Feedback on Group One Presentation: "Operating System Support for Database Management"

CSci 8701: Overview of Database Research
University of Minnesota

Michael Goshey, Group 12

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Introduction

Assignment summary

The assignment was for every member of each group in CSci 8701 to document substantive feedback on the analytical write-ups and presentations of two other groups, resulting in a rich body of constructive commentary for each group to use in evaluating its work.

Selected Article

Group One selected M. Stonebraker’s Operating System Support for Database Management as the target of its analysis. The article discusses certain operating system services that database systems typically disregard in favor of DBMS-specific versions of the same services and debates this state of affairs.

Feedback

(Note: bulleted items with (w) are for the write-up and (s) are for the slides. Bolded text reflects my emphasis.)

Technical Accuracy

Overall I found this group’s synopsis and analysis of the paper to be a technically sound treatment of the material. I would raise the following technical questions:

→ (w) “The main observation of the paper is that many of these services don’t exactly fit the needs of the DBMS or that they are poorly implemented...” I did not read this level of criticism into Stonebraker’s analysis but rather that the implementations of the services are non-optimal for typical database systems as the group itself later states in section two of its analysis.

→ (w) “UNIX has a mechanism built in to detect sequential data reads; in which case, it prefetches sequential blocks...However, this may not be optimal for a DBMS.” My understanding of this problem is that sequential pre-fetching is (on the contrary) ideally suited for database systems with their ordered access methods, etc. but that the OS’s logical file structure does not map to the DBMS’s sequential ordering of records and that is the source of the problem.

→ (w) “Message passing is extremely expensive in UNIX. (~5,000 instructions for round-trip message).” It would enhance the technical analysis to comment as to whether this 25 year old observation is still relevant today or if the situation has changed dramatically.

Presentation Clarity

In general I though the write-up and slides were clear and well-presented though I thought the following warranted additional clarification:

→ (w) “Also, if the DBMS implements its own buffer management system, the crash recovery process would be impossible by the operating system.” Can you explain why this is so?

→ (w) “He use the example of large files creating large page table files that may not be able to be stored in memory; in which case the OS would be start thrashing.” I think it would strengthen the analysis to clarify the meaning of this term.

→ (w) “He suggests bind chunks of the file into the user space, but recognizes that this may have performance loss.” It would be helpful to explain the cause of this performance loss.

→ (s) Slides 4-7 are very informative but bordering on being too wordy. You may find you are losing audience’s attention span during this portion of the presentation as its hard to read and listen at the same time.
→ (s) The first bullet in the “Validation” slide seems unnecessary. One assumes all papers are informational (if not, why publish?).

**Analysis and Insights**

I thought the group presented a couple of insightful suggestions that would strengthen the paper:

→ (w) “It should also quantify any claims...and **use the statistics** to compare the chosen systems.” I agree- this would add value. You may also want to include examples of statistics you had in mind.

→ (w) “The paper would seem more authoritative and urgent if the problems were presented with **industry data** to support the real need.” I think this is another good point. What kind of data would satisfy this need?

→ (s) I like the fact that you have challenged the paper’s validity based on it being 25 years old. Its a “win-win” challenge because if you demonstrate that it is still valid then that is a remarkable accomplishment for a 25 year old paper, yet if you demonstrate that it is no longer valid that too would be an informative exercise.

**Ideas for Improvement**

The following are specific suggestions for improvement:

→ (w) The group has observed that Stonebraker’s paper deals mainly with Unix and suggests that it should be expanded to include other operating systems. Another interesting approach might be to compare Unix at the time the paper was written to Unix (i.e. *nix) today.

→ (w,s) The discussion about OS trees and having three trees vs. a single tree that accomplishes three purposes seems perfect for a helpful diagram comparing these approaches.

→ (w,s) I felt both when reading Stonebraker’s paper and when reading the group’s analysis that the subject would be better served by a concrete example of when/how the LRU cache replacement algorithm fails with respect to DBMS buffer pool management.