ABSTRACT

THE COST BOUND AS A MECHANISM FOR CONCURRENCY CONTROL IN DISTRIBUTED TRANSACTION PROCESSING SYSTEMS

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Concurrency Control in distributed transaction processing systems is the activity of coordinating the actions of processes that operate in parallel, access shared data, and therefore potentially conflict with each other. These mechanisms developed by researchers, in general, tend to reduce the ratio of transactions that complete, against ALL the transactions that entered the database environment.

This ratio is generally termed Database Availability and is reduced because these mechanisms adhere strictly to the maintenance of database Integrity Considerations. These Integrity Considerations are usually database conditions that must always be preserved.

Generally, Concurrency Control techniques can be grouped into two classes, these classes represent, (1) algorithms that are Pessimistic and (2) algorithms that are Optimistic in nature. The pessimistic schemes check for integrity of the database before a

transaction can be applied to it. The optimistic schemes apply the transaction to the database and then check for database integrity.

Therefore in distributed systems where access conflicts are frequent both the optimistic and pessimistic algorithms could inflict critical delays in transaction response times. Airline Reservation, Banking and Inventory Control fall into this category. These systems have not accepted the techniques developed by distributed database research [17].

We propose a new algorithm that utilizes both the pessimistic and optimistic algorithms. In the optimistic case the new algorithm will allow updates to the distributed database, even in cases where there is loss of database integrity. We speculate that both these schemes could run on separate processors communicating via resources that are held by both processes in common.

The measure of how far the optimistic mechanism will allow transactions to proceed during periods of loss of integrity is controlled by a value called the Cost Bound. This means that transactions that attempt optimistic processing can be blocked pending the outcome of pessimistic processing.