

MVCC (Multi-Version Concurrency Control)

Multiversion concurrency control (abbreviated MCC or MVCC), in the database field of computer science, is a concurrency control method commonly used by [database management systems](#) to provide concurrent access to the database and in programming languages to implement transactional memory.

MVCC provides each user connected to the database with a [snapshot](#) of the database for that person to work with. Any changes made will not be seen by other users of the database until the [transaction](#) has been [committed](#).

MVCC uses [timestamps](#) or increasing transaction IDs to achieve serializability. MVCC ensures a transaction never has to wait for a database object by maintaining several versions of an object. Each version would have a write timestamp and it would let a transaction (Ti) read the most recent version of an object which precedes the transaction timestamp (TS(Ti)).

If a transaction (Ti) wants to write to an object, and if there is another transaction (Tk), the timestamp of Ti must precede the timestamp of Tk (i.e., $TS(Ti) < TS(Tk)$) for the object write operation to succeed. Which is to say a write cannot complete if there are outstanding transactions with an earlier timestamp.

Every object would also have a read timestamp, and if a transaction Ti wanted to write to object P, and the timestamp of that transaction is earlier than the object's read timestamp ($TS(Ti) < RTS(P)$), the transaction Ti is aborted and restarted. Otherwise, Ti creates a new version of P and sets the read/write timestamps of P to the timestamp of the transaction TS(Ti).

The obvious drawback to this system is the cost of storing multiple versions of objects in the database. On the other hand reads are never blocked, which can be important for workloads mostly involving reading values from the database. MVCC is particularly adept at implementing true snapshot isolation, something which other methods of concurrency control frequently do either incompletely or with high performance costs.

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