

Advanced eBusiness Transactions for B2B-Collaborations

ACID Properties in Distributed Databases

Abstract

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A distributed database is a database that is under the control of a central database management system (DBMS) in which storage devices are not all attached to a common CPU. It may be stored in multiple computers located in the same physical location, or may be dispersed over a network of interconnected computers. There are 2 processes exist in distributed database, replication and duplication. Replication involves using specialized software that involves looking for changes in the distributive database. Once the changes have been identified, the replication process makes all the databases look the same. Duplication will identify one database as master and then duplicate it. Upon those processes, it seems data in database will be very consistent and will have no problem when some transaction is executed. But in fact, if there is no definition on transaction, the database will in a mess condition. So how does the database looks to be consistent and stable? Here ACID properties, which are a set of properties that guarantee the reliability of database transactions, will be introduced. In this paper, we make the case that transaction will cause fault in distributed database without ACID properties, it will raise the need of some methods for the transactions like timestamp, commit and recovery protocols, 2-phase commit, 2-phase locking and replication protocol to make the database in order. In addition, we will also see the failure situation and the recovery method when database meet a fault or error such as Crash faults, Omission faults and Timing faults. However, if the database is not a distributed database but heterogeneous database, ACID properties can also be applied by establishing the global data model or global external view.

List of contents:

- 1 Introduction
- 2 Transaction in distributed database
 - 2.1 Transaction concept
 - 2.2 ACID implementation
 - 2.2.1 Atomic
 - 2.2.2 Consistency
 - 2.2.3 Isolation
 - 2.2.4 Durability
- 3 Transaction failure and recovery
 - 3.1 Fault classifications
 - 3.2 Fault recovery
- 4 Transaction example
- 5 ACID in heterogeneous database
- 6 Conclusion

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