Week 9

Paper Critique

**Traffic Management: A Holistic Approach to Memory Placement on NUMA Systems (ASPLOS '13)**

This paper suggests the carrefour to avoid the traffic congestions occurring in the memory on NUMA systems. It relieves the congestion problem by replication, interleaving and replacement of the pages.

The advantage of suggested paper is that it efficiently solve out the memory congestion problem, but there is a limitation of solving out since it assumes many scenario where it would not practically happen in the real-world. Therefore, it is only efficient when the application uses memory heavily.

The improvement that can be done here is considering the write more. Since writing the page causes significant overhead followed by the synchronization issue. Therefore, more optimized solution for synchronizing the page around the node would be helpful.

**Regularities Considered Harmful: Forcing Randomness to Memory Accesses to Reduce Row Buffer Conflicts for Multi-core, Multi-bank Systems (ASPLOS '13)**

This paper proposes a novel kernel-level memory allocator called M3 cube. It organizes the memory in a notion of a memory container, which is defined as a unit of memory that comprises the minimum number of page frames. Moreover, it orchestrates page frame allocation so that pages that threads access are dispersed randomly across multiple banks. In this way, the access of the page from the multiple threads is randomized.

The contribution of this paper is that the proposed scheme shows that the randomized accesses reduces inter-thread access interference on the row-buffer in memory banks, therefore, randomized access pattern outperforms that of sequential manner.

However, randomized access pattern causes fragmentation problem with the heavy lock contention. It is brilliant approach that accessing the memory in a random pattern might not affect the storage device lying below, but it affects the memory directly. Therefore, solving out the fragmentation problem would improve the scheme.