Seminar: Implementation Techniques for Main Memory Database Systems

Kickoff Meeting

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Overview

Weekly Meeting
• Monday, 14:00 - 16:00, starting April 25, 2022
• Room MI 02.09.014
• 2 presentations per meeting
• There will be an attendance log

Required Work
• Seminar paper (≤ 5 pages)
• Sample implementation (C++)
• Presentation (20 minutes + 10 minutes discussion)
Organization

Registration through matching system
• Write an email to mds@mailkemper.in.tum.de. if you are interested
  – Subject should be: [DBSeminar] Kickoff Meeting
  – Emails will be filtered based on this subject
• Register for the seminar on https://matching.in.tum.de!

After matching: Check in with us for your preferred topic
1. Check in soon after matching for paper recommendations (preferences considered FCFS)
2. Check in when rough structure is planned
3. Check in when first draft is ready

Due Dates
• Structure: ca. 4 weeks prior to presentation date
• Presentation slides: 1 week prior to presentation date
• Seminar paper and finished implementation: 2 weeks after presentation date
Preliminary Topic List

Transactions

- Fast Serializable Multi-Version Concurrency Control for Main-Memory Database Systems
- Cicada: Dependably Fast Multi-Core In-Memory Transactions
- Speedy transactions in multicore in-memory databases
- Hekaton: SQL server’s memory-optimized OLTP engine
- HyPer: A hybrid OLTP&OLAP main memory database system based on virtual memory snapshots
- Tictoc: Time traveling optimistic concurrency control

Locks

- Optimistic Lock Coupling: A Scalable and Efficient General-Purpose Synchronization Method
- Scalable and robust latches for database systems
Sampling and Statistics

- Optimal random sampling from distributed streams revisited
- Concurrent online sampling for all, for free
- alpha to omega: the G(r)eek Alphabet of Sampling
- Small Selectivities Matter: Lifting the Burden of Empty Samples

Index Structures and Compression

- Contention and Space Management in B-Trees
- The adaptive radix tree: ARTful indexing for main-memory databases
- FSST: Fast Random Access String Compression
https://db.in.tum.de/teaching/ss22/seminarModernDatabaseSystems/