

Effective Analysis of Concurrency Control Techniques in Database Management Systems Used in Large Organizations of Pakistan

Sidra Qayyum Chatha, Rao Muhammad Mahtab Mahboob, Mueed Ahmed Mirza

Abstract: Many investigations have been made in today's global database. The main issue with the distributed database management system is to maintain the stability in the database. Many control policies are presented in the past and there are some issues like response time, data losses and performance. This paper studied a comparison of control techniques compatible with their performance. This paper recommends analyzing different types of concurrency control in the Distributed Database Management System and summarizing all Concurrency control ideas. Concurrency control techniques consist of locking technique, time stamping and optimistic technique.

Keywords: Distributed database management system, Transaction processing, Timestamp, Two Phase Locking, Concurrency control, Optimistic, Shared Lock, Exclusive Lock

I. INTRODUCTION

In distributed database systems, several sites can store the databases. To ensure the reliability and stability of the transaction on the database, we must ensure concurrency control. Concurrency control is keen to manage an integrated way on a database that is affected by others. The main factor is the serializability which is used for the concurrency control. Serializability authorized to have a schedule for the implementation of transactions.

Many communication views are described by many people. Their procedures are unique in their presentation and mechanisms.

First of all lock control technology is secure. Locking is a strategy that is used to access information instantly.

When a transaction occurs in a database, different access denied lock can occur on transactions to avoid incorrect results. Shared lock: If there is a mutual lock on the transaction information, this information can be read but can't be updated.

Exclusive lock: If the transmission on the information is limited to sending, then they can read and read the item again.

Along these lines, the length of transactions holds the exclusive lock on the item; no different transactions read or updated that information item.

Each process can be divided into two steps in two lock phase (2PL): All locks in the growing phase required but can't clear any locks. Shrinking phase release locks, new locks are not found. There is not any prerequisite that all locks be acquired at the equal time.

Some basic rules of locking: Before working on this item, transactions must be locked on something. Lock can be used for read or write.

Once the transaction removes the lock, it will not get the new locks. Something happened while sending.

When waiting for two or more transmission locks to be held, others are retained. When there is still, built-in applications can't resolve this problem. Instead, DBMS must understand that there is no such arrangement. Unfortunately, one or more transactions are likely to end up breaking into dimensions.

We can avoid the starvation, Starvation happens when the same transaction is dependably select as the item, and the transaction can never end.

The starvation occurs when the counseling process does not select any particular transaction to be secured.

The second method is time stamping concurrency control. This procedure is use with two locked phases. If the transactions you want something has already been secured, it can have to wait until the goods

are replaced. Timestamp method of securing counseling is very different from how to lock.

The third is optimistic concurrency control technique. This technique is based on the theory that the conflict is unusual and ensures that serials are more effective to allow delaying transactions without delay. When the transaction is required, it is decided to decide whether or not the dispute has occurred. If there is a conflict, the transaction returns and you want to resume it. The corrective method has two or three stages, based on reading or updating the transaction, immediately reading the cover step since the beginning of the transactions earlier the promise. Database reads the values of all data requirements and local variable stores. The verification step is as follows: Checks are implemented to ensure serial serialization, which does not violate, and then the latest transactions apply to the database. If stopped, transactions are cancelled and will resume. If there is no interference, the transmission will work. Take the verification phase successfully in a step for updated transactions. At the verification stage, the updated version applies to the database.

II. RELATED WORK

Solaiman and Morgan (2011)proposed optimization techniques to control synchronization which is suitable for key transaction operations on the database. Develop OCC (Optimistic Concurrency Control) by changing the verification phase with the written phase.

K, Jitendra, Dhiraj and Datta (2012) prepared a distributed database because the design is more difficult. Access to several

- Sidra Qayyum Chatha
Visiting Lecturer at University of Agriculture, Faisalabad,
Pakistan ,Ph:+923420130700,
Email:sidrachatha88@gmail.com
- Rao Muhammad Mahtab Mahboob
University of Agriculture, Faisalabad
Ph:+923066837178
Email: rao.mahtab_stu@uaf.edu.pk
- Mueed Ahmed Mirza
Govt College University, Faisalabad, Pakistan
Ph:+923126971013
Email: mueedahmed92@gmail.com

types of information, its proposed design increases Scalp, discomfort and flexibility.

Kaur and kaur (2013) focus using four representatives of some important issues through the study of algorithms, distributed 2PL, the basic time stamp based, wound wait algorithm distributed hope, a detailed model of distributed database management systems. This article presents key characteristics of ACID challenges (consistency, when data distribution fails, isolation and durability). Concurrent transactions perform write or can verbs and whatever method is chosen by their performance, so recovery procedures are defined as protection.

Deng and Liu (2013) suggested mathematical analysis that performed better. In his article, memory-based improvements to high-end management solutions were introduced to the data problems without too much interruption.

Mhatre and Shedge (2014) present a sequence such as the method of consultative control, synchronization and distribution of lock. Comprehensive control is necessary to ensure the availability, efficiency, stability and reliability of these databases in these databases. Their technique reduces time and increases performance.

