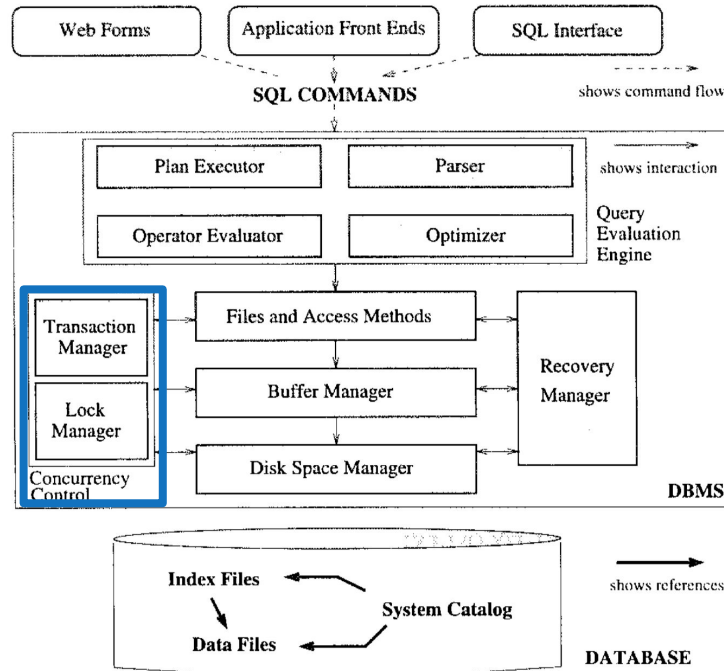# The Case for Decoupled Transaction Managers (Lightning Talk)

Hiroyuki Yamada, Toshihiro Suzuki, Vincent Guilpain,
Mitsunori Komatsu, Akihiro Okuno, Jun Nemoto
Scalar, Inc.

Transaction Manager

- A transaction manager is one of the main components in a DBMS.
  - It is usually coupled with other components for better performance.

The figure is from "R. Ramakrishnan, J. Gehrke, Database Management Systems."

Decouple a Transaction Manager from a DMBS

- Let's think about decoupling a transaction manager from a DBMS.
 - Deuteronomy [CIDR'11], Cherry Garcia [ICDE'15]
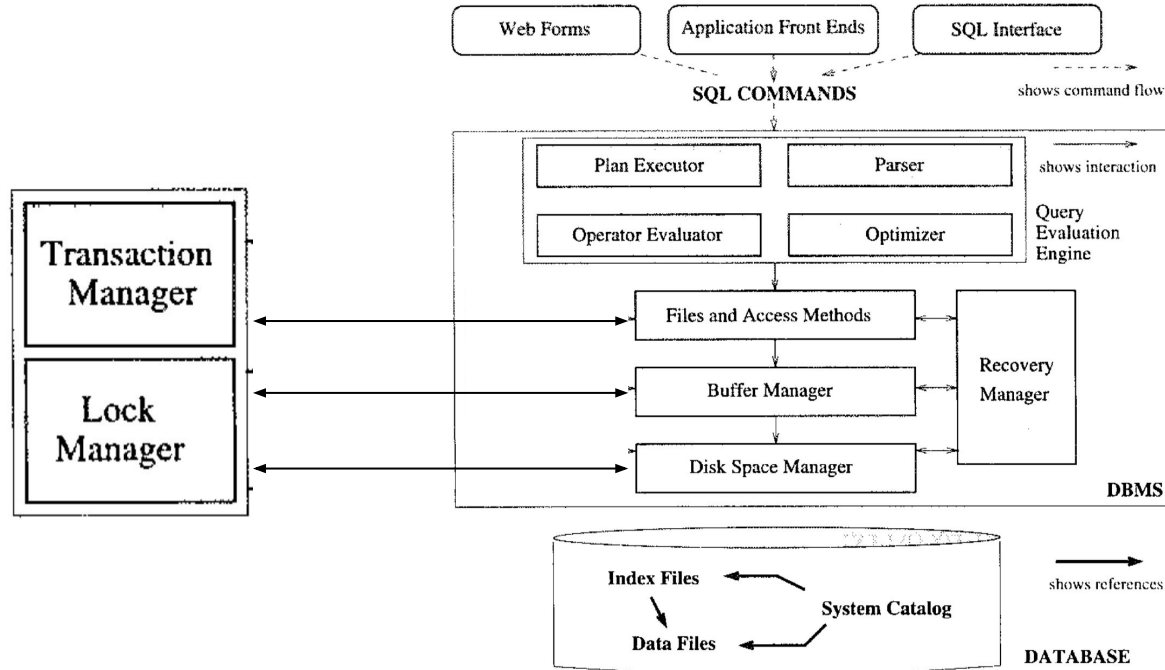
Benefits of Decoupling a Transaction Manager

- Transaction managers can be reused.
    - We can avoid creating a different transaction manager in every DBMS.
- Transaction managers can do *global transactions* across multiple databases.
    - It is not easily achievable without decoupling a transaction manager.

