

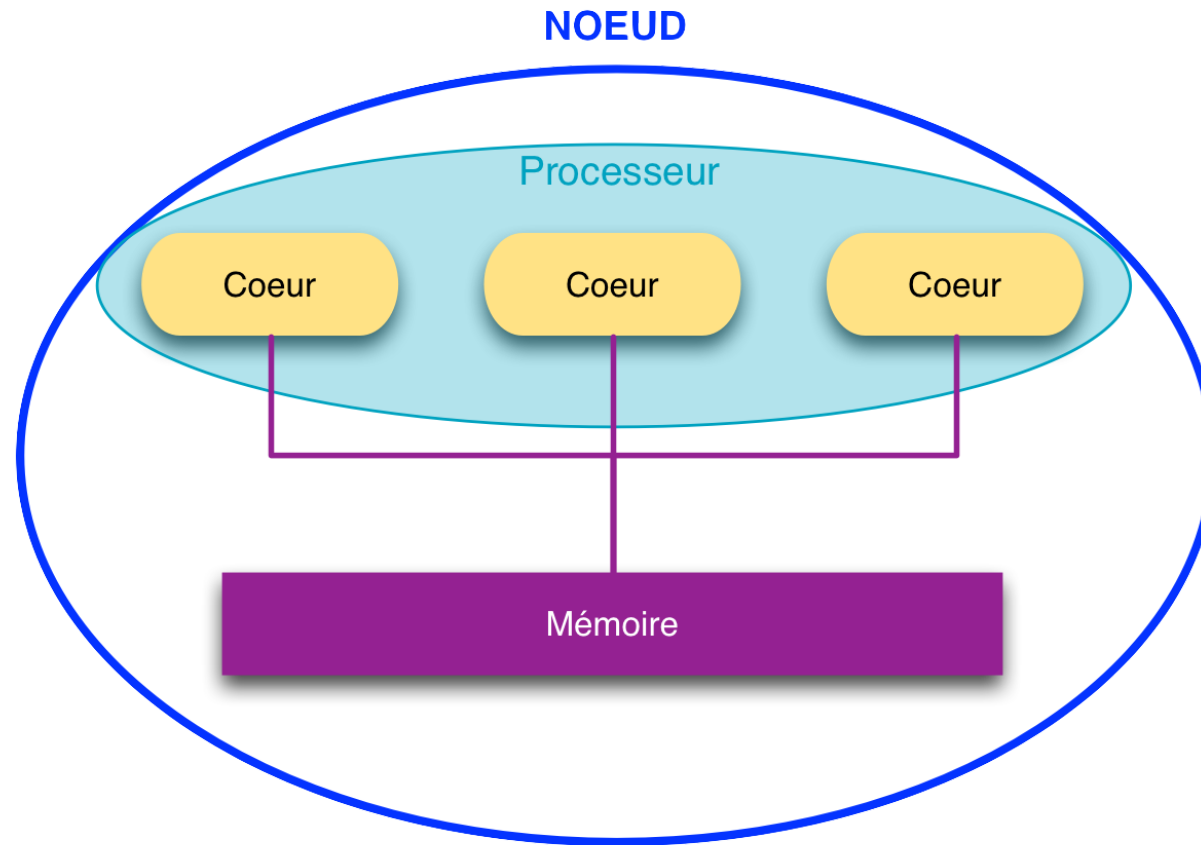


Memory Architectures

The Two Main Memory Architectures:

