Universität Zürich
Institut für Informatik

Binzmühlestr. 14
CH-8050 Zürich
Schweiz
Tel. +41 044 635 43 33
Fax +41 044 635 68 09
boehlen@ifi.uzh.ch
www.ifi.uzh.ch/dbtg

Prof. Dr. Michael Böhlen
Database Technology

Informatikvertiefung

Robert Dewor
Rütschistrasse 27
CH-8037 Zürich

Matrikelnummer: 08-715-922
email: rdewor@gmx.net

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Topic: Analysis of Snapshot Isolation and approaches to make it serializable

In a database management system (DBMS), concurrency control techniques are used to ensure noninterference resp. isolation of concurrently executing transactions. Those techniques use protocols (set of rules) to guarantee certain properties such as serializability.

Besides concurrency control techniques which use only one version of a data item (e.g. two-phase locking), there are multiversion concurrency control (MVCC) protocols that maintain multiple versions of a data item. MVCC protocols such as Snapshot Isolation (SI) keep old values of a data item when the item is updated. When a transaction requires access to a data item, an appropriate item version is chosen. SI is widely used and offered by many DBMSs. But SI allows non-serializable executions that can lead to data consistency violations.

Within the scope of the proposed work, Snapshot Isolation (SI) as well as approaches to make SI serializable shall be analyzed.

Tasks:

- Literature research on Snapshot Isolation and approaches to make SI serializable [1, 2, 3].
- Write a report of 10-15 pages that includes the following points:
  - Explanation of SI (operating mode, examples, limitations, anomalies)
  - Explanation of the approaches to make SI serializable presented in [1, 2] (operating mode, examples etc.)
- Presentation of results (15 minutes)
- Oral exam - content: Multiuser synchronization, SI, approaches for making SI serializable presented in [1, 2]

Literatur

[1] M. J. Cahill, U. Röhm, and A. D. Fekete. Serializable isolation for snapshot databases. In *SIGMOD '08: Proceedings of the 2008 ACM SIGMOD inter-*

national conference on Management of data, pages 729–738, New York, NY, USA, 2008. ACM.

[2] A. Fekete, D. Liarokapis, E. O'Neil, P. O'Neil, and D. Shasha. Making snapshot isolation serializable. *ACM Trans. Database Syst.*, 30(2):492–528, 2005.

[3] G. Weikum and G. Vossen. *Transactional Information Systems: Theory, Algorithms, and the Practice of Concurrency Control and Recovery.* Morgan Kaufmann, 2002.

Task assignment and Supervisor:

- Christian Tilgner

Starting date: 24.01.2011

Ending date: 23.07.2011

Department of Informatics, University of Zurich

Prof. Dr. Michael Böhlen