

Paper Review Title: The Impact of Operating System Structure on Memory System Performance

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1. Summarize the (at most) 3 key main ideas.

In this paper, they have evaluated the memory behaviour of 2 completely different implications of UNIX operating system.

Apart from that the key idea of the paper includes the following points I.e.

1. To evaluate impact of operating system on over all performance in both contemporary operating system.
2. Exploring the impact of uniprocessor memory system
3. Evaluation of memory system behaviour

2. State the main contribution of the paper

The primary contributions are-

1. Comparing two popular contemporary operating systems
2. Creating system interface to execute programs on UTRIX operating system
3. Creating tracing system by using EPOXIE instrumentation tool

3. Critique the main contribution

3.a. Rate the significance of the paper on a scale of 5 (breakthrough), 4 (significant contribution), 3 (modest contribution), 2 (incremental contribution), 1 (no contribution or negative contribution). Explain your rating in a sentence or two.

It is a significant contribution so I would rate as 5 because the methodology includes the following-

1. Creating address tracing systems that allow complete and accurate measurements of activity on a computer system.
2. The tracing system uses the EPOXIE instrumentation tool.
3. Which is a program that rewrites assembly code to record a complete address trace of instructions and memory references.
4. These traces are fed into a simulation of DS5000/200 memory system using the below parameters.

4. b. Rate how convincing is the methodology: do the claims and conclusions follow from the experiments? Are the assumptions realistic? Are the experiments well designed? Are there different experiments that would be more convincing? Are there

other alternatives the authors should have considered? (And, of course, is the paper free of methodological errors.)

The methodology which includes the following,

1. Memory dilation (program text instrumented with EPOXIE which can affect paging and TLB(translation look aside buffer)
2. Time Dilation affects clock interrupts and the latency of I/O operations.
3. In Configuration the system clock interrupt at 1/15th the standard rate so the time dilation will take care of that.
4. Different parameters like instruction cache, write buffer, translation buffer and page mapping are useful for physical page used before given virtual page.
5. MCPI is a metric commonly used to evaluate computer systems.

3. c. What is the most important limitation of the approach?

Though it's a brilliant paper but still have few un answered questions with limitations.

1. Lack of cache associativity
2. How to modify cache size
3. Simulations are based on DEC station 5000/200 memory system but what about the results from confined system
4. 64K byte caches can be generalized to be a larger cache but how to arrange the hierarchy?

4. Rate the writing in the paper on a scale of 5 (great) to 1 (muddled), and justify your ranking. Did you have to re-read sections? Were algorithms clearly explained? Did the paper have a logical flow?

Writing-5

The paper had a logical flow and proper explanation of methodology like starting from the paper objective, architectural design, limitations, future goal for improvising the performance are well explained.

As the authors clearly explained the design and implementation, its easy to understand the logic.

Functions like: *MCPI, cache, write buffer, translation buffer* are clearly explained with usage

5. Answer one of the following three questions (whichever is most relevant for this paper):

1. What lessons should system researchers and builders take away from this work? 2. What is the lasting impact of this work? 3. What (if any) questions does this work leave open?

By answering the question 1 these are the following points which researchers can work further,

1. Changing the cache hierarchy
2. 13 Workloads like gcc, lisp, compress, doduc can be used for more experiments.
3. Six out of seven Assertions about memory system behavior are true so the researchers can find another way to prove all assertions are true about memory
4. Improvisation for the locality of system code and data can be done
5. Automating Block operations can be useful
6. For majority of the workloads they considered the number and cost of all the non ide instructions to be executed substantially, which new researches can modify the assumption