

On Transactional Concurrency Control

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Goetz Graefe

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On Transactional Concurrency Control

Goetz Graefe

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ABSTRACT

This book contains a number of chapters on transactional database concurrency control. A two-sentence summary of the volume's entire sequence of chapters is this: traditional locking techniques can be improved in multiple dimensions, notably in lock scopes (sizes), lock modes (increment, decrement, and more), lock durations (late acquisition, early release), and lock acquisition sequence (to avoid deadlocks). Even if some of these improvements can be transferred to optimistic concurrency control, notably a fine granularity of concurrency control with serializable transaction isolation including phantom protection, pessimistic concurrency control is categorically superior to optimistic concurrency control, i.e., independent of application, workload, deployment, hardware, and software implementation.

KEYWORDS

concurrency, concurrency control, database, update, transaction, serializability, phantom protection, locking, index, b-tree, key-range locking, key-value locking, deadlock avoidance, lock acquisition sequence, pessimistic concurrency control, optimistic concurrency control, validation, timestamps, snapshot isolation, versioning, multi-version storage, write buffer, distributed systems, mirroring, replication, log shipping, two-phase commit, three-phase commit, controlled lock violation, deferred lock acquisition, deferred lock enforcement, weak lock enforcement, reserved locks, pending locks, orthogonal key-range locking, orthogonal key-value locking, partitioning

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