Multiprocessor and multicomputer are distinguished by a shared common memory and unshared distributed memories.

Shared Memory multiprocessor- Three most common shared memory multiprocessors models are –

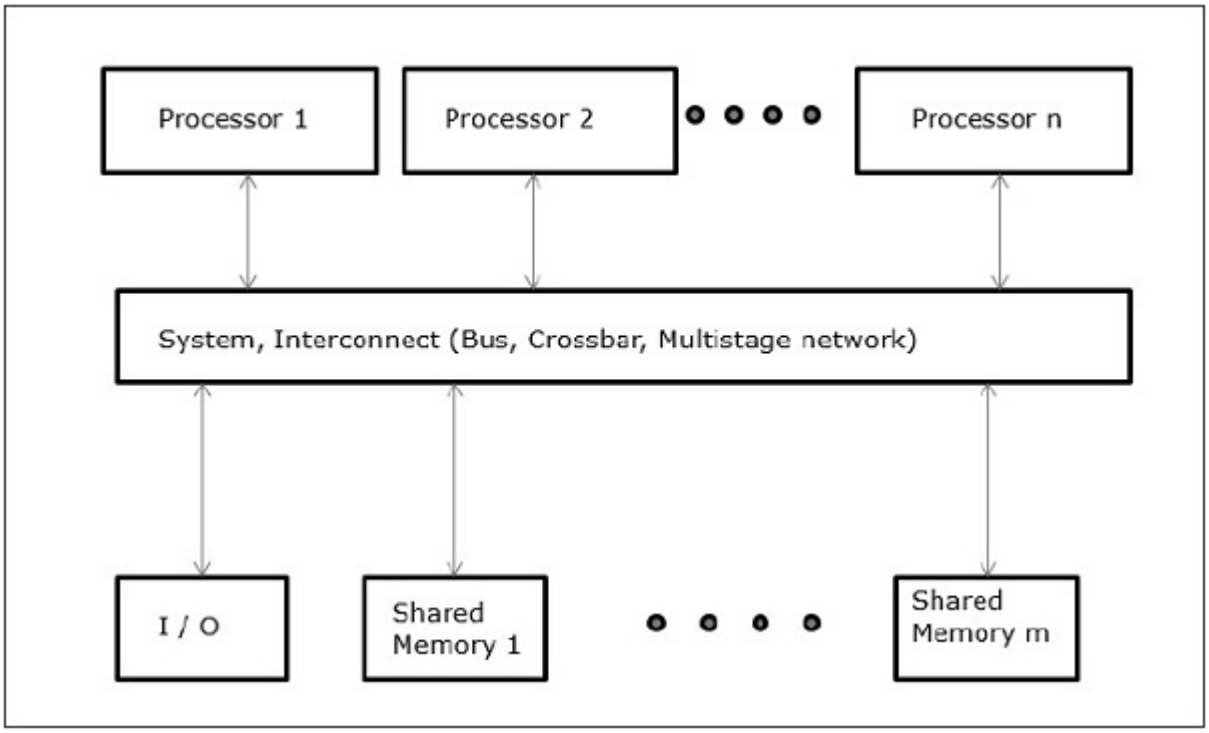
1. Uniform Memory Access (UMA)
2. Non-uniform Memory Access (NUMA)
3. Cache Only Memory Architecture (COMA)

1. Uniform Memory Access (UMA)

In this model, all the processors share the physical memory uniformly.
All the processors have equal access time to all the memory words.
Each processor may have a private cache memory.
Same rule is followed for peripheral devices.

When all the processors have equal access to all the peripheral devices, the system is called a symmetric multiprocessor.

