

# Weaker Isolation Levels

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- SQL allows the application to choose a **more efficient implementation**, which is **not always serializable**: **weak isolation levels**
- Isolation Level in SQL

## Isolation Levels in SQL

1. "Dirty reads"

```
SET TRANSACTION ISOLATION LEVEL READ UNCOMMITTED
```

2. "Committed reads"

```
SET TRANSACTION ISOLATION LEVEL READ COMMITTED
```

3. "Repeatable reads"

```
SET TRANSACTION ISOLATION LEVEL REPEATABLE READ
```

4. Serializable transactions

```
SET TRANSACTION ISOLATION LEVEL SERIALIZABLE
```

ACID

### o **Dirty read**

- { No READ locks will be fast when tries to read uncommit values.  
    Strict 2PL WRITE Locks (Long Duration)

- Possible Problem: **dirty and inconsistent reads**

### o **Read committed**

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- (Strict 2PL) Write lock Long duration
    - Read Lock (Only acquire while reading) ← Not 2PL, Short duration
  - Unrepeatable reads: when reading same element twice, may get two different values.
- Repeatable read
  - (Strict 2PL) { read lock  
write lock
  - not serializable → phantoms
- Serializable
  - = repeatable read + predicate locking  
(deal with phantoms)

## Beware!

In commercial DBMSs:

- Default level may not be serializable
- Default level differs between DBMSs
- Some engines support subset of levels!
- Also, some DBMSs do NOT use locking and different isolation levels can lead to different pbs

**Bottom line: Read the doc for your DBMS!**

- SQLite lock types

- Read lock (to read)
- Reserved lock (to write)
- Pending lock (wants to commit)
- Exclusive lock (to commit)