



# CASE STUDY NO : 10

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Case Study On :- Study of Distributed Shared memory.

## Distributed shared memory (DSM) -

DSM implements the distributed system shared memory model in a distributed system, that hasn't any physically shared memory. Shared model provides a virtual address area shared between any or all nodes. To beat the high forged of communication in distributed system.

DSM memory model provides a virtual address area shared between all nodes. Systems move information to the placement of access. Information moves between main memory and secondary memory and between main read locations of various nodes.

DSM permits programs running on separate reasons to share information while not the software engineer's having to agitate causation message instead underlying technology can send the messages to stay the DSM consistent between compute. DSM permits programs that want to treat constant laptop to by simply, tailored to control an separate reason, programs access what seems to them to be traditional memory.

## Architecture of Distributed Shared Memory -

Every node consists of 1 or additional CPU's and a memory. A high-speed communication network is employed for connecting the nodes. A straight-forward message passing system permits process on completely different nodes to exchange one another.

## Memory mapping manager Unit -

Memory mapping manager runs in every node maps the native memory onto the shared computer storage for mapping operation. The shared memory house is divided into blocks.

Information caching may be a documented answer to deal with operation latency. DMA uses information caching to scale back network latency. The most memory of the individual nodes is employed to cache items of the shared memory house.

Memory mapping manager of every node reads its native memory as an enormous cache of the shared memory house for its associated processors. The basic unit of caching may be a memory block. Systems that support DSM, information moves between secondary memory and main memory also as between main reminiscences of various nodes.

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## Communication Network Unit-

Once method access information within the shared address space, mapping manager maps the shared memory address to the physical memory. The mapped layer of code enforced either within the operating kernel or as a runtime runtime.

Physical memory on every node holds pages of shared virtual addresses. Native pages are unit gift in some node's memory. Remote pages in some other node's memory.

## On-Chip Memory -

Although most computers have an external memory, self-contained chips containing a CPU and all the memory also exist. Such chips are produced by the millions, and are widely used in cars, appliances, and even toys. In this design the CPU portion of the chip has address and data lines that directly connect to the memory portion.

One could imagine a simple extension of this chip to have multiple CPUs directly sharing the same memory. While it is possible to construct a chip like this, it would be complicated, expensive and highly unusual. An attempt to construct a one-chip multiprocessor this way, with say, 100 CPUs directly accessing the same memory would be impossible for engineering reasons. A

different approach to sharing memory is needed.

### Bus - Based Multiprocessors -

- A set of parallel wires called a bus acts as a connection between CPU and memory.
- Accessing of same memory simultaneously by multiple CPU's is prevented by using some algorithms.
- Cache memory is used to reduce network traffic.

### Ring - Based Multiprocessors -

- There is no global centralized memory present in ring-based DSM.
- All nodes are connected via d token passing ring.
- In ring-based DSM a single address line is divided into the shared data.

### Advantages -

- 1) Scales well with a large number of nodes.
- 2) Message passing is hidden.
- 3) Can handle complex and large database without replication or sending the data to processes.
- 4) Generally cheaper than using a multiprocessor system.
- 5) Provides large virtual memory space.
- 6) Programs are more portable due to common programming interfaces.

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## Disadvantages :-

- 1) Generally slower to access than non-distributed shared memory.
- 2) Must provide additional protection against simultaneous access to shared data.
- 3) May incur a performance penalty.
- 4) Little programmer control over actual message being generated.

## Conclusion -

The implementation approach for these tasks is different for distributed memory than for shared memory architecture. In the case of the distributed memory machines, the critical factor for performance is the availability of low latency, high bandwidth communication primitives.