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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 data updates to users and applications.

KEY CONCEPTS

Strong Consistency

All users see the same data at the same time after an update.

Eventual Consistency

Data will eventually become consistent, 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

Users can always read their own writes immediately after they are made.

Linearizability

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

EXAMPLES

→ A bank transaction showing updated balance immediately to the user.

→ A social media post that may take time to appear on all users' feeds.

→ A collaborative document where changes are seen in real-time by all users.

MEMORY TIPS

★ Think 'Strong = Same' for strong consistency.

★ Remember 'Eventual = Eventually Consistent' for eventual consistency.

★ Use 'Causal = Cause and Effect' to recall causal consistency.

COMMON MISTAKES

✗ Confusing eventual consistency with strong consistency.

✗ Assuming all NoSQL databases use the same consistency model.

✗ Neglecting the impact of consistency on application performance.

QUICK RECAP

Consistency models are crucial for understanding data synchronization in NoSQL databases. They range from strong consistency, where all users see the same data, to eventual consistency, where data may be temporarily stale. Knowing these models helps in designing effective distributed systems.