Experiment 26:

Data Replication Techniques

Synchronous Replication

- Data is copied to the replica immediately after a write operation.
- Ensures strong consistency but may introduce latency.
- Used in high-availability systems where data integrity is critical.

Asynchronous Replication

- Data is copied after the write operation completes.
- Improves performance but may lead to data loss in case of failure.
- Suitable for disaster recovery and distributed systems.

Near-Real-Time Replication

- A middle-ground between synchronous and asynchronous replication.
- Replication occurs within a short delay after changes are made.
- Used in eventual consistency systems like NoSQL databases.

Snapshot Replication

- Periodic snapshots of the database are replicated to another server.
- Efficient for read-heavy workloads but not ideal for frequent updates.
- Used in data warehousing and backup systems.

Transactional Replication

- Only committed transactions are replicated.
- Provides real-time, consistent copies of data.
- Common in financial applications that require high consistency.

Merge Replication

- Data changes from multiple sources are combined into a single replica.
- Useful in mobile applications and distributed environments.
- Requires conflict resolution strategies.

Peer-to-Peer Replication

- All nodes in the network maintain a full copy of the data.
- Ensures high availability and load balancing.
- Used in blockchain and distributed databases.

Log-Based Replication

- Replicates changes based on database logs (e.g., binlogs in MySQL).
- Efficient for incremental updates and streaming replication.
- Used in real-time analytics and event-driven systems.