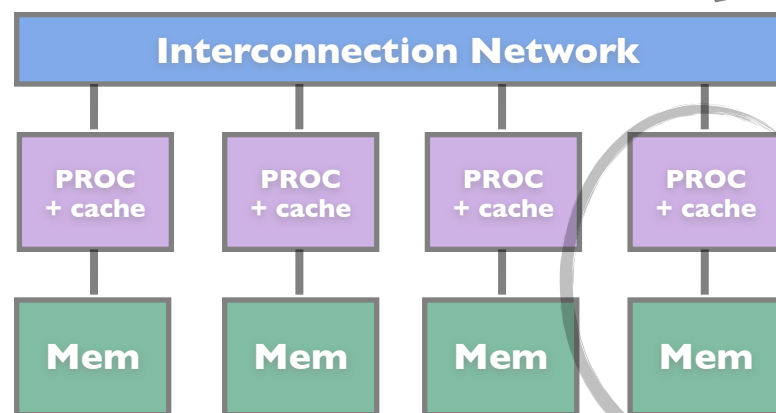


## Distributed Memory



Focus on who owns what data and what communication is needed

snow  
Rmpi  
pbdMPI

Sockets  
MPI  
Hadoop

LAPACK  
BLAS

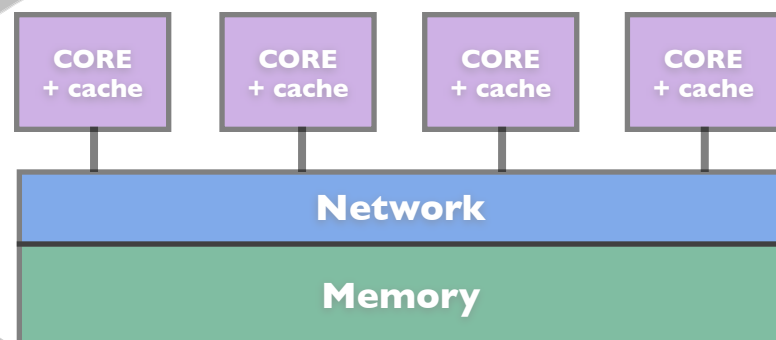
ScaLAPACK  
PBLAS  
BLACS

PETSc

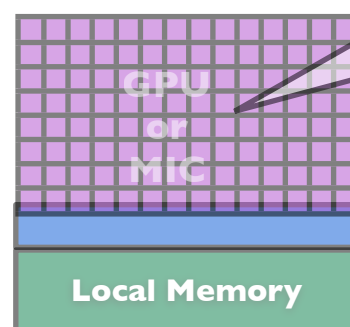
Trilinos

pbdDMAT

## Shared Memory



## Co-Processor



Same Task on  
Blocks of data

GPU: Graphical Processing Unit  
MIC: Many Integrated Core

Focus on which  
tasks can be parallel

CUDA  
OpenCL  
OpenACC

.C  
.Call  
Rcpp  
OpenCL  
inline

OpenMP  
OpenACC

OpenMP  
Threads  
fork

multicore  
(fork)

magma

CUBLAS

MAGMA

MKL  
ACML  
LibSci

HiPLARM

DPLASMA

PLASMA



snow + multicore = parallel