

# ACID

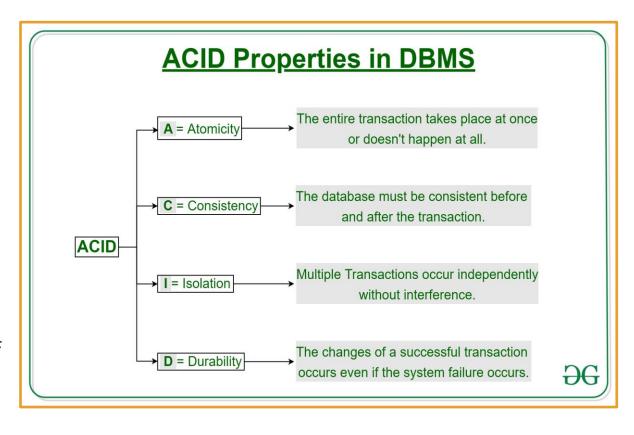
(Atomicity, Consistency, Isolation, Durability)

.NET

ACID (atomicity, consistency, isolation, durability) is a set of properties of database transactions intended to guarantee validity even in the event of errors or power failures.

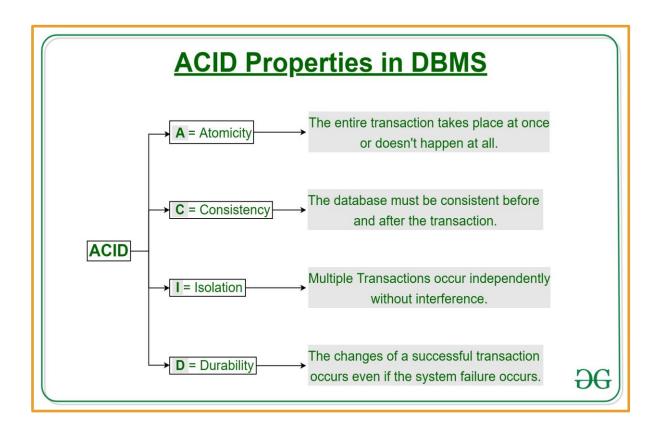
## ACID – Atomicity

- A *transaction* must execute exactly once and must be *atomic*.
- An *Atomic Transaction* is indivisible and irreducible. Either all operations occur, or none do.
- By performing only a subset of interdependent operations, the overall intent of a *transaction* would be compromised.
- Atomicity eliminates the chance of processing only a subset of operations.



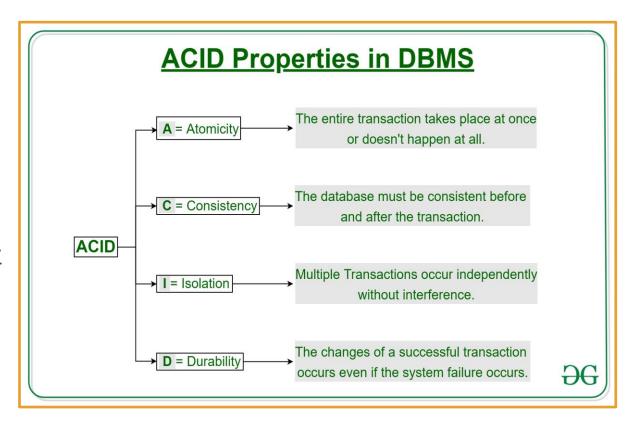
#### ACID – Consistency

- A transaction must transform data from one consistent state to another consistent state.
- The responsibility for maintaining consistency falls to the application developer.
- Referential Integrity must be maintained when transforming one consistent state of data into another consistent state of data.



#### ACID – Isolation

- A *transaction* must be completed in isolation.
- Concurrent Transactions should behave as if each were the only transaction running in the system.
- A high degree of *isolation* can limit the number of *concurrent* transactions.
- There are 5 levels of Isolation.



### ACID – Durability

- A *transaction* must have durability (be recoverable).
- If a *transaction 'commits'*, its updates will *persist* even if the system fails immediately after.
- Specialized logging allows the system's restart procedure to complete unfinished operations required by the *transaction*. This makes the *transaction durable*.

