

“Adaptive Indexing for Main-Memory Databases”

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TU München - Fakultät für Informatik
Lehrstuhl III: Datenbanksysteme

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11:00 am – 12:00 noon

Room NOE 3105

(bulding of the Faculty of Computer Science , Noethnitzer Str. 46)

Abstract:

Main memory capacities have grown up to a point where most databases fit into RAM. For main-memory database systems, index structure performance is a critical bottleneck. Traditional in-memory data structures like balanced binary search trees are not efficient on modern hardware, because they do not optimally utilize on-CPU caches. Hash tables, also often used for main-memory indexes, are fast but only support point queries. To overcome these shortcomings, ART, an adaptive radix tree (trie), combines fast point accesses with ordered storage. Its lookup performance surpasses highly tuned, read-only search trees, while supporting very efficient insertions and deletions as well. At the same time, ART is very space efficient and solves the problem of excessive worst-case space consumption, which plagues most radix trees, by adaptively choosing compact and efficient data structures for internal nodes. Even though ART's performance is comparable to hash tables, it maintains the data in sorted order, which enables additional operations like range scan and prefix lookup.

Professor Neumann (born 1977) conducts research on database systems, focusing on query optimization (computing efficient query strategies) and query processing (efficient query execution). Professor Neumann studied business information systems at the University of Mannheim and received a doctorate in informatics from the same university in 2005. Before joining TUM (2010), Professor Neumann was a senior researcher at the Max Planck Institute for Informatics in Saarbrücken. He acquired his postdoctoral teaching qualification (habilitation) in informatics from Saarland University (2010).