Turcu, Palmieri, Ravindran and Hirve (2016) developed a procedure for the use of automatic data distribution in granola-based distribution transactions. The system introduced five criteria and, in most cases, both transaction and an improvement in the ratio of distributed transactions.

III. METHODOLOGY

Data can be stored randomly using simple data structure. If we generate several

transactions then multiple operations will be performed like read or write. If two persons want to write the transactions concurrently on some data then we use concurrency control techniques. In two phase locking, firstly it checks that our data is locked or unlocked. If the data is unlocked then locked the data until first operation performed. By comparing performance it is concluded that locking technique have good for update while optimistic technique is better for read only data and Timestamp provides better effects. Some available data can be used for transactions to increase concurrency control. Millions of techniques are waiting for some points, and hopefully they are able to overcome the back-up transactions. In this study, a survey was conducted using a questionnaire through a survey of views and the collected data were analyzed by different organizations using the chi-square test on collected feedback. Thus, what technology can be improved for concurrency control in large organization databases?

IV. RESULT AND ANALYSIS

The information which was gathered from respondents through questionnaire is showing by using Chi-square test on our data. Pearson Chi-square value is 88.437 and df is 6. The p value is 0.000 so we see that p value is less than 0.5 so we reject our hypothesis and concluded that there is a significant relationship between respondents experience and technique. It means that experienced respondents use timestamp technique.

Chi-Square Test

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	88.437 ^a	6	.000
Likelihood Ratio	121.150	6	.000
Linear-by-Linear Association	47.622	1	.000

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.96.

On the other side we run transactions on random data. We performed randomly write and read operations on data. We take 1000 transactions in which 100 individual transactions are run and 10 transactions performed in each run. We calculated total committed transactions, rollback transactions or in waiting state transactions and we get results as presented in table 1.

Table 1 Transactions for Different Concurrency Control Techniques

	Number of run for transactions	Transaction in each run	Rollback transaction	Committed transaction	Wait transaction
Two phase locking	100	10	370	180	550
Timestamp approach	100	10	712	288	-
Optimistic approach	100	10	677	333	-

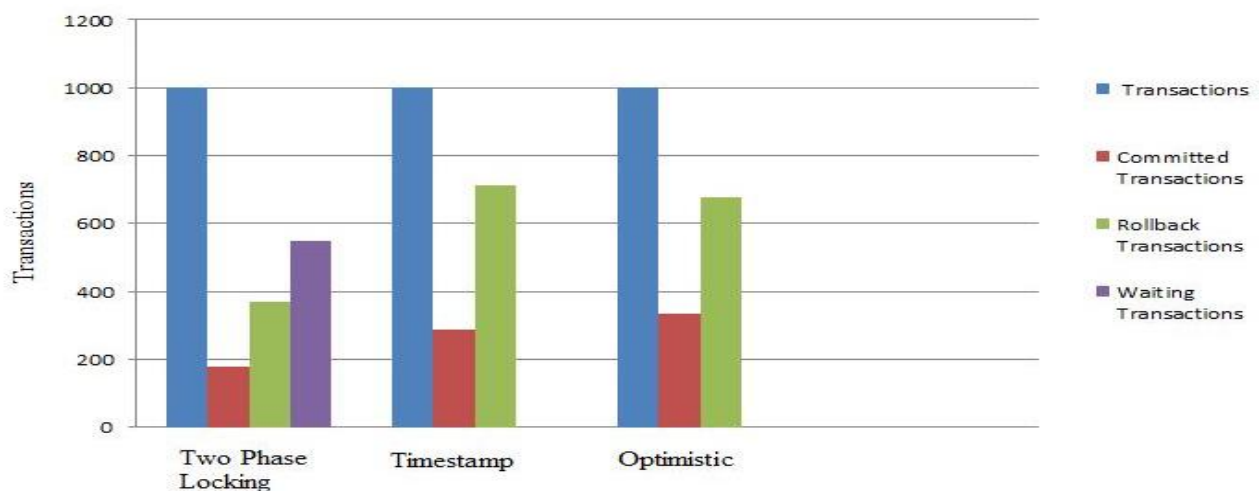


Figure 1 Comparison Of Concurrency Control Techniques

Table 2 Performance Analysis of Concurrency Control Techniques

Features/Techniques	Lock based Technique	Time stamp based Technique	Optimistic Technique
Waiting time	More	Less	Less than locking but more than TSO
Delay	Delay occurs	Delay occurs	No Delay
Occurrence of deadlock	Deadlock occurs	Deadlock-free	Deadlock-free
Serialization order	Decided dynamically	Decided statistically	Decided dynamically

V. CONCLUSION

Locking technique is better technique because it prevents concurrency issues and it is pessimistic approach in which we get deadlock. Time stamping technique is a deadlock free. Optimistic concurrency control technique has some priority to other techniques because it accepts that not too many transactions will clashes .It is free from deadlock. In this study, an investigation has been led through questionnaire though and gets response from various organizations. The gathered information has been examined by using chi-square test. The result evaluated that mostly experienced persons are using time stamp technique due to its less waiting time. So Time stamp technique is better than other techniques. Several techniques indicated that there are various methods to control concurrency in databases. By comparing all concurrency control techniques it is found that time stamping is a better approach for transactions in terms of performance and response time.

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