

Introduction to Consistency Models

Understanding Consistency Models in NoSQL Databases

DEFINITION

Consistency models define how data is synchronized across distributed systems. They determine the visibility of updates to users and applications.

KEY CONCEPTS

Strong Consistency

All users see the same data at the same time, ensuring immediate visibility of updates.

Eventual Consistency

Updates will propagate through the system eventually, but users may see stale data temporarily.

Causal Consistency

Operations that are causally related are seen by all users in the same order.

Read Your Writes

A user will always see their own updates immediately after they are made.

Linearizability

A stronger form of consistency where operations appear to occur instantaneously at some point in time.

EXAMPLES

- A bank transaction shows the updated balance immediately to the user.
- A social media post may take time to appear on all users' feeds.
- Collaborative editing tools show changes made by a user instantly to them but may delay for others.

MEMORY TIPS

- ★ Think 'Strong = Same Time' for strong consistency.
- ★ Remember 'Eventually = Later' for eventual consistency.
- ★ Use 'Causal = Cause and Effect' to recall causal consistency.

COMMON MISTAKES

- ✗ Confusing strong consistency with eventual consistency.
- ✗ Assuming all NoSQL databases use the same consistency model.
- ✗ Overlooking the importance of consistency in application design.

QUICK RECAP

Consistency models are crucial for understanding how data is managed in NoSQL databases. They dictate how updates are seen by users and applications, ranging from immediate visibility to eventual updates.