Task 1: "How Do Big Systems Store Data?"

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Search: Do apps like Instagram, Uber, or Amazon use SQL databases or something else?

Instagram

- Databases Used: Primarily PostgreSQL (SQL) and Cassandra (NoSQL).
- Use Cases:
  - PostgreSQL: Handles structured data such as user profiles, relationships, and transactional information.
  - Cassandra: Manages large volumes of unstructured data like photos, comments, and activity feeds, benefiting from its horizontal scalability.
- Rationale: Combining relational and non-relational databases allows Instagram to efficiently manage both structured and unstructured data, ensuring scalability and performance

Uber

- Databases Used: MySQL (SQL) for transactional data and Google Cloud Spanner (SQL with NoSQL features) for global consistency.
- Use Cases:
  - MySQL: Manages core transactional data like ride requests, driver information, and payments.
  - Google Cloud Spanner: Provides global consistency and scalability for distributed systems.
- Rationale: Uber's architecture leverages the strengths of traditional SQL databases for transactional integrity and modern distributed databases for scalability and global consistency.

Amazon

- Databases Used: Amazon DynamoDB (NoSQL) and Amazon RDS (supports various SQL engines).
- Use Cases:
  - DynamoDB: Handles high-throughput operations like shopping cart data and real-time analytics.
  - Amazon RDS: Manages structured data requiring relational integrity.
- Rationale: Amazon employs a mix of NoSQL and SQL databases to balance performance, scalability, and data consistency across its vast ecosystem.

Summarize the kind of database structure big companies use and why.

SQL vs. NoSQL in Large Applications

SQL Databases: Preferred for structured data and complex queries, offering ACID compliance and strong consistency.

NoSQL Databases: Chosen for their flexibility, scalability, and performance in handling unstructured or semi-structured data, especially in distributed systems.

Many large applications adopt a hybrid approach, leveraging the strengths of both SQL and NoSQL databases to optimize performance and scalability.

Try to find one that uses SQL Server specifically:;

While tech giants like Instagram, Uber, and Amazon primarily use open-source or custom-built database solutions, several major companies rely on Microsoft SQL Server for their database needs:

Morgan Stanley: A leading global financial services firm utilizing SQL Server for its robust data management capabilities.Span Global Services

John Deere: An American corporation in the agricultural and construction machinery sector, employing SQL Server for its enterprise applications.Span Global Services

JP Morgan Chase: A multinational investment bank and financial services company using SQL Server to manage vast amounts of financial data. Span Global Services

Task 2: "Do Video Games Use Databases?"

Real-Time Data: Stored in server RAM for performance.
Persistent Data: Saved to databases at intervals or upon specific events.
Database Choices:
SQL: Used for structured data requiring complex queries and relationships.
NoSQL: Employed for unstructured data and scenarios requiring high scalability.
Example: NCSoft uses relational databases for managing persistent game data.
Understanding the balance between in-memory storage for performance and database storage for persistence is crucial in online game development.

Task 3: "Can a Database Work Without the Internet?"

Offline SQL databases can be incredibly useful in various scenarios. Here are some common use cases:
Local Development and Testing: Developers often use offline databases to test applications locally without needing an internet connection. This ensures that changes can be made and tested in a controlled environment.
Data Analysis: Offline databases are useful for performing data analysis on large datasets without the need for constant access to a live server. This can be particularly beneficial for tasks that require significant computational resources.
Backup and Recovery: Offline databases are essential for creating backups and performing recovery operations. They allow administrators to restore data without affecting the live database.

Maintenance Tasks: Offline databases can be used for maintenance tasks such as index rebuilding, schema changes, and other operations that might disrupt normal database operations

Mobile and Remote Applications: Applications that need to function in areas with limited or no internet connectivity can benefit from offline databases. This is common in mobile apps and remote field applications

Disaster Recovery: Offline databases can be part of a disaster recovery plan, ensuring that data is safe and can be restored in case of a system failure

Offline Database Use Cases
Military Bases: Use secure, robust databases like SQL Server or Oracle for logistics and personnel management without internet.
Airplanes: Use specialized databases like SQLite for flight management and in-flight systems.
SQL Server Offline
Capabilities: SQL Server can run without an internet connection, suitable for secure or remote environments.