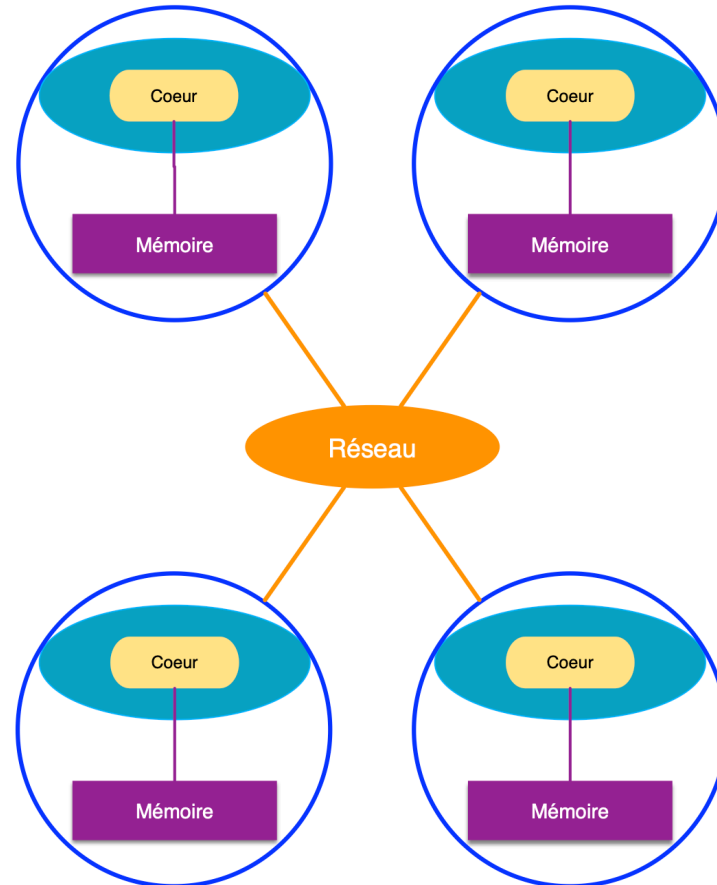
- shared Memory
- distributed Memory

Shared Memory



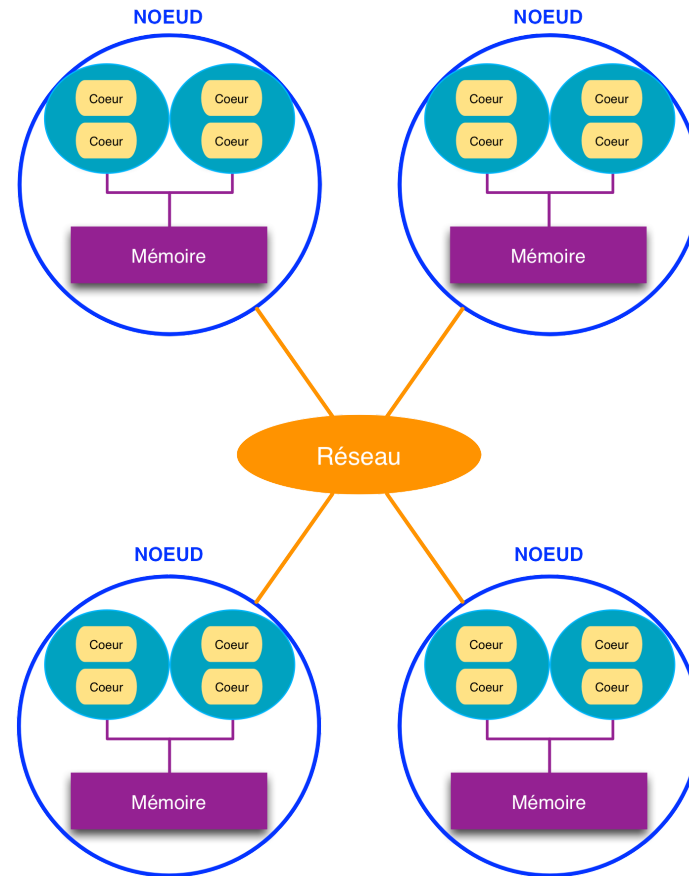
One node (1 processor/3 cores) with shared memory

Distributed Memory



4 nodes (1 processor/1 core) with distributed memory

Hybrid Memory (Shared/Distributed)



4 nodes (2 processors/2 cores) with hybrid memory

Example: Nautilus Supercomputer

Nautilus est composé de 48 noeuds de calcul

- 2 processors with 48 cores each
- 384 GB de RAM (at least)

Two types of usage:

- Shared Memory : Single node, 384 or 768 GB (96 cores)
- Distributed/Hybrid Memory: The full cluster, 19.5 TB (4608 cores)

Memory Organization: An important choice

- Cost reduction: Hybrid memory
- Specific parallel programming library
 - shared memory : OpenMP
 - distributed memory : MPI
- With what goal
 - shared memory : only faster
 - distributed memory : larger problem