Transaction
Manager

Global transactions
with ACID

PostgreSQL

DynamoDB
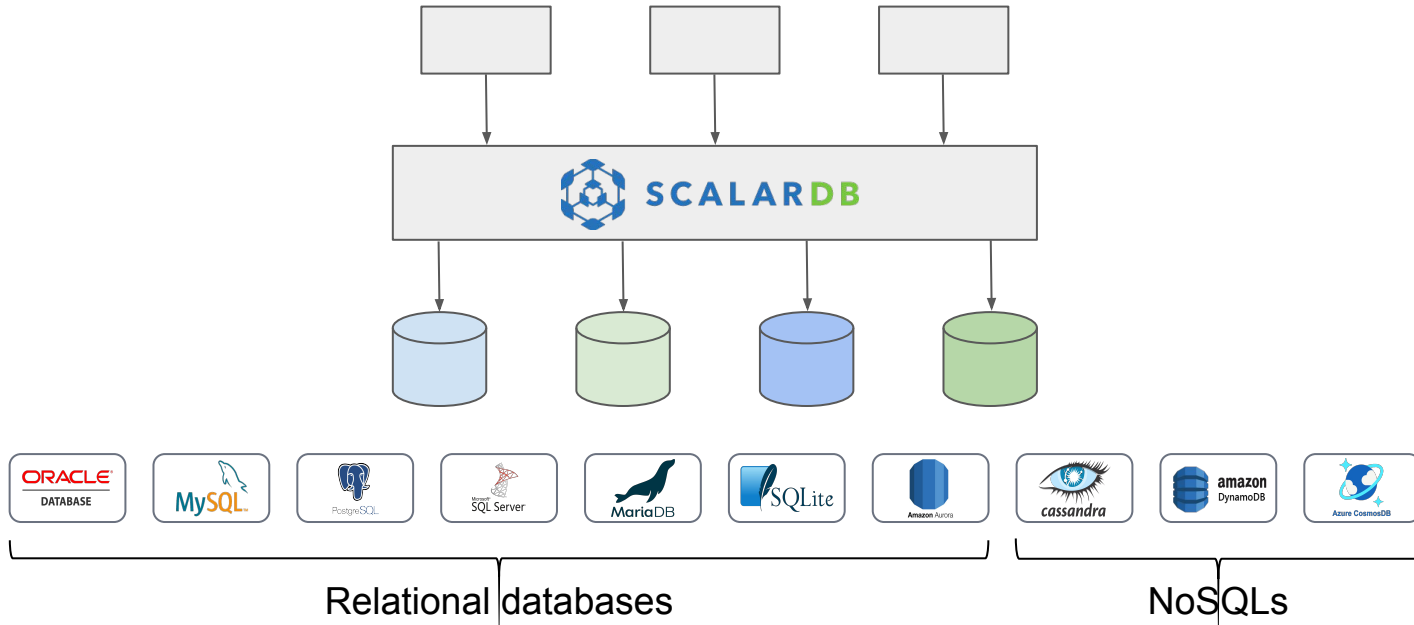
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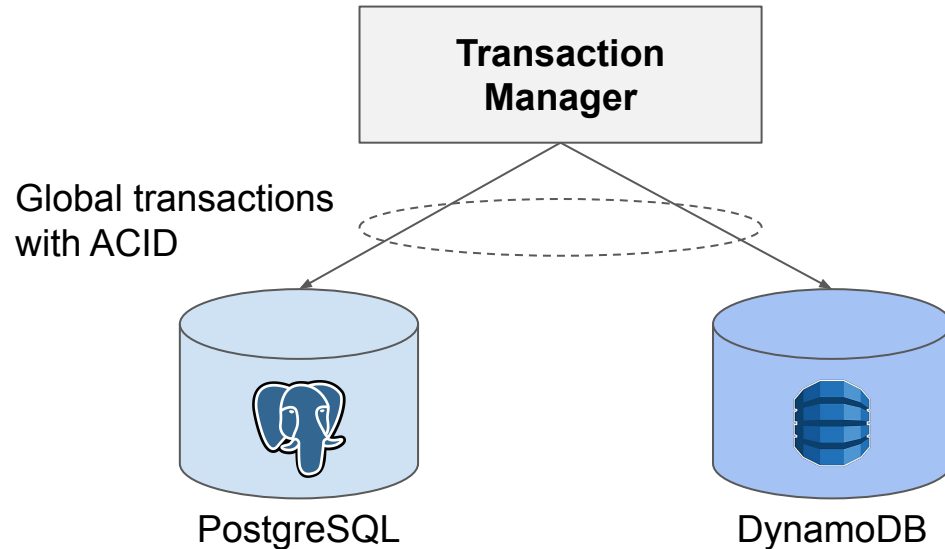
Use Cases of Global Transactions

