

snow  
Rmpi  
pbdMPI

