





Complete Guide to MySQL Database

# Transaction Control Language (TCL) =

## **Master MySQL Transaction Management**

# Transaction Fundamentals

# ACID Properties

ACID adalah fondasi dari sistem database yang reliable:

- Atomicity (Atomisitas) All or nothing principle
- Consistency (Konsistensi) Data integrity maintained
- Isolation (Isolasi) Concurrent transactions don't interfere
- Durability (Durabilitas) Changes survive system failures

#### **ACID Properties**



Contoh ACID dalam kehidupan nyata:

#### Transfer Bank (Atomicity):

- Debit dari rekening A:
- Credit ke rekening B:
- Jika salah satu gagal → ROLLBACK semua

#### Consistency:

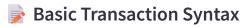
• Total uang sebelum = Total uang sesudah

#### **Isolation:**

• Transfer A tidak melihat transfer B yang belum selesai

#### **Durability:**

• Setelah COMMIT, data tersimpan permanen



#### **Basic Transaction Structure:**

```
-- Start transaction
START TRANSACTION;
-- atau
BEGIN;

-- Your SQL operations
UPDATE accounts SET balance = balance - 1000
WHERE account_id = 1;

UPDATE accounts SET balance = balance + 1000
WHERE account_id = 2;

-- Commit changes
COMMIT;

-- Or rollback if error
-- ROLLBACK;
```

#### **Transaction with Error Handling:**

```
-- Start transaction with error handling
START TRANSACTION;

-- Check if sufficient balance
SELECT balance FROM accounts
WHERE account_id = 1 AND balance >= 1000;

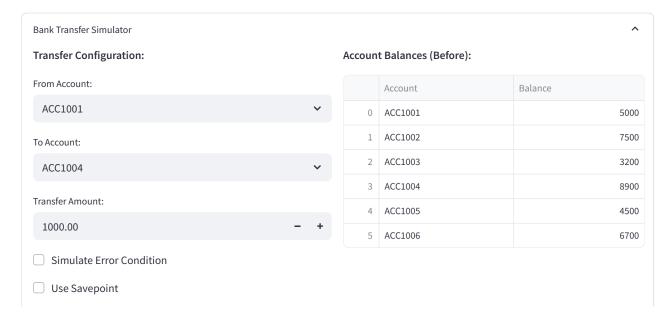
-- If balance sufficient, proceed
UPDATE accounts SET balance = balance - 1000
WHERE account_id = 1;

UPDATE accounts SET balance = balance + 1000
WHERE account_id = 2;

-- Commit if all operations successful
COMMIT;

-- Rollback on any error
-- ROLLBACK;
```

## Interactive Transaction Demo



Execute Transfer