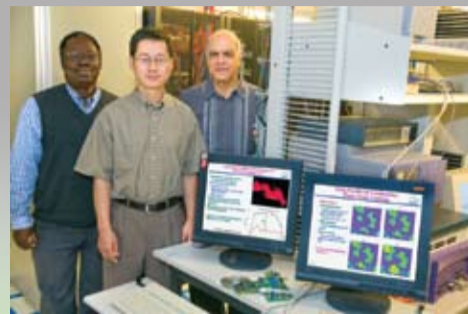




FastBit Index



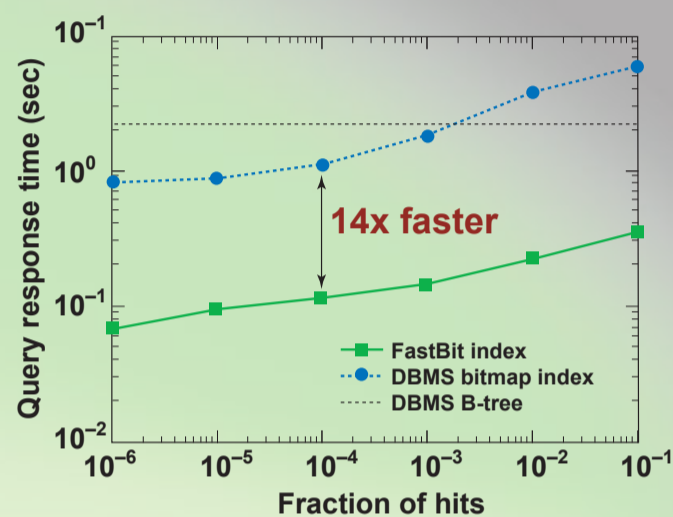
FastBit is an extremely efficient bitmap indexing technology for searching massive datasets



Kesheng "John" Wu, Arie Shoshani, Ekow Otoo, and Kurt Stockinger
Lawrence Berkeley National Laboratory
University of California

Faster Speed: FastBit implements a set of revolutionary techniques to dramatically improve the speed of searching operations

- "FastBit is at least 10x, in many situations 100x, faster than current commercial database technologies"
– Senior Software Engineer, Yahoo! Inc
- The timing chart on the right shows a typical comparison of FastBit against the best commercial indexes



Smaller Size: FastBit index sizes are small compared to well-known database indexes

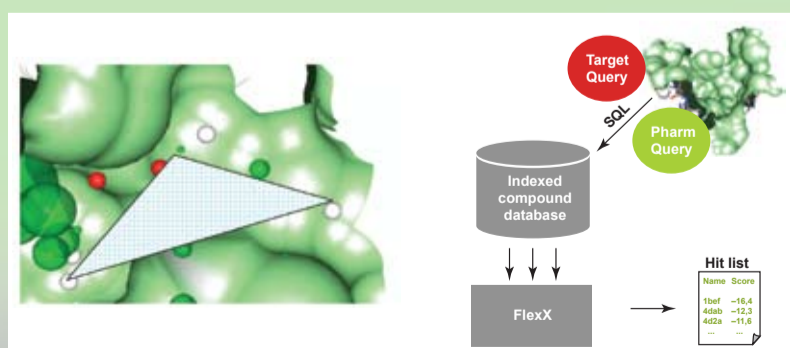
- FastBit uses an innovative (patented) compression method to keep the indexes small while significantly improving the efficiency of search operations
- Tests show that the size reduction depends on the number of distinct values (cardinality) in data, and can range from 2 for high cardinality to 50 for low cardinality

Index sizes (MB)	DBMS B-tree	FastBit Index
Low Cardinality Dataset	371	7
High Cardinality Dataset	408	186

Use Case 1: Molecular Docking

Schlosser and Rarey, ACS Fall 2007

- Using FastBit accelerated molecular docking 140—250 times
- Accelerated docking software being commercialized by BioSolveIT
- In the left figure, the triangles are used to represent the shape of cavities in proteins
- The right figure illustrates the process of matching billions of such triangles required to identify the docking sites



Use Case 2: Network Security

Bethel, Campbell, Dart, Stockinger, and Wu, VAST 2006

- Forensic analysis of network incidents
- Analyzed 2.5 billion network sessions in seconds – thousands of times faster than conventional pattern matching techniques
- The figure on the right shows increased activity on certain receiving ports over a period of time
- Drilling down into a busy region revealed a coordinated attack as shown by the colored stripes on the left figure

