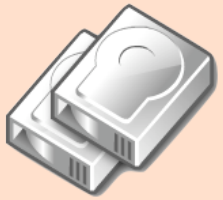


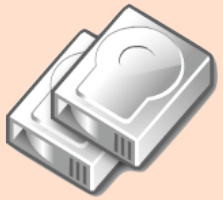
Architecture of a DBMS

Organizational Matters

Architecture and Implementation of Database Systems

Summer 2016

Torsten Grust
Wilhelm-Schickard-Institut für Informatik
Universität Tübingen



Architecture of a DBMS

Organizational Matters

Chapter 1
Introduction
Preliminaries and Organizational Matters

Architecture and Implementation of Database Systems
Summer 2016

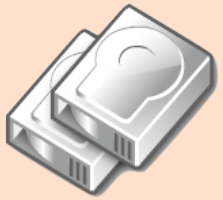
Torsten Grust
Wilhelm-Schickard-Institut für Informatik
Universität Tübingen

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 secondary memory 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.



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Architecture of a DBMS / Course Outline

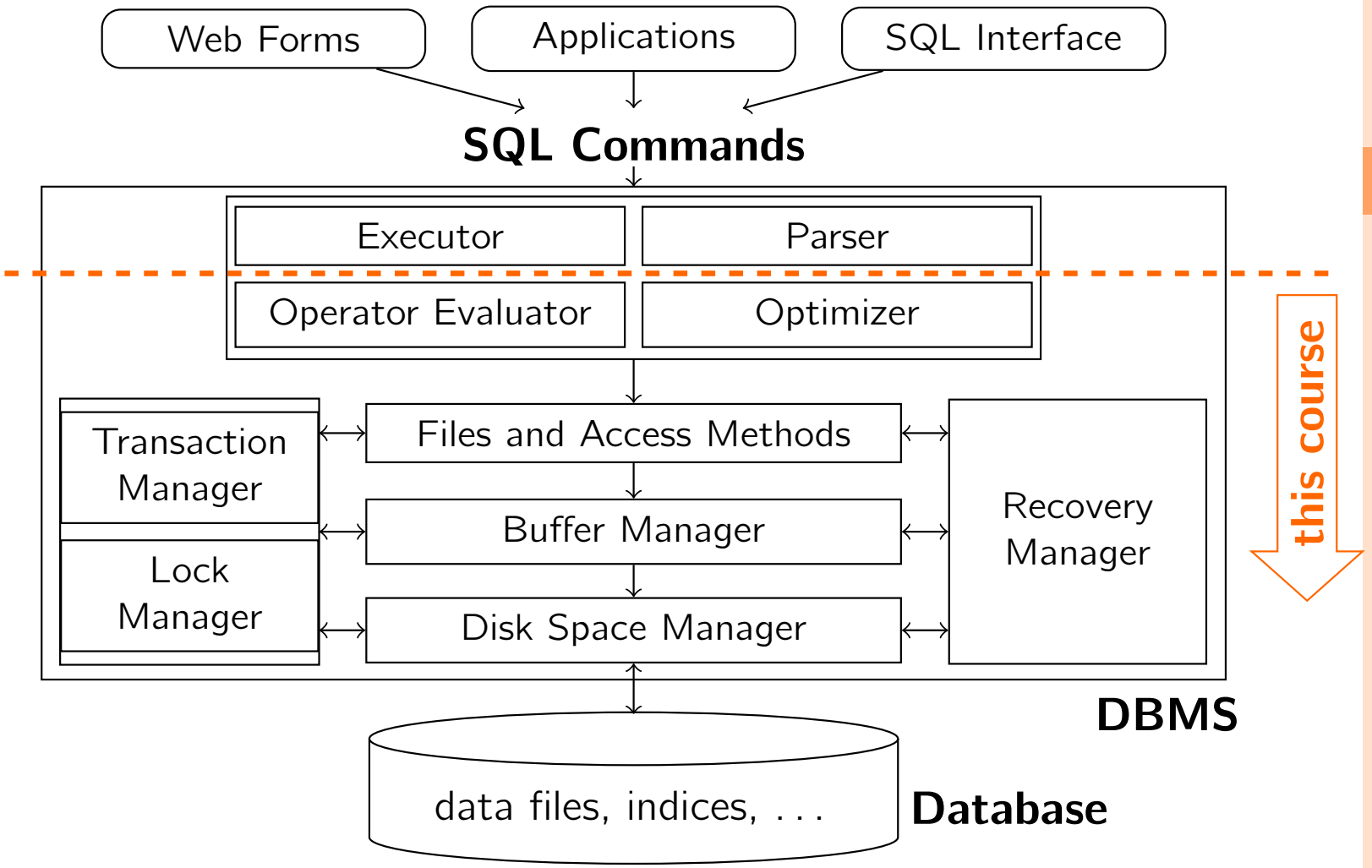
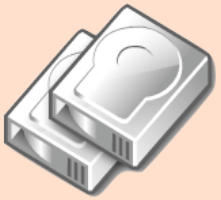


Figure inspired by Ramakrishnan/Gehrke: "Database Management Systems", McGraw-Hill 2003.

A Few Words About Myself

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 +49 7071 29-78952 (Monika Weber)



Architecture of a DBMS

Organizational Matters

Organizational Matters

Lectures

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

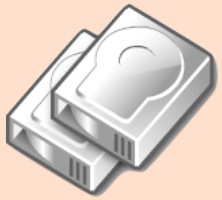
`http://db.inf.uni-tuebingen.de/teaching/DatenbanksystemeIISS2016.html`

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

Exercises (Benjamin Dietrich, Dennis Butterstein)

When	Where
Thursdays, 14:15–15:45	Sand 6/7, gr. Hörsaal
(starts April 21, 2016)	

In-depth discussion of course topics, exercise sheets, plus occasional additional material. **Become friends with `git`.**



Architecture of a DBMS

Organizational Matters

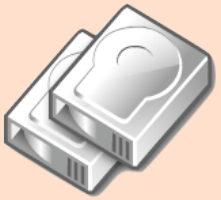
Examination

- **Written exam** to be held on **Monday, July 18, 2016** (this is the regular lecture slot).
- You will be allowed to bring **1 (one) hand-written double-sided piece of A4 paper** with notes.
- Score $\geqslant 2/3$ of the exercise points to be admitted to the exam.
- Excel in exercises and score up to 25 % of exam bonus points.
- Further details will be posted.

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.

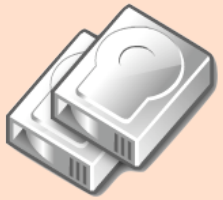
Code Snippets, Algorithms

DB2 IBM DB2 Specifics

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

PostgreSQL Specifics

Ditto, but related to the glorious PostgreSQL (v9.x) system.



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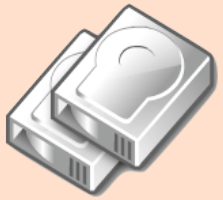
Before We Begin

Questions?

Comments?

Suggestions?



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