

Architecture and Implementation of Database Systems

Summer 2013

Torsten Grust
Wilhelm-Schickard-Institut für Informatik
Universität Tübingen



Introduction

Torsten Grust



Architecture of a
DBMS

Organizational
Matters

Chapter 1

Introduction

Preliminaries and Organizational Matters

Architecture and Implementation of Database Systems

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Welcome all ...

...to this course whose lectures are primarily about digging in the mud of database system internals.

- While others talk about SQL and graphical query interfaces, we will
 - 1 learn how DBMSs can **access files on hard disks without paying too much for I/O traffic**,
 - 2 see how to **organize data on disk** and which kind of **“maps” for huge amounts of data** we can use to avoid to get lost,
 - 3 assess what it means to **sort/combine/filter data volumes that exceed main memory size** by far, and
 - 4 learn **how user queries are represented and executed** inside the database kernel.



Architecture of a DBMS / Course Outline

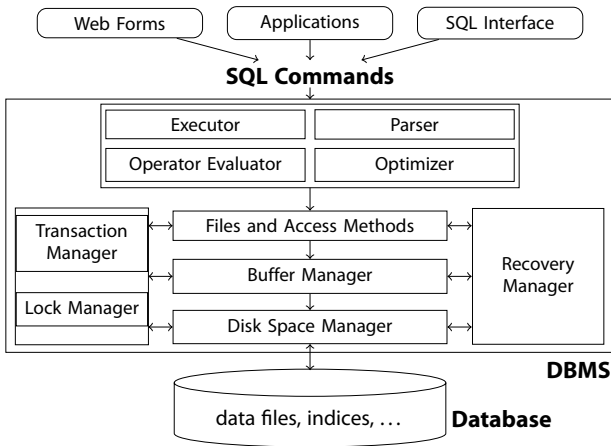


Figure inspired by Ramakrishnan/Gehrke: "Database Management Systems", McGraw-Hill 2003.

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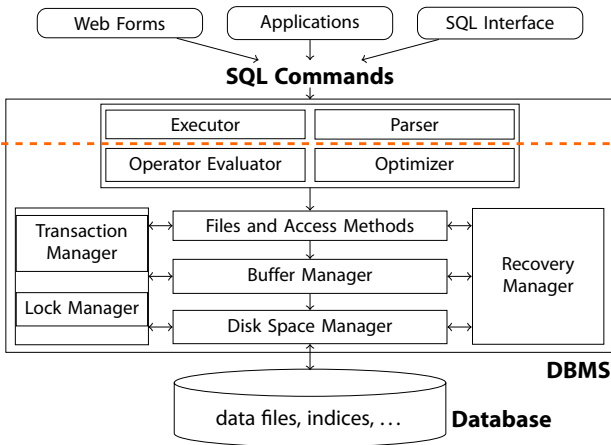


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this course

A Few Words About Myself

Introduction

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Torsten Grust

Originally from Hannover

1989–1994 Student of Computer Science @ TU Clausthal

1994–2004 Database Research @ U Konstanz

1999 Promotion

2000 Visiting Scientist @ IBM, Silicon Valley Lab,
DB2 Everyplace Development

2004 Habilitation

2004–2005 Professor @ TU Clausthal

2005–2008 Professor @ TU München

since 9/2008 Professor @ U Tübingen

Web home `db.inf.uni-tuebingen.de`

Coordinates B318, Sand 13

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Organizational Matters

Lectures

When	Where
Mondays, 14:15–15:45	Sand 6/7, gr. Hörsaal
Tuesdays, 10:15–11:45	Sand 6/7, gr. Hörsaal

db.inf.uni-tuebingen.de/teaching/ss13/db2

Please visit regularly — we will post slides and course updates.

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Exercises (Alex Ulrich)

When	Where
Thursdays, 14:15–15:45 (starts April 25, 2013)	Sand 6/7, gr. Hörsaal

In-depth discussion of course topics, exercise sheets, plus occasional additional material. **Please register with CIS.**

Examination

- **Written exam** to be held on **Monday, July 22, 2013** (this is the regular lecture slot).
- You will be allowed to bring **1 (one) hand-written double-sided piece of A4 paper** with notes.
- Further details will be posted.

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Reading Material

- Raghu Ramakrishnan and Johannes Gehrke.
Database Management Systems. McGraw-Hill.
- Alfons Kemper and André Eickler.
Datenbanksysteme: Eine Einführung. Oldenbourg Verlag.
- Dennis Shasha and Philippe Bonet.
Database Tuning. Morgan Kaufmann Publishers.
- ... in fact, any book about advanced database topics and internals will do — pick your favorite.

Here and there, pointers (↗) to specific research papers will be given and you are welcome to search for additional background reading. Use *Google Scholar* or similar search engines.

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These Slides...

- ...prepared/updated throughout the semester — **watch out for bugs** and please let me know. Thanks.
- Posted to course web home on the day before the lecture — **bring a printout and take notes.**

Example

Open Issues/Questions

Take notes.

Code Snippets, Algorithms

DB2. IBM DB2 Specifics

If possible and insightful, discuss how IBM DB2 does things.



PostgreSQL Specifics

Ditto, but related to the glorious PostgreSQL system.

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Before We Begin

Questions?
Comments?
Suggestions?

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