



# SQL SERVER – ACID (Atomicity, Consistency, Isolation, Durability)

🕒 December 9, 2007   👤 Pinal Dave   📁 SQL   💬 71 Comments

**ACID** (an acronym for Atomicity, Consistency Isolation, Durability) is a concept that Database Professionals generally look for when evaluating databases and application architectures. For a reliable database all these four attributes should be achieved.

**Atomicity** is an all-or-none proposition.

**Consistency** guarantees that a transaction never leaves your database in a half-finished state.

**Isolation** keeps transactions separated from each other until they're finished.

**Durability** guarantees that the database will keep track of pending changes in such a way that the server can recover from an abnormal termination.

Above four rules are very important for any developers dealing with databases.

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## A - Atomicity

All or Nothing Transactions

## C - Consistency

Guarantees Committed Transaction State

## I - Isolation

Transactions are Independent

## D – Durability

Committed Data is Never Lost

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This is one of the most popular interview question and answer. Additionally, I strongly believe every database administrator should know the answer to this question. When you design a database which follows these properties as that will help you better develop applications for your business.

Andreas Reuter and Theo Härder created the acronym ACID in the year 1983 however Jim Gray had already defined these properties in the late 1970s. SQL Server, Oracle, MySQL, PostgreSQL are some of the databases which follow these properties.

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A - Atomicity	All or Nothing Transactions
C - Consistency	Guarantees Committed Transaction State
I - Isolation	Transactions are Independent
D - Durability	Committed Data is Never Lost

(c) <https://blog.sqlauthority.com>

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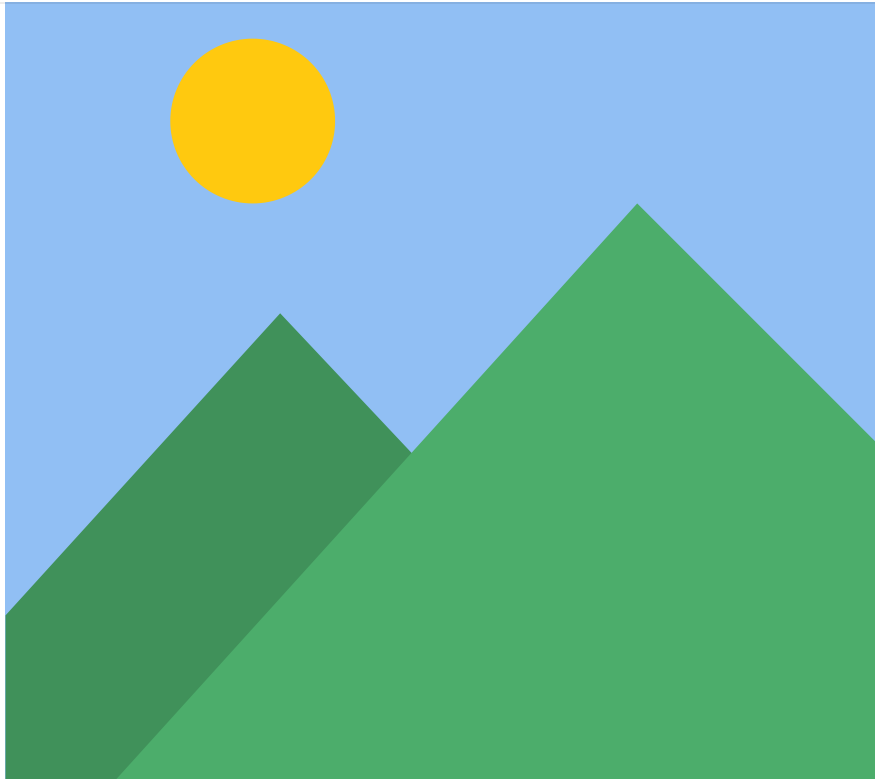
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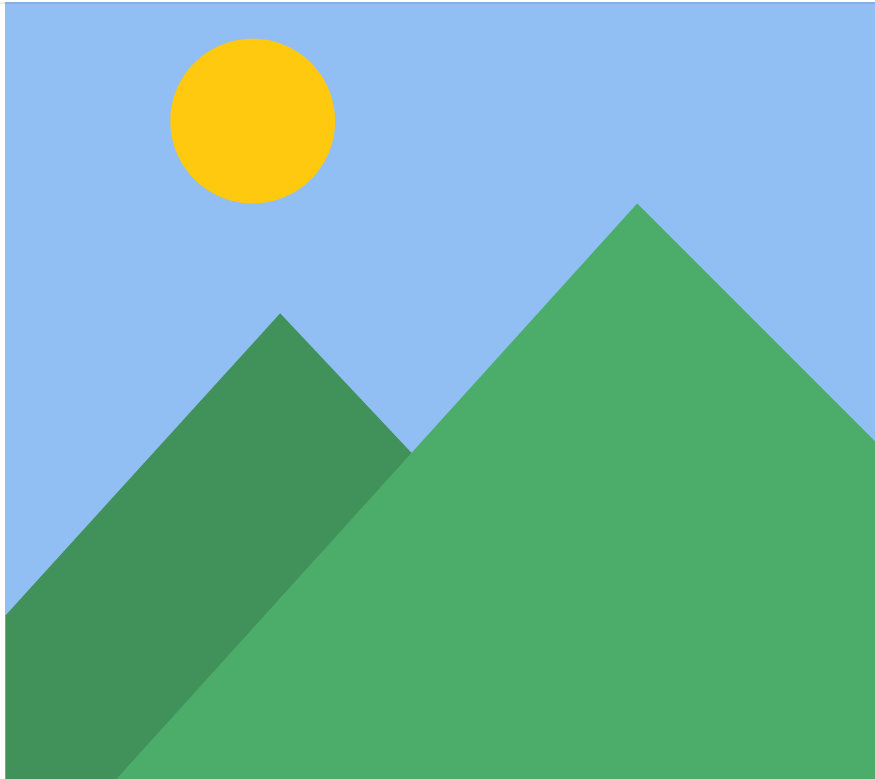


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**Rob**

October 10, 2017 6:59 pm

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Isolation level that you use?

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**Darren Woodford**

April 30, 2019 8:01 pm

You have stated "Consistency guarantees that a transaction never leaves your database in a half-finished state" whereas it is my understanding that Consistency guarantees that "data written to the database must be valid according to all defined rules, including constraints, cascades & triggers". See [https://en.wikipedia.org/wiki/Consistency\\_\(database\\_systems\)](https://en.wikipedia.org/wiki/Consistency_(database_systems)). Your definition is more a restatement of Atomicity.

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**Pinal Dave** is an SQL Server Performance Tuning Expert and independent consultant with a degree of Science degree and numerous database certifications.

Pinal has authored 12 SQL Server database books and 37 Pluralsight courses. To freely share his knowledge, Pinal has also written more than 5,500 database tech articles on his blog at [https://blog.sql](https://blog.sqlauthority.com)



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Pinal is an experienced and dedicated professional with a deep commitment to flawless customer service. If you need help with any **SQL Server Performance Tuning Issues**, please feel free to reach out at [pinal@sqlauthority.com](mailto:pinal@sqlauthority.com).

Pinal is also a **CrossFit Level 1 Trainer (CF-L1)** and **CrossFit Level 2 Trainer (CF-L2)**.

**Nupur Dave** is a social media enthusiast and an independent consultant. She primarily focuses on the database domain, helping clients build short and long term multi-channel campaigns to drive leads for their sales pipeline.

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