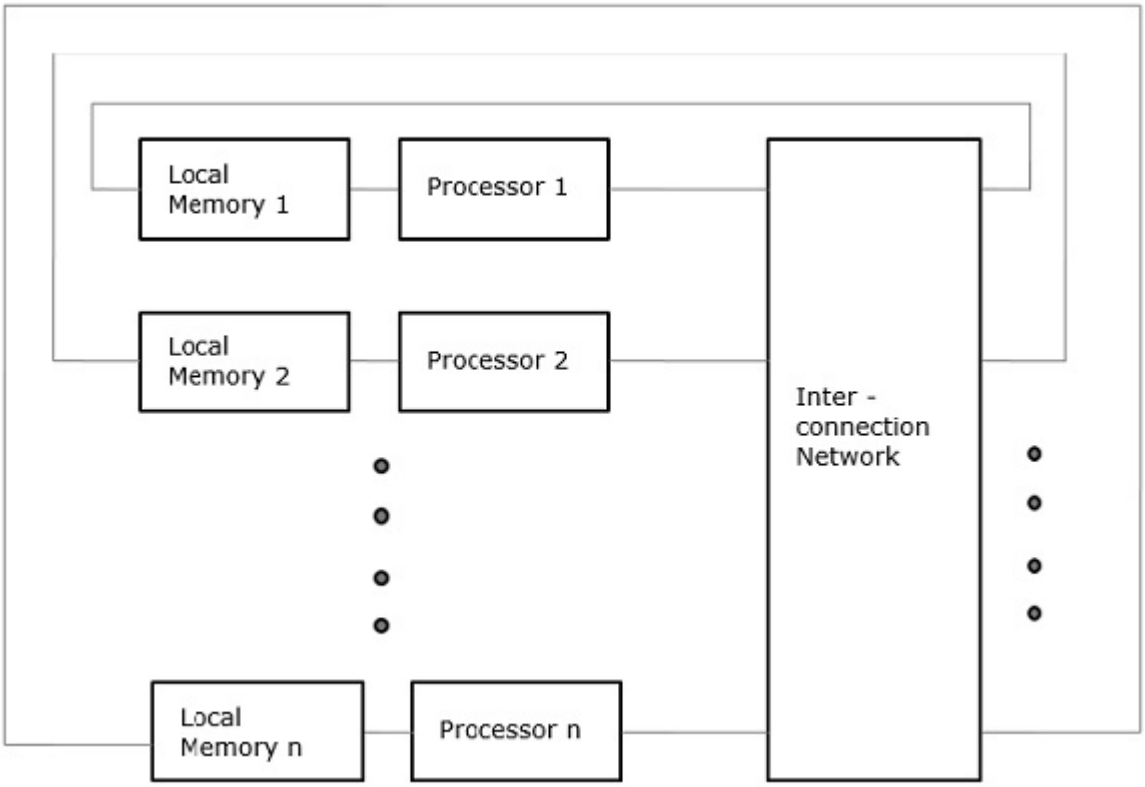
When only one or a few processors can access the peripheral devices, the system is called an asymmetric multiprocessor.



2. Non-uniform Memory Access (NUMA)

In NUMA multiprocessor model, the access time varies with the location of the memory word. Here, the shared memory is physically distributed among all the processors, called local memories.

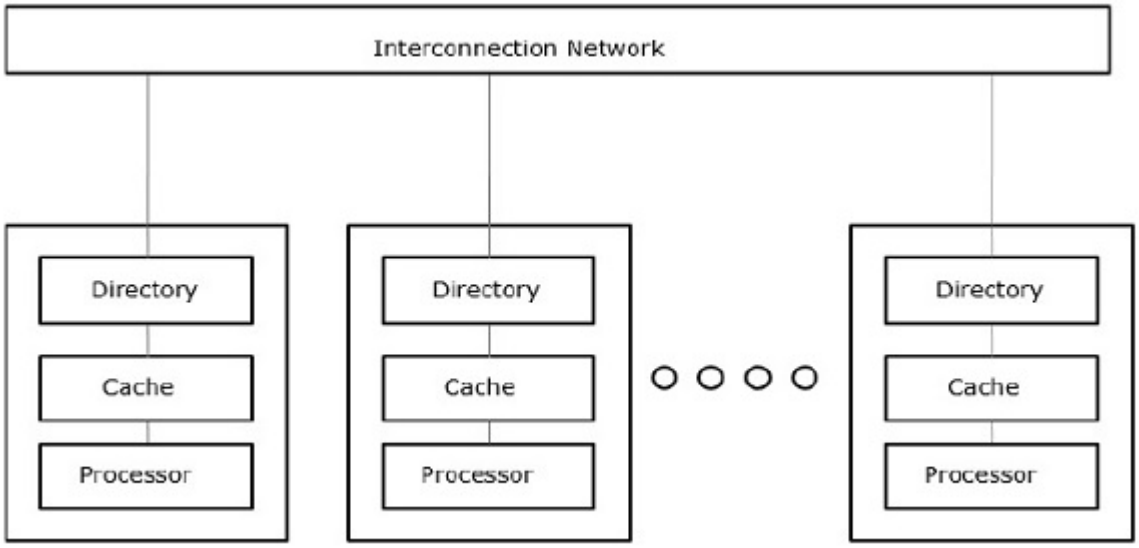
The collection of all local memories forms a global address space which can be accessed by all the processors.



3. Cache Only Memory Architecture (COMA)

The COMA model is a special case of the NUMA model.

Here, all the distributed main memories are converted to cache memories.



Distributed – Memory Multicomputer:

A distributed memory multicomputer system consists of multiple computers, known as nodes, inter-connected by message passing network.

Each node acts as an autonomous computer having a processor, a local memory and sometimes I/O devices.

In this case, all local memories are private and are accessible only to the local processors.

This is why, the traditional machines are called no-remote-memory-access (NORMA) machines.