

Atomic Multi-database Transaction of WAL Journaling Mode in SQLite

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Abstract—This work is to propose a solution for multi-database atomicity problem of WAL journaling mode in SQLite. SQLite is the most widely deployed and used DBMS in mobile system. SQLite has several journaling modes. WAL (Write-Ahead Logging) is the one of those journaling modes included from version 3.7.0. WAL is significantly faster in most scenarios and provides more concurrency as reading and writing can proceed concurrently. However, transactions that involve changes with multiple attached databases do not guarantee atomicity across all databases as a set. We modify transaction and recovery procedure of WAL to solve this problem. This work consists of three parts: (i) Enabling Use of Master Journal for WAL. (ii) Creation of ‘mj-stored’ File in Multi-Database Transaction. (iii) Rollback with ‘mj-stored’ File. In multi-database transaction, we create ‘mj-stored’ file for each WAL file to save the state before the transaction begins and the master journal file name. If crash occurs during the transaction, database with WAL journaling mode try to find the ‘mj-stored’ file and corresponding master journal file to roll back to the state before the transaction began in recovery time. With this solution, multi-database transaction with WAL journaling mode can guarantee atomicity.

Keyword— Atomicity, Database, Multi-database, SQLite, Write-Ahead Logging



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