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Review Paper on Transaction Processing in Mobile Computing

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Abstract *— Transaction processing is very important for mobile computing because nowadays we are mostly prefer online booking for bus and railway tickets, E banking, online Payment using mobile. Synchronization and accurate transaction processing are major issues during temporary disconnection .Most of transaction models which allow higher conjunction and transaction processing for wireless communication is discussed in this paper. It also addresses the issues like Caching, Concurrency, Commit protocols, Synchronization, Query Processing, Recovery and Security as well brief comparison of all transaction models are also included in this paper.*

Keywords: - *Transaction Models, Concurrency Control, Replication, Synchronization, Caching, Query Processing, Recovery, Security,*

I. INTRODUCTION

With the rapid growth of mobile computing, a very high demand arises for online transactions through mobile devices. Currently mobile computing has provided users the opportunity to access information and services even their location or movement behavior is portable. Mobile users should have the ability to update public and private databases. Transaction processing and efficient update techniques for mobile and disconnected operations have been very popular. In this paper we survey the issues related only to the transaction management through different transaction models and different strategies.

II. TRANSACTION MODELS

Mobile Transaction is a set of operations that form a single logical unit of work which takes place in mobile environment. Transaction support is difficult in mobile environment due to variable bandwidth, disconnections and limited resources on mobile hosts. Mobile host can operate in mainly three modes like fully connected, disconnected, partially connected modes and other is doze mode as well. The disconnection of mobile stations for long time and bandwidth limitations require a reconsider of transaction model and transaction processing techniques. There are many proposals to model mobile transactions. Most of these approaches view a mobile transaction as consisting of sub-transactions which have some flexibility in consistency and commit processing [2]. Transaction management may be static at the mobile unit or the database server, or may move from base station to base station as the mobile unit moves [5]. In many of these models, some of the ACID properties and non-blocking execution in the disconnected mobile unit, caching of data, commit protocols and recovery issues are examined which all are basic requirements for the transaction models.

2.1 Kangaroo Transaction Model

This Model captures both the data and moving behavior of mobile transactions and it can provide mobile transaction processing in a heterogeneous as well multi database environment. This model can deal with both short-term and long-term transactions. Multiple nodes processing of Kangaroo Transaction can be used when the user requests new sub-transactions based on the results of previous ones. Here Kangaroo Transaction has a unique identification number which consists of the base station number and unique sequence number within the base station. When the mobile device moves from one cell to another, the control of the Kangaroo transaction changes to a new Data Access Agent and it is used for retrieving data in the database. This idea is pointing out that there will be no need to keep status table and log files in the base stations DAA. In this model, agent infrastructure must provide the movement of the state information with the moving agent.

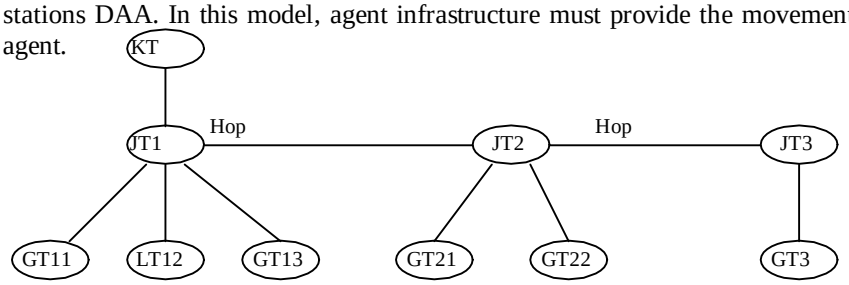

Figure 1 Basic structure of Kangaroo Transaction [5]

2.2 Clustering Model

In this model items of a database are partitioned into clusters and they are the units of consistency in that all data items inside a cluster are required to be fully consistent, while data items residing at different clusters may exhibit bounded inconsistencies. Clustering may be constructed depending on the physical location of data [2]. The nature of intended disconnection can be used to define the clusters and clusters of data may be explicitly created or combined to the associated mobile host by disconnection or connection of mobile host. The movement of the mobile will determine the place of the mobile in the cluster. When it enters a new cell, it can change its cluster too. It also defines the full consistency to be required for all data inside a cluster but degrees of consistency for replicated data at different clusters. The degree of consistency may vary depending on the availability of network bandwidth among clusters by allowing little deviation in availability [2].

Set of data items are available in Database and in this model it is partitioned to a set of clusters. Data items have number of restrictions called integrity constraints which among data-items inside the same cluster are called intra-cluster constraints and constraints among data items at different clusters are called inter-cluster constraints. During disconnection or weak connection, the only data that user can access may not satisfy inter-cluster constraints strictly. Using weak-read and weak-write operations. It allows users to operate with the lack of strict consistency which can be tolerated by the semantics of their applications. The standard read and writes operations are called strict read and strict write operations to discriminate them from weak operations. Users can use weak transactions to modify private data and strict transactions to modify extremely used common data. Better bandwidth utilization can be achieved by allowing all this applications which can be used to specify their logical requirements.

2.3 Pro-Motion

This model uses a ten level scale to characterize the correctness of a transaction execution and currently it is based on the degrees of isolation defined in ANSI SQL standard. Here Source code is maintained in Java virtual Machine and it must be unique in each compact and all compacts are written in Java. It is fully data centric approach.

2.4 Multi database transaction model

This model is mainly used for multi database environment. Call for messages from a mobile host to its coordinating site is dealt asynchronously allowing for the mobile host to unplug it [4]. The coordinating node return out the messages instead of the mobile unit and it is possible to inquire the position of the global transaction from mobile hosts. There are five transaction sub queues are used for execution such as input queue, allocate queue, active queue, suspend queue and output queue. These are used to manage global transactions by the mobile workstations.

2.5 Toggle transaction model

This model is basically for Mobile Multi database management system and it is the software which operates several database systems. A global transaction is comprised a set of operations, each of which is a legal operation done by some service interface. If mobile users change location to a new location of another Mobile Support Station then operations of a global transaction may be presented from different stations and such type of transactions are called migrating transactions.

III. SUMMARY AND CONCLUSION

There are many transaction models and here we give a comparison of all transaction models as per ACID Properties in Table 1.

Model	Atomicity	Consistency	Isolation	Durability	Execute in	Transaction type	Operation mode
Report & Co-transaction model	Yes	Yes	Yes	Yes	Mobile unit or fixed network	Global transactions and sub transactions	Connected
Kangaroo transaction model	May be	NO	NO	NO	fixed network	Coordination and transaction execution	Movement in connected mode
Clustering model	NO	NO	NO	NO	Mobile unit or fixed network	Strict &Weak transaction	Connected, weak connected, disconnected
Two-tier transaction model	No	No	No	No	Mobile unit or fixed network	Base transaction	Connected, disconnected
Multi database transaction model	No	NO	NO	NO	Mobile Unit or fixed network	Coordination and execution of multitrans-actions	Movement in connected, disconnected mode
Promotion model	Yes	Yes	Yes	Yes	Mobile unit or fixed network	compact construction, commit of locally committed transactions	Connected, disconnected

Toggle transaction model	Yes	Yes	Yes	Yes	Mobile unit or fixed network	site-transaction, migrating transaction	connected

Table 1 Comparison of Mobile Transaction Models [3]

Mobile transaction originates and ends at same site and the indication of the movement of such transaction have classical atomicity, concurrency and recovery solutions. As we can overcome this problem in the direction and we analyzed different types of transaction models and compared them in order to divulge the similarities as well as dissimilarities based on their problem.

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