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***COURSE:DATA BASE MANAGEMENT
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Gift Coupon Application Using MySQL

A detailed use case on ACID compliance, scalability, and normalization



Introduction

- A Gift Coupon Application is a digital platform enabling users to receive and redeem coupons.
- It ensures data integrity and transaction safety using a relational database system (MySQL).



Objective

- • Design a relational database for managing gift coupons.
- • Maintain ACID properties during all transactions.
- • Prevent deadlocks and ensure data normalization up to 3NF.
- • Achieve horizontal scalability using MySQL clustering.

System Overview

- • User Interface: Customers view and redeem coupons.
- • Application Server: Handles business logic and API requests.
- • MySQL Database: Stores user, coupon, and transaction data.
- • MySQL Cluster: Provides scalability and fault tolerance.

Why MySQL (Relational DB)

- • Supports ACID transactions.
- • Ensures strong consistency, unlike NoSQL systems.
- • Offers replication and clustering for scalability.
- • Well-suited for handling large volumes of transactional data.


ACID Properties

- • Atomicity: All or none of a transaction is executed.
- • Consistency: Database moves from one valid state to another.
- • Isolation: Transactions execute independently.
- • Durability: Committed transactions survive system failures.

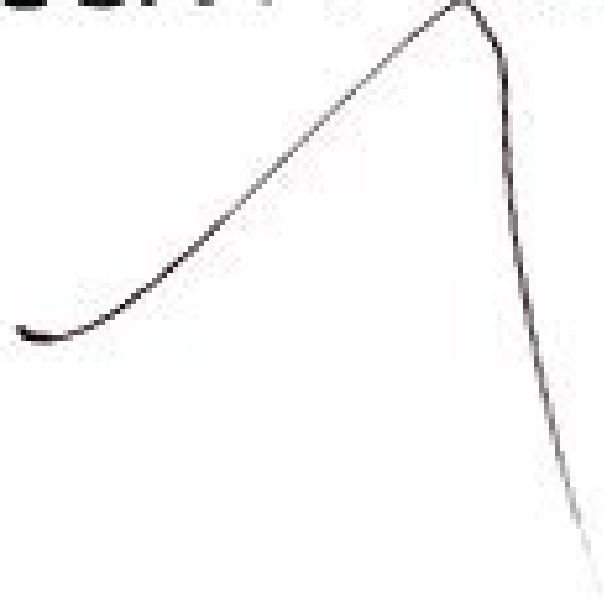
Database Design

- Tables: Customer, Coupon, Transaction
- Relationships: Customer \leftrightarrow Transaction \leftrightarrow Coupon
- Normalization: Up to 3NF to remove redundancy. ✓

Example SQL Schema


- CREATE TABLE Customer (...);
 - CREATE TABLE Coupon (...);
 - CREATE TABLE Transaction (...);
 - All tables linked using Foreign Keys for referential integrity.
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Transaction & Deadlock Management

- • MySQL InnoDB engine ensures row-level locking.
 - • Deadlocks avoided using consistent query ordering.
 - • COMMIT and ROLLBACK maintain atomic operations.
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Horizontal Scalability in MySQL Cluster

- • MySQL Cluster distributes data across nodes.
 - • Enables horizontal scaling for high read/write throughput.
 - • Provides replication and fault tolerance.
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Conclusion

- The Gift Coupon Application using MySQL ensures reliability, scalability, and integrity.
 - Normalized schema and ACID compliance enable consistent transactions.
 - MySQL Cluster enhances performance under heavy load.
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