

Architecture and Implementation of Database Systems

Summer 2014

Torsten Grust
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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

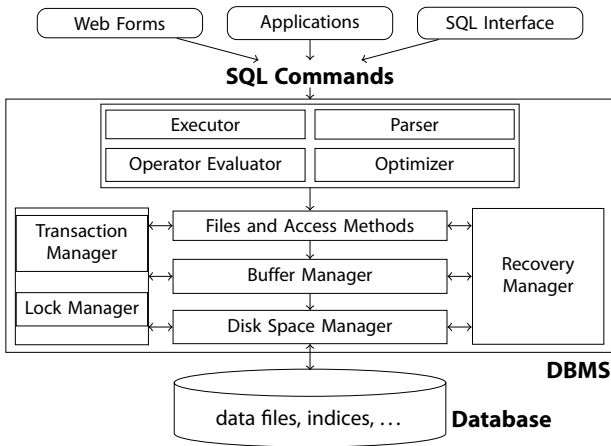


Figure inspired by Ramakrishnan/Gehrke: "Database Management Systems", McGraw-Hill 2003.

Introduction

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Architecture of a DBMS

Organizational Matters

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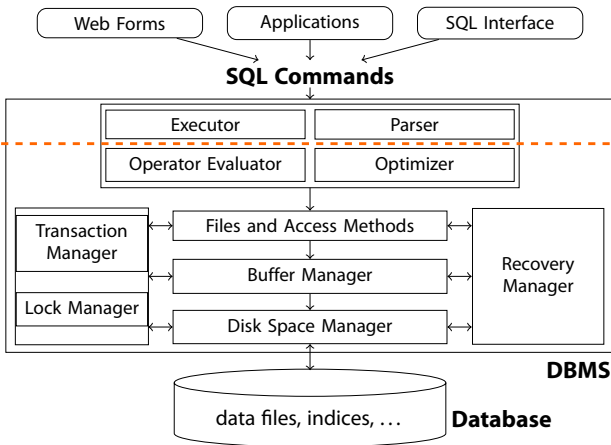


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this course

A Few Words About Myself

Introduction

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Organizational
Matters

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, 10:15–11:45	Sand 6/7, gr. Hörsaal
Tuesdays, 10:15–11:45	Sand 6/7, gr. Hörsaal

`db.inf.uni-tuebingen.de/teaching/
DatenbanksystemeIISS2014.html`

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

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Exercises (Benjamin Dietrich)

When	Where
Thursdays, 14:15–15:45 (starts April 17, 2014)	Sand 6/7, gr. Hörsaal

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

Examination

- **Written exam** to be held on **Monday, July 14, 2014** (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.

Introduction

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Architecture of a
DBMS

Organizational
Matters

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.

Introduction

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DBMS

Organizational
Matters

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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Organizational
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