A Few Words About Me

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1996–2001 Diploma in Physics, U Konstanz
2001–2005 Research assistant, DBIS Group, U Konstanz
2005–2007 Research assistant, Database Group, TU München
Oct 2006 PhD in Computer Science (XML query processing)
2007–2008 Postdoc, IBM T. J. Watson Research Center, NY, USA
2008–2013 Senior Researcher, Systems Group, ETH Zurich
since 4/2013 Full Professor, DBIS Group, TU Dortmund University

Topic: Database systems on modern computing hardware
What this Course is About

**TPC-E Industry Benchmark** (modeling a brokerage firm)

- 2.3M customers; 11.5M accounts; 2B holdings; 40B trades
- 18.5 TB initial database size

Current record: **11,059 tpsE (110,590 transactions/sec total)!**

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**Numerical Quantities Summary**

<table>
<thead>
<tr>
<th>Response Time (in seconds)</th>
<th>Minimum</th>
<th>Average</th>
<th>90\textsuperscript{Th} Percentile</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broker-Volume</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>1.02</td>
</tr>
<tr>
<td>Customer-Position</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>2.96</td>
</tr>
<tr>
<td>Market-Feed</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>2.93</td>
</tr>
<tr>
<td>Market-Watch</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
<td>1.00</td>
</tr>
<tr>
<td>Security-Detail</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.82</td>
</tr>
<tr>
<td>Trade-Lookup</td>
<td>0.01</td>
<td>0.05</td>
<td>0.08</td>
<td>1.03</td>
</tr>
</tbody>
</table>

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**Reported Throughput:** 11,058.99 tpsE  
**Configured Customers:** 5,750,000

**How can databases provide such throughput, yet be transaction-safe?**
Architecture of a DBMS / Course Outline

Web Forms → Applications → SQL Commands

Executor → Files and Access Methods → Transaction Manager

Operator Evaluator → Buffer Manager → Lock Manager

Parser → Optimizer

Optimizer → Disk Space Manager

Transaction Manager

DBMS

data files, indices, ...

Database

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Organizational Matters

Lecture

- Mondays, 8–10h, Room OH 12, E.003
- Wednesdays, 10–12h, Room OH 12, E.003
  Please visit this website regularly. I will frequently post new information during the semester.

Exercises

- Mondays, 14–16h, Room OH 12, E.003
- Tuesdays, 8–10h, Room OH 12, 3.031
- TA: Michael Müller (michael3.mueller@tu-dortmund.de)
- Register via AsSESS by Fri 13, 2018. (Registration will open shortly.)
- Participation is not mandatory, but highly recommended.

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There will be a **written exam**.

- Thursday, July 26, 2018; 11:00h-12:30h; Room HG 2, HS5
- Thursday, September 20, 2018; 13:30-15:00h; Room HG 2, HS3
- duration: 90 minutes
- More information during the semester
I’d like to make this course highly interactive. Please speak up, discuss, ask questions!

The material we discuss is relevant in practice. We’ll provide practical examples and exercises. You get most out of this course by actively participating in (and solving) the exercises.
Literature


- Dennis Shasha and Philippe Bonet. *Database Tuning*. Morgan-Kaufmann.

- …or pick your own favourite in the library — most text books about advanced database topics will do.

I’ll also sometimes point to specific research papers and you’re welcome to search for additional background reading. Search engines like Google Scholar are your friend.
You might also be interested in...

...the course **Data Processing on Modern Hardware**

- Winter Semester
- Many similar concepts, geared to exploit the characteristics of modern computing hardware.

...doing your **Master Thesis** with me

- Chance to participate in the forefront of research.
- Many ways to join, approach me if you’re interested.