Transaction Processing

Thomas Leich, Gunter Saake

University of Magdeburg
Institute of Technical and Business Information Systems

Last updated: 18.10.2019
Overview

1. Motivation
2. Transaction models
3. Transaction management
4. Advanced transaction models
5. Recovery and back-up
6. Distributed transactions
7. Replication
Required basic knowledge

Databases I:

- Basic principles of database systems
- Tables, attributes, keys
- Relational algebra and SQL
Organization

- Lecturer: Thomas Leich
- Information (Timings, Room) & Slide copies can be found at http://www.dbse.ovgu.de/Lehre/Lehrveranstaltungen/Transaction+Processing.html
- Lecture: Friday, 15:00 - 17:00 Room: G22 - H2
- Exercise:
  - Exercise conductor: Sabine Wehnert
  - Exercise (voluntary):
    - G16 - 215, Monday 11:00–13:00 (Begins: 28.10.2019)
    - Room t.b.a. Thursday 11:00–13:00 (Begins: 7.11.2019)
- Examination:
  - Oral exam (If less than 35 participants)
  - Requirement: Registration for exercise
- For feedback and questions:
  - Room: G29-105 (on appointment)
Underlying Textbook I

Edition 3, mitp, 2011
644 Pages, 39,95 €
Chapters 8, 9, 10
Rahm, E.; Saake, G.; Sattler, K. Verteiltes und Paralleles Datenmanagement. Von verteilten Datenbanken zu Big Data und Cloud
379 Pages
Chapters 11–15
Available as download!
For Database Implementation


For Transaction Processing:

1. Introduction

Roles of Transactions
1. Introduction

1. Roles of Transactions

2. Transactions in the Architecture of a DBMS
Nine capabilities of a DBMS by Codd

1. Integration
2. Operations
3. Catalog
4. Views
5. **Consistency Control**
6. Data Protection
7. **Transactions**
8. Synchronization
9. Recovery
Transaction properties

A transaction is a sequence of operations (actions), which transfers a database from a consistent state into another eventually changed consistent state, applying the ACID properties.

- Aspects:
  - Semantic integrity: Correct (consistent) database state after the end of transactions
  - Run-time integrity: Avoid errors caused by simultaneous access of several users to the same data