Evaluating Stream Buffers as a Secondary

Cache Replacement

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# Introduction:

This paper is very interesting article discussing on effect of cache on the performance of system: the most common problem in any multicore architecture. The importance of cache performance significantly effects in high performance parallel computing. The authors argue that using secondary cache would shoot up the cost as well. They provide an alternate way by using Jouppi’s Stream buffers which not only requires much less hardware but also have a performance very similar to that of large secondary cache. The authors have stated that they have the proposed memory very well tested for fifteen scientific applications. There results show that the Stream buffers tend to perform even good as the data-set size increases. The other big challenge in computer architecture is bandwidth requirement. The authors proposed a filtering scheme that reduces the bandwidth required in interaction of secondary buffer with the main memory. Their idea is to implement a history based buffer which reduces the repeated interaction with main memory there by reducing the bandwidth requirement. In addition to this they proposed an additional method which enables the buffer to pre fetch the data in huge amounts (larger strides). Finally, the authors compared all the above proposed methods with performance of secondary cache and concluded given some touch ups and improvements Stream buffers could for sure serve as the replacement of traditional secondary cache and the transition becomes significantly important in a multicore unit.

# Conclusion:

Generalizing the discussion, it is a totally understood fact that secondary cache has faster access than main memory and it is well understood that performance of multi core system depends on the latency of cache. The authors went proposing an alternate method which requires less hardware but greater bandwidth. Even though they proposed a few methods to reduce the bandwidth, they got confirmed to a few research work but never implemented in real life. The primary reason being the paper compares the work in 1990 and served as a better solution compared to its contemporaries. However, as years passed by more research has been carried in this area and advanced caches with better search algorithms have evolved. For example, secondary cache has been replaced with SRAM these days and is widely accepted. As time passed by, not only the better algorithms evolved, there is also significant decrease in the cost.