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A Review on Mobile Transaction and Disconnection Management

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ABSTRACT

Mobile computing is an innovative technology, Born as a result of remarkable advances in computer hardware and wireless communication have made mobile computing possible that tens millions of users uses a portable computer device with wireless connection. This technology introduces a term called as mobile database which increasingly uses day by day. Using mobile database technology, mobile user can read and update the database while they are disconnected from the network. In this technology, data is being moved closer to the applications in order to improve the performance and autonomy. But it is having some problems which we will discuss here. As a solution we proposed a module to handle co-ordination between Mobile Host and Server.

Introduction

Recent advance in wireless communication networks and portable computer (e.g. laptop, PDA, and cellphone) have given mobile computing attention in past few year as a fertile area of work for researcher in areas of database and data management, mobile devices are gradually more use for database driven application like sales order entity, product inventory tracking, airline booking etc. In order to provide these services, required information is retrieve from database server via wireless channel and passes on mobile host.

As mobile computing devices become more and more common, mobile databases are becoming more popular. Some author defines mobile database as a database that is stored on mobile devices [1,2]. Some other describe mobile database as a distributed database in which accessing mode is mobile[3,4]. Some other author stated that it is a union of distributed database, disconnected database and ad-hoc database. The distributed database is treated as the home for mobile database and the other deal with access of mobile user[5]. According to [6, 7] The mobile database can be defined as a database that is portable and physically separate from centralized database server, but is capable of communicating with server from remote sites allowing the sharing of data. Mobile database attributed to the data management technology, that Enable use of a database on the mobile computing environment. This database is more advanced and challenging than the fixed distributed databases, as it offer the following features:

1. Data are available anywhere independent of the availability of the fixed network connection:

-With a help of mobile- devices, users can store a part of database and use it. When a mobile user wants data which is not available locally, he can raise the request of for activating of the wireless communication of his device and initiate a connection to the network via the closest mobile support station (MSS). Once it is connected, he can access the data from the database which can be a part of a distributed database .mobile users can virtually access the data anywhere and anytime, even in the absence of fixed network connection.

2. Databases on both mobile and fixed hosts are shareable in seamless way:

-In mobile information systems, databases expended on both mobile and fixed hosts which is forming a distributed database system. There are many techniques are existing which use of data sharing in distributed databases .They are more complex than those algorithms which existing for centralized databases. In a mobile environment, use of wireless network, which is known to be prone of frequent disconnections and the period of disconnection, is also unpredictable. The database which performs operation can be collected together to create a unit of carrying out instruction is called as a transaction. A transaction is nothing but legitimate Implementation of database operation. A transaction transformed the database or related information from one coherent, uniform state to another state. A transaction Start From creating a coherent state of the database. Then the database operation is started executing, after completion of operation a new logical state is connected. Each transaction is completed in a successful manner and Save in the database. If any fault during successfully completion, then at the beginning state re-connection perform by terminating the previous connection by terminating by previous connection.

In [14], the characteristic of a Mobile Transaction is provided as follows:

- The Mobile transactions are long-lived transactions due to the mobility of both data and users and due to the frequent disconnection.
- The mobile transactions might have to split their computations into sets of operations, some of which execute on mobile host and others on fixed agent. A mobile transaction shares their states and partial results with other transactions due to disconnection and mobility.
- The mobile transactions require computations and communications to be supported by Mobile Service Stations (MSS).
- As the MHs move from one cell to another, the states of transaction, states of accessed data objects, and the location Of information also changes according to MHs.
- The mobile transactions should support and handle concurrency, recovery, disconnections and consistency of the replicated data

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Literature survey

When simultaneous access to data is made at the server, concurrency control techniques are employed to avoid data inconsistency. Concurrency control in mobile database can be defined as mechanism which permit multiple transaction, to operate on database simultaneously while ensuring that the database appear consistent after each transaction. Most of the concurrency controls Mechanism are locking, timestamp and optimistic concurrency control. This Mechanism scheme is suitable for traditional database application, not for mobile environment due to various constraints in a mobile environment and the nature of different online application, tradition concurrency control may not work properly.

Conventional locking based concurrency control methods like centralized Two Phase locking and distributed Two Phase locking are not suitable for mobile environment. In centralized Two Phase locking scheme [8], where one node is responsible for managing all locking activities, the problem of single point failure cannot be avoided. The distributed two phase locking scheme used in [9], allows all nodes to serve as lock managers. But in the event of data partition, this algorithm could degenerate into a centralized two phase scheme. In the conventional locking scheme, the communication overhead that arises due to locking and unlocking requests can create a serious performance problem because of low capacity and limited resources in a mobile environment [10]. Moreover, it makes mobile hosts to communicate with the server continuously to obtain and manage locks [11].

In timestamp approach for serializing the execution of concurrent transactions was developed for the purpose of more flexibility, to eliminate the cost of locking, and to cater to the requirements of distributed database systems [12], [13]. In timestamp approach a unique timestamp is given to every transaction. And the execution order of concurrent transaction is defined before the beginning there execution. When two transactions conflict over a data item, there timestamp are used to decide which transaction has to rollback.

Most of the mobile application has faced the disconnection problem. For the transaction continuity when the mobile host is disconnected, there is a need of techniques called as optimistic replication. In an optimistic concurrency control strategy using on demand multicasting is discuss that maintain consistency and introduces application specific conflict detection and resolution strategy. Optimistic concurrency control with dynamic timestamp adjustment [11], in optimistic concurrency control with update time, timestamp are associated with data items which is used to compare client data stamp with the last update stamp maintain at the server to valid its data, a transaction check invalidation report that are broadcast periodically by the server. If the client locates the data item it has updated in this report, it can roll back the transaction without exchanging messages for the wireless link otherwise a request to commit message is sent to the server.

Data replication has long been used in a distributed database system to increase data availability and reliability, to improve System performance, and maximize network band-width utilization. There are various types of replication scheme, in voting bas replication scheme the data consistency is guaranteed, however they tends be more expensive require much more communication. And in a mobile environment, the local replica, while disconnected, cannot participate in the decision/voting process and any changes to the local data may result in an inconstancy.

In [15], depending on read and requests, they consider the one copy allocation scheme and two copy allocation schemes. If mobile client issue number of read operation request more than write operation. Than Mobile client can hold the replication data. That is the two-copy allocation. Other hand, if a mobile client issue number of read operation request that are less than that of write operation request than, the mobile client hold the replication data that is one copy allocation scheme, however, in a case of disconnection, the two copy allocation is useful because there always has a local copy for local process.

Proposed System

The propose an agent based architecture model is illustrated in fig 1. It Consist of Server, Fixed Agents and Mobile Host in this architecture agent is a computer program reside on server side which is connected to the server through wired/wireless network. fixed agent as a communication area. In that, any number of mobile host access the server through fixed agent. It has a big storage space like server. Cache is used to store the data in fixed agent. When the mobile host enters in to the agent area to access data from the server first its request for data to the server through an agent, data is retrieved from the server and stored in the cache area from where mobile hosts are allowed to access data. Subsequent request is handled by the data access manager module itself, when a mobile host request for data update, after local updation of data item, invalidation report is sent to all the mobile host that have already accessed the data. After that the Mobile hosts refresh the data values. When a mobile host is disconnected from fixed agent, when the mobile host is disconnected from the fixed agent after updation request, the updation task is transmitted to the data access manager in fixed agent.

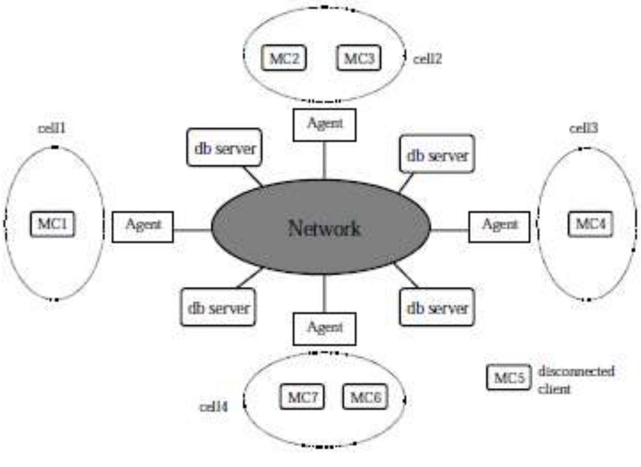

Fig 1. Agent Base Mobile Computing Architecture

Due to simultaneous access to data at the server by a number of mobile hosts will increase the system overhead. To overcome this problem, data are cached in fixed agent. The Data Access Manager at the fixed agent is responsible for enforcing concurrency and cache invalidation.

Functionalities:

Mobile Host:

-When mobile client wants to access data from the server, it connect to the server through nearer fixed agent, after connecting to the server, Mobile host gets copies of the data get the data item from the data access manager using read request. If the Mobile host wants to update dataitem, it first checks whether it is a transaction update or not. If the mobile host is about tobe disconnected from the fixed agent, it transfers the updation task to a data access manager before disconnection otherwise update request is send to data access manager.

Data Access Manager:

-When a mobile host request for read the data it check the cache of fixed agent, if same data stored in cache memory than it send the data to mobile clients. If data is not cached the retrieved the data from the server and stored in a cache of fixed agent.

When mobile host trying to update the data, Data Access Manager Update data locally and invalidation report is sent to all the mobile hosts that have already accessed the same data. This makes all the mobile hosts update their data values. This update request is transferred to the server. The server updates the data and sends an invalidation conformation with updated data value. After receiving the confirmation, Data Access Manager, Data in cache. When mobile host transfer updation task to the DAM and disconnect, DAM send the updation request to the server and after getting confirmation generates updation report and forwards it to the mobile host when it gets reconnected.

Concurrency Control Mechanism:

-When more number of hosts are accessing data simultaneously the problem of data inconsistency arises using an efficient concurrency control mechanism we can solve this problem, after getting the request from the mobile host for the data, is retrieved from the server and stored cache future request for same data are handled directly by DAM . Data Access Manager stored the data in cache in a special format [8]. It consists of (Id, TLU, PLP, Data Val, NT) where Id represents unique Id of the data item, TLU indicate time of last update, PLP is predicated life period, Data Val denotes a current value of data item, NT is a number of transactions that concurrently access the data item. When data access manager retrieves data for the first time from the server, it sets TLU to current time, TLP to optimal time depending on the nature of the data item and NT initialize to one. Whenever when a data access request is made for data which is in cache NT is incremented the lifetime of data item indicated by PLP value when a mobile host request for data updation that time, PLP is expires and the data item is becoming out dated, once the DAM get the confirmation of data updation with new updates data values, PLP is modified.

Conclusion:

In this paper, our research has focused on proposing a module called as Data Access Manager which handles mobile hosts read requests and also it does the updating task for mobile host which is disconnected. It manages and maintains the profiles of all mobile host under the fixed agent communication area. It allows simultaneous access of multiple mobile host at server end. using efficient concurrency control mechanism it avoid data inconsistency.

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