- Utilize the best of multiple purpose-built databases.
  - E.g., 10+ purpose-built database products in AWS
- Manage separated databases in microservices.
- Manage siloed databases in large enterprises.
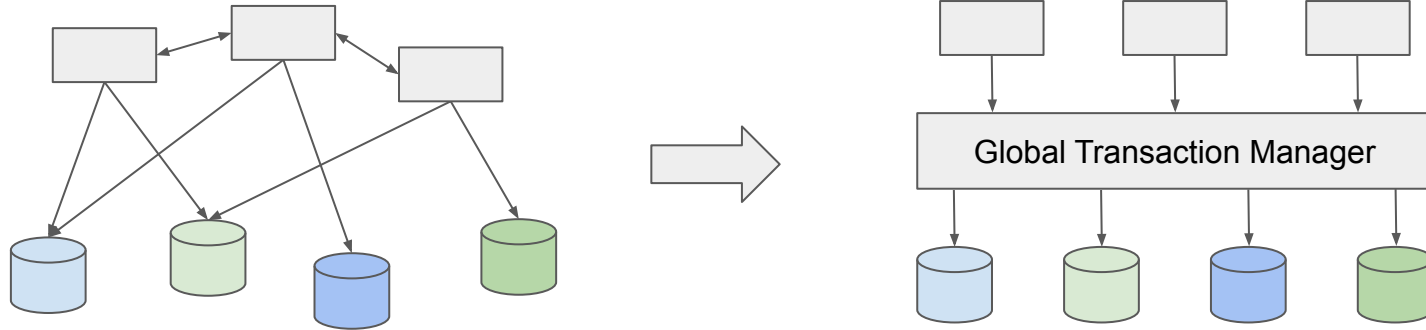
Global transactions could simplify the complexity of managing multiple databases.
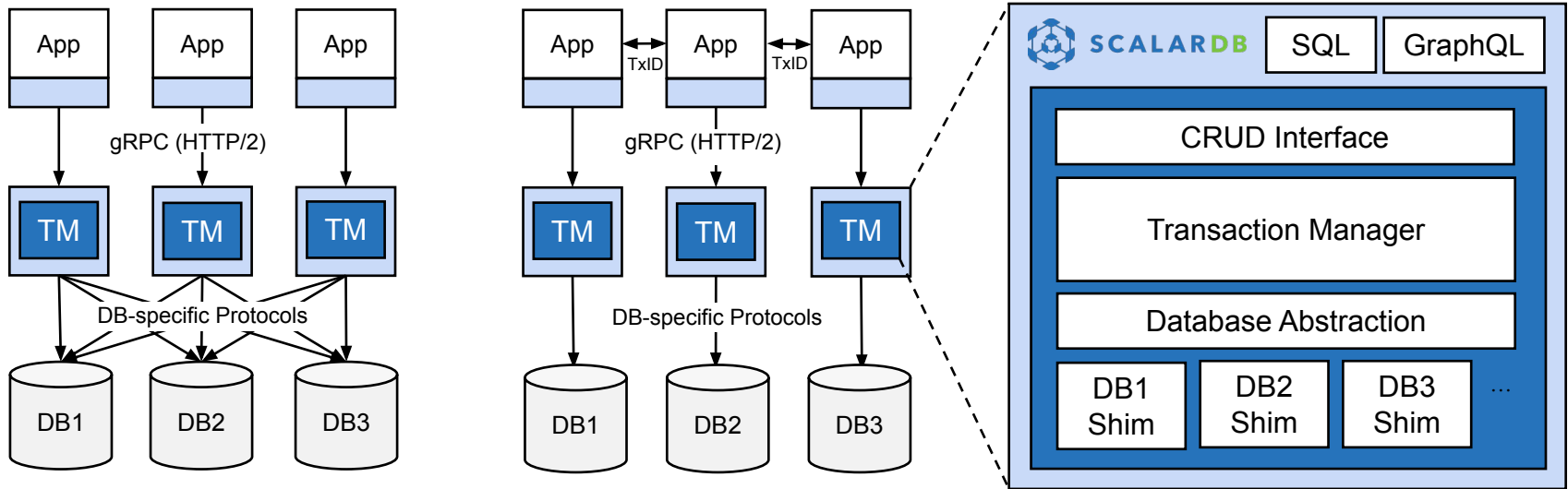
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Case Study: ScalarDB

- A universal transaction manager for polystores.
- Achieves global transactions across multiple disparate databases.
- Supports various kinds of databases, such as RDBs and NoSQLs.

Relational databases   NoSQLs

ScalarDB Architecture

- ScalarDB abstracts underlying databases with its own abstraction.
- Abstraction requires each underlying database to provide minimal capabilities.
  - E.g., linearizable read/write on a single record, durability of written database records.

Summary

- Decoupling a transaction manager enables global transactions naturally.
- Global transactions could simplify recent complex data architecture drastically.
- ScalarDB is a universal transaction manager that achieves global transactions.
- We will present our paper about ScalarDB in the main conference. (Please come to Session A6 on Thursday!)
  - ScalarDB is based on several research works and extended to provide a strong correctness guarantee (i.e., strict serializability), further performance optimizations, and several critical mechanisms for productization.

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