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The adaptive serializable snapshot isolation protocol for managing database transactions

Yang Yang
University of Wollongong

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The Adaptive Serializable Snapshot Isolation Protocol for Managing Database Transactions

A thesis submitted in fulfillment of the requirements for the award of the degree

Master of Computer Science by Research

from

UNIVERSITY OF WOLLONGONG

by

Yang Yang

Computer Science Department
February 2007
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by

Yang Yang

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Dedicated to

My parents
Declaration

This is to certify that the work reported in this thesis was done by the author, unless specified otherwise, and that no part of it has been submitted in a thesis to any other university or similar institution.

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Yang Yang
February 15, 2007
In this thesis, concept of database concurrency control, computational models of database transaction, the correct criterias of concurrent execution of transactions and concurrency control algorithms such as two phase locking, serialization graph testing, Snapshot Isolation are reviewed. A graph based mechanism is proposed for preserving Snapshot Isolation protocol(SI) serializable at run-time. Firstly, we present Dynamic Managed Snapshot Isolation Serialization Graph(called DSISG). By using this mechanism, non-serializable transactions under Snapshot Isolation protocol can be detected at run-time. Secondly, in order to guarantee the effectivity of DSISG, a new model of database transaction(segmented transaction model) is proposed. Thirdly, an algorithm of managing a hierarchical structured acyclic graph is presented. The run-time characterzing of non-serializable transaction under Snapshot Isolation protocol will be more efficient when this hierachical graph structure is applied to DSISG. We also summarize the contributions of this thesis and formulate some open problems.
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