

SIMD Architecture (Single instruction Multiple Data)

Single instruction is applied to a multiple data item to produce the same output.

Master instruction work on vector of operand

No of processors running the same instruction one clock cycle by the strict lock approach

It is type of Instruction level parallelism

Communication network allow parallel synchronous communication between several Processing Element / Memory modules.

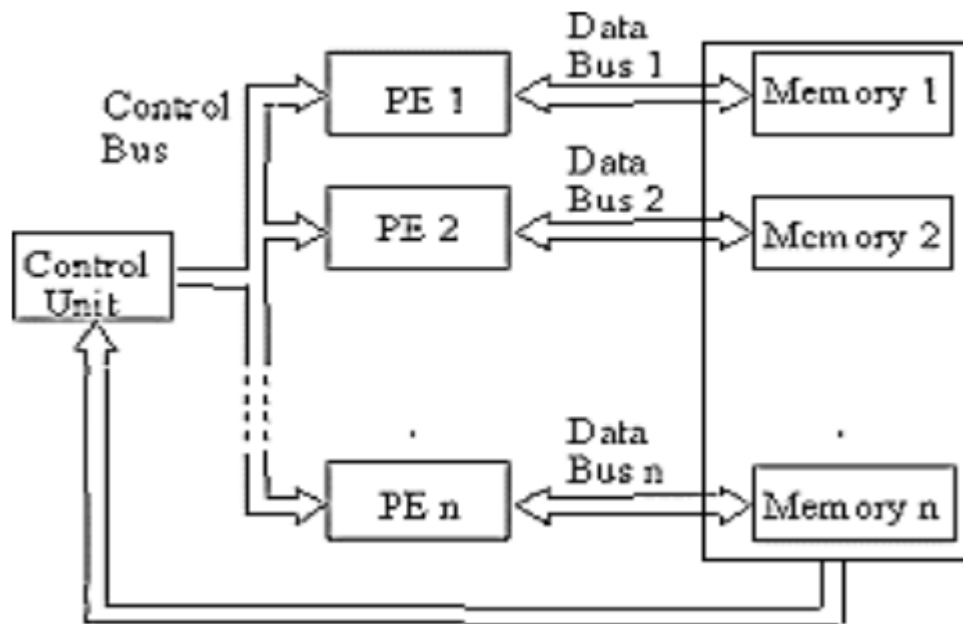
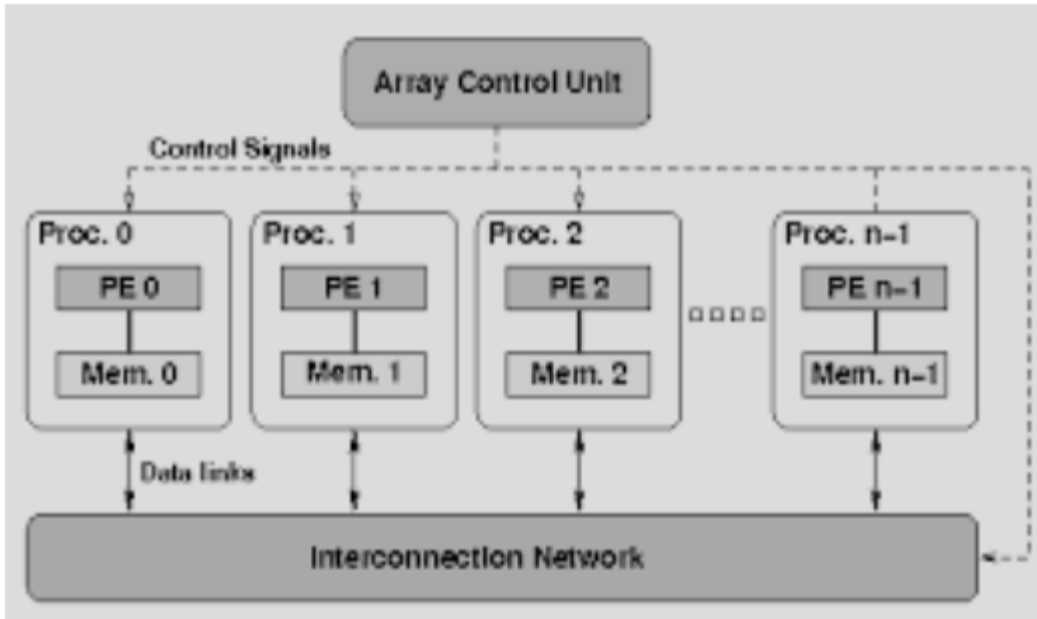


Fig (a) SIMD Processor Architecture

Following two SIMD architectures depict fundamentally different approaches to the parallel processing

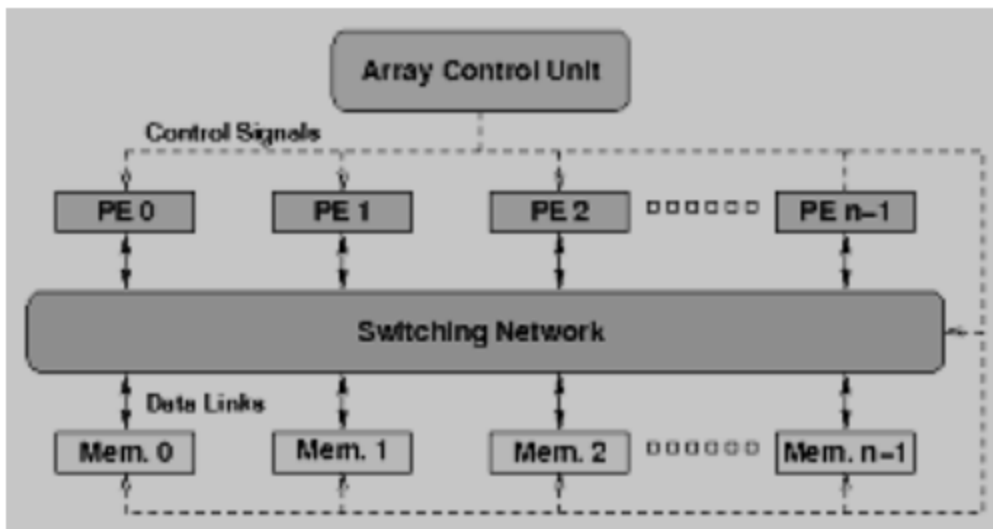
Data Communication based on message passing paradigm:

Here the memory is part of PE and thus it communicates through the interconnection network for passing the data.



Shared memory between processors:

Here memories are not local and the data is read and aligned by the alignment network that aligns the data between PEs and Memory modules



SIMD Parallel Process:

During the execution of program, it is often required to mask of a PE from doing processing, which is equivalent to having some autonomous control within a PE.

PE has a mask bit which can be masked during processing of an instruction.

When a mask in PE is set it receives instruction from Control Unit as No operation.

Executes instruction when mask bit is reset.

Each PE has one or more index registers added to global addresses supplied by the CU Instruction.

The arithmetic logic unit has few general purpose registers and pointer registers to support data and address manipulation.

SIMD mesh connected architecture:

Here we are dealing with the mesh Connected architecture which has been built using the mesh connected architecture

Each node of such machine will have four ports- Top port, left port, right port and bottom port.

The instruction set belongs to CU with PEs executing some of instructions that are prefixed with P to indicate that these shall be executed on PEs in parallel.

Each PE also has four bidirectional ports for communication to four neighbors.