ABSTRACT

Design and Management of Distributed Shared Memory with Multicore Architectures

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Background: Distributed and parallel processing systems are one of the most advanced area of research today. They provide the shared memory construct in systems with physically distributed memories and consequently combine the advantages of both approaches. A distributed shared memory (DSM) is the popular exploration areas in multiprocessor network. It has been measured by researchers from diverse areas of sciences and engineering. It is require to optimize distributed shared memory performance for building high performance, large scale multiprocessor systems. Much research has been carried out in the past which overcome number of limits but the achievable issue still persists DSM algorithm, locking shared space, thrashing, concurrent access, page fault, extension, transparency, large database support and cost. These thesis focused on new distributed shared memory design using software parameters that give significant performance improvement compared to conventional structural design to manage software distributed shared address space. This research also discusses various factors that exist while moving toward software distributed shared memory implementation.
**Aim:** The main aim of this research is to develop new distributed shared memory architecture using software approach. The goal is to develop and implement efficient algorithm and low latency rate.

**Material and Methods:** This research describes principles and methodologies of a distributed shared memory system and one way of DSM implementation. This study and research refer to two ways by which it is possible to achieve DSM system are first in hardware like cache coherence circuits and network interfaces and the second is software. Software distributed shared memory is architected by using a different concept of an operating system, by utilizing a programming library and by extending underlying virtual address space architecture. This proposal has a new DSM algorithm based on replication technique and the data transfer granularity choice that makes the system more efficient using sequential consistency mechanism. In each system node, mapping manager does map between local memory of that node and the shared virtual memory space. Overall memory management is handled by the memory controller of the system using write update protocol to tackle look up and action performed by each node. Still it depends upon specific research requirement and its environment criteria. A comparison of proposed technique with conventional one is given in this report.

**Results and Discussion:** The research carrying out is using shared variable as granularity on distributed nodes and design provides a low latency rate and better system performance. It has been also become possible to shared structures in global distributed address space (GDAS). The proposed DSM algorithm makes system more effective to achieve data item as per requirement that make it more scalable and reliable.

**Conclusion:** Implementation of proposed paradigm requires a careful evaluation of number of architectural considerations such as interaction with logical shared memory, data granularity, selection of consistency model, synchronization and latency rate etc. The motivation for the proposed design was to implement using shared variables and data structure, choice of various software issues, process interactions, protocols and algorithm programming involved. All goals have been largely met.