Abstract

Replication is used by databases to implement reliability and provide scalability. However, achieving transparent replication is not an easy task. A replicated database is transparent if it can seamlessly replace a standard stand-alone database without requiring any changes to the components of the system. Database replication transparency can be achieved if: (a) replication protocols remain hidden for all other components of the system; and (b) the functionality of a stand-alone database is provided.

The ability to simultaneously execute transactions under different isolation levels is a functionality offered by all stand-alone databases but not by their replicated counterparts. Allowing different isolation levels may improve overall system performance. For example, the TPC-C benchmark specification tolerates execution of some transactions at weaker isolation levels in order to increase throughput of committed transactions. In this thesis, we show how replication protocols can be extended to enable transactions to be executed under different isolation levels.