Paper Review: Granularity of Locks and Degrees of Consistency in a Shared Data Base

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In this paper, Gray et al. introduce two important considerations when developing and maintaining database systems: concurrency and consistency. These concepts are part of ACID properties that a usable and scalable data application must have. However, accessing the same database from different entry points can distort the information stored and result in inconsistency. Therefore, to address this problem, the authors suggest applying a varying level of lockable units and types of locks.

To ensure consistency, there are several design decisions to make in DBMS. Specifically, granularity of locks is the size of lockable unit, which is a portion of logical data level that is atomically preserved in each transaction of data. The design decision of granularity varies with the use of databases: First, X, exclusive locks, are widely used for writing as this type of locks limits sharing data. Second, S, shared locks, allows accessing data across different transactions, so S locks can found in reading. Additionally, Gray asserts that consistency is a function of concurrency, determined by the level of locks in place. On a scale of 0 to 3, we can classify the level of restrictiveness posed by locks, 0 being the most flexible and 3 being the most restrictive.

In conclusion, this paper's main contributions include its delineation of concurrency and consistency that comply with ACID, the main principle of database management systems, and suggestions on the implementation of locks depending on different usage. Considering concurrency and consistency, stakeholders can design a system that utilizes different locks applications to ensure consistency in running concurrent queries without causing any distortions in data.