THE DATABASE MACHINES STRIKE BACK!

RAVI RAMAMURTHY
MICROSOFT
DATABASE MACHINES

- Build specialized hardware for turbocharging databases
- Hugely popular in the early 80's
- 288 papers, 230 PhDs
- Britton Lee Database Machine

Jim Gray: And so there was that thread. And spun off from the INGRES project was a Britton Lee group. And the Britton-Lee group included Paula Hawthorn and Bob Epstein and Mike Ubell and probably a lot of other people. And they built a database machine [31]. In that era, there was this whole notion that you could really do much better by building a special-purpose piece of hardware and a special-purpose operating system and then a database system. Build up from the bare metal and it's going to run a lot faster. I think Roger mentioned that that was part of the Essex concept as well. Briton Machine was another...
WHAT HAPPENED?

- Killed by a single paper!

- Key Argument: You must be an idiot to work in this area.

- Technical Reasons: Limited Storage Bandwidth, Fabricating an ASIC vs. riding Moore’s Law
DO WE NEED A DATABASE MACHINES SEQUEL?

- Sequels are sometimes better

- DeWitt is occasionally wrong

TECHNICAL REASONS

- DISK STRIPING
- FPGAs
- CONSERVING POWER
- SECURITY

What Next?
A Few Remaining Problems in Information Technology

Jim Gray,
1998 Turing Lecture
SIMPLER VARIANT OF THE PROBLEM

Build a generic encrypted DBMS that can run all of SQL efficiently such that the only information that can be stolen is ciphertext.

NOTE: Homomorphic encryption or its variants will not solve this problem.
CLAIM: Cannot be done without specialized hardware support to store the encryption keys and perform database operations in it a.k.a a secure database machine

http://research.microsoft.com/cipherbase/