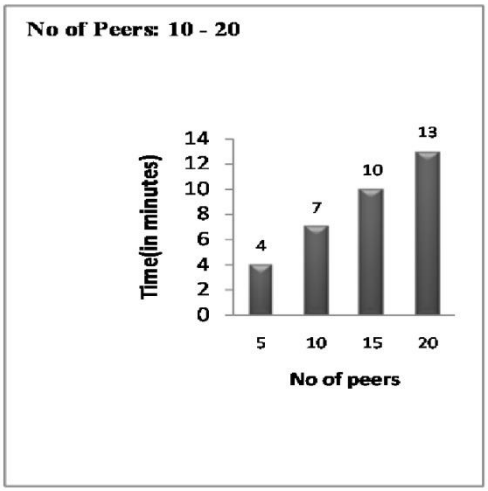

Figure3: Execution Time query processing

5. CONCLUSION

In this paper, we proposed the peer database system in a large network with a discovery of topology in all peers where mappings between peer are established and creating an acquaintances with effective query processing. This paper supports peer users in creating and sending queries and integrates the query results. It greatly reduces the amount of query execution time. In future work, the number of peer should be increased and an automatic tool will be implemented for updating the mapping tables. We intend to extend the framework for supporting the query processing with automated software in the network with a larhe number of peers.

REFERENCES

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

[2] Enrico Franconi,,Gabriel Kuper,Andrei Lopatenko,Ilya Zaihrayeu Free University of Bozen–Bolzano, Faculty of Computer Science, “Queries and Updates in the coDB Peer to Peer Database System”Italy, Proceedings of the 30th VLDB Conference, Toronto, Canada, 2004 .

[3] Federica mandreoli,Riccardo martoglia,Wilma Penzo,Simona Sassatelli,Giorgio Villani,”Efficient and Effective Query Answering in a PDMS with SUNRISE” ESWC’07 Conference

[4] Raddad Al King, Abdelkader Hameurlain, Franck Morvan,” Query routing and Processing in Peer-to-Peer data sharing systems”, International journal of database management systems (IJDMS), Vol 2, No 2, 2010.

[5] Papadimos, V. Maier, D., and Tufte, K.: “Distributed query processing and catalogs for peer-to-peer systems”, CIDR 2003, Online proceedings at http://www.informatik.unitrier.de/~ley/lb/conf/cidr/cidr2003.html

[6] Y. Halevy, Z. G. Ives, J. Madhavan, P. Mork, D. Suciu, and I.Tatarinov," Thepiazza peer-data management system". In IEEE Transactions on Know ledge and Data Engineering , Vol. 16, no. 7, 2004.
[7] George Kokkinidis and Vassilis Christophides," Semantic Query Routing and Processing in P2P Database Systems: The ICSFORTH SQPeer Middleware", Lecture Notes in Computer Science, Springer journal, Volume 3268/2005, pp 433-436, 2005.
[8] Castano S, Montanelli S (2006) Enforcing a semantic routing mechanism based on peer context matching,. In: Proc. of the 2nd int. ECAI workshop on contexts and ontologies: theory, practice and application
[9] Rafic HAGE CHEHADE, Hussein EL GHOR, Gilles NACHOUKI and Tamim FLITI," Semantic Routing in Peer-to-Peer Systems: Techniques and Categories", 5th International Conference: Sciences of Electronic, Technologies of Information and Telecommunications, SETIT 2009, March 22-26, 2009.
[10] F. Mandreoli, R. Martoglia, W. Penzo, S. Sassatelli, "Semantic Routing for Effective Search in Heterogeneous and Distributed Digital Libraries", Proc. of the 3rd Italian Research Conference on Digital Library Systems (IRCDL), 2007.
[11] Arturo Crespo and Hector Garcia-Molina," Semantic Overlay Networks for P2P Systems", Springer journal, Lecture Notes in Computer Science, 2005, Volume 3601, pp1-13, 2005
[12] Luciano Serafini, Fausto Giunchiglia, John Mylopoulos, Philip A. Bernstein, University of Trento, 38050 Povo, Trento, Italy,"The Local Relational Model: Model and Proof Theory
[13]Steven Gribble Alon Halevy Zachary Ives Maya Rodrig Dan Suciu,gribble, alon, zives, rodrig, suciu@cs.washington.edu,Universit y of Washington Seattle, WA USA,"What Can Databases Do for Peer-to-Peer?"
[13] Verena Kantere and Abdur Rahmani, "Peer data coordination through distributed triggers", Journal Proceedings of the VLDB Endowment VLDB Endowment Hompage archive, Volume 3, Issue 1-2, September 2010
[14] Masataka Kan," Data Management in Mobile P2P Systems", Data Management in Mobile P2P Systems", Technical Report, University of Stanford, September 2005.
[15] Reza Akbarinia, Esther Pacitti, Patrick Valduriez," Query processing in P2P systems", inria--00128221,, version 2 - 6 Feb 2007
[16] Claudia Gómez Santillán, Laura Cruz Reyes, Eustorgio Meza Conde, Guadalupe Castilla Valdez, and Satu Elisa Schaeffer,"A Self-Adaptive Ant Colony System for Semantic Query Routing Problem in P2P Networks.", Computación y Sistemas 13(4):pp 433-448, 2010.
[17] Srikanth Kallurkar and R. Scott Cost," An Active Query Routing Methodology for P2P Search Networks", Third conference on professional knowledge management, 2005.
[18] K. Nakauchi, Y. Ishikawa, H. Morikawa, and T. Aoyama,"Exploiting Semantics in Unstructured Peer-to-Peer Networks", IEICE Transactions on Communications, Vol. E87-B, No. 7, pp. 1806-1817, July 2004.
[19] Chrysakis I. y Plexousakis D., "Semantic Query Routing and Distributed Top-k Query Processing in Peer-to-Peer Networks", Reporte Técnico. Institute of Computer Science – FORTH, 2006.
[20] Amit Singhal,"Modern Information Retrieval: A Brief Overview", IEEE Data Eng. Bull., vol. 24 (2001), pp. 35-43.
[21] Loser,A.,Naumann,F.,Siberski,W.,Nejdi,W.,Thaden,U:Semantic Overlay Clusters within Super Peer networks.In Proceedings of the 1st International Workshop on Databases,Information Systems and Peer –to-Peer Computing (DBISP2P 2003).

BIOGRAPHY OF AUTHORS

Ms .U.V.ARIVAZHAGU received the B.E degree in Computer Science & Engineering from Madras University, and the M.E degree in Computer Science & Engineering from Sathyabama University, and the MBA degree in HR from Tamil Nadu Open University, Where she is currently working towards the Ph.D degree in Computer Science & Engineering at Sathyabama University.Her area of interests includes Data mining, Database System, and Networking.

Dr. S. SRINIVASAN received the Ph.D degree in Computer Science & Engineering from the Sathyabama University, Chennai, and the M.Tech in Computer Science & Engineering from the Indian Institute of Technology, Chennai, and M.B.A. in Systems & Finance from Sathyabama Engineering College, University of Madras, Chennai, and the M.Sc. in Mathematics from the Gobi Arts College, Gobichettipalayam, Bharathiar University, and Coimbatore. He is presently working as Professor & Head Dept of CSE& MCA, Director Affiliation, Anna University of Technology,Madurai. He has rich experience in Teaching and Research. He has also held various positions and responsibilities in Technical Institutions. He is currently serving as an expert in various capacities at different levels. He has published more number of research papers in journals, books, conferences, and workshops. His research interest includes text mining, data mining & data warehouse, and image database.