**COMPUTER ENGINEERING DEPARTMENT**

**ASSIGNMENT NO. 3**

**Subject: Distributed Computing**

COURSE: B.E Year: 2021-2022 Semester: VIII
DEPT: Computer Engineering
SUBJECT CODE: CSC802 DUE DATE: 25/03/2022

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Class: BE-Comps B Date of Submission: 25/03/2022

**DC Assignment - 3**

| Sr. No. | Questions |
|---|---|
| 1 | Discuss distributed shared memory with an application in detail. |

**Student Signature:**

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Q1 : Discuss distributed shared memory with an application in detail.

Ans:

- Distributed shared memory is a mechanism that manages memory across multiple nodes & make interprocess communication transparent to end users.
- DSM is a mechanism of allowing user processes to access shared data without using inter-process communication.
- In DSM, every node has its own memory & provides memory read & write services & it provides consistency protocol.
- It implements the shared memory model in distributed systems but it doesn't have the physical shared memory
- All the nodes share the virtual address space provided by the shared memory model & the data moves between the main memories of different nodes.

Types of distributed shared memory:

① On-chip memory:
- The data is present in the CPU portion of the chip.
- memory is directly connected to address lines.
- It is expensive & complex.

② Bus-based multiprocessors:
- A set of parallel wires called a bus acts as a connection between CPU & memory.
- Accessing of same memory simultaneously by multiple CPUs is prevented by using same algorithms
- Cache memory is used to reduce network traffic.

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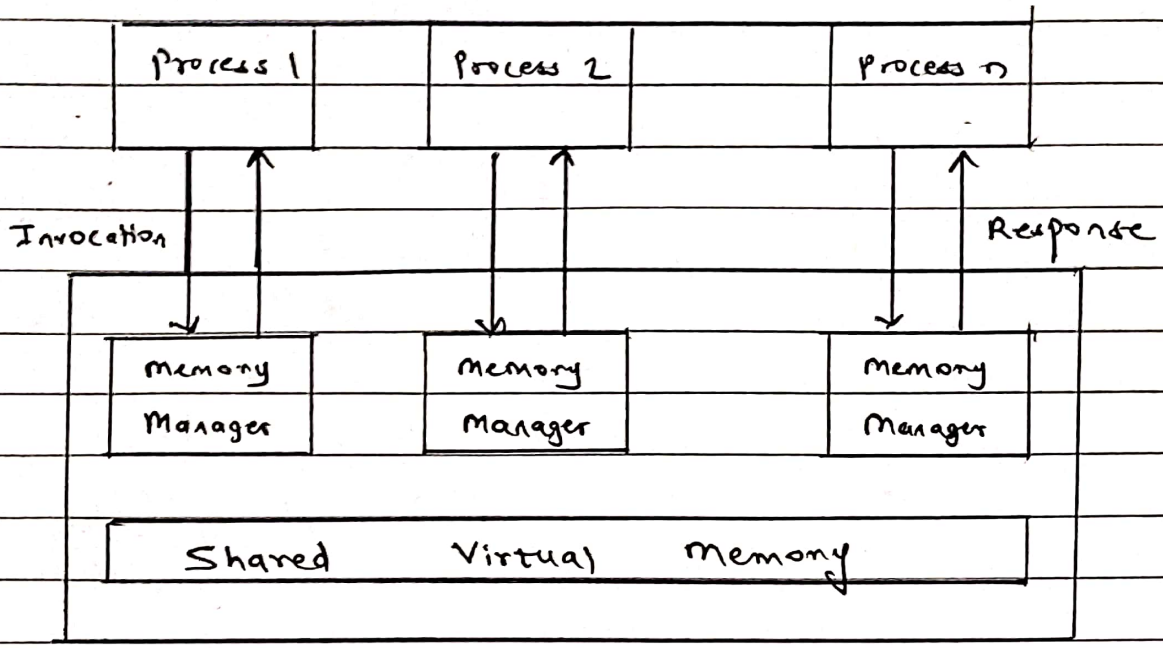
③ Ring based microprocessor

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

Advantages of DSM

- Programmers need not concern about the movement, as the address space is the same. It is easier to implement than RPC.
- DSM programs are portable as they use a common programming interface
- Data moved in large blocks .i.e data near to the current memory location that is being fetched, may be needed future so it will be also fetched
- On-demand data movement is provided by DSM will eliminate data exchange phase
- It provides large virtual memory space, the total memory size is the sum of the memory size of all the nodes, paging activities are reduced.
- DSM improves performance and efficiency by speeding up access to the data.
- It has a flexible communication environment.
- They all share the address space so one process can easily be moved to a different machine.




Application :

Orca

- It is an object based programming language & distributed shared memory system.
- In Orca, objects are in line with the conventional conception of objects.
  eg - An object is a set of data & set of methods.
- It is based on distributed coherent objects
  eg - Orca doesn't invalidate objects on write, but propogate the write to all copies of objects
- This is done by sending the writer to a primary copy & an object. The node that holds this will then update all copies.
- Coherence is still an active research system & proven very good performance on a set of applications that are not necessarily focused on linear algebraic problems.

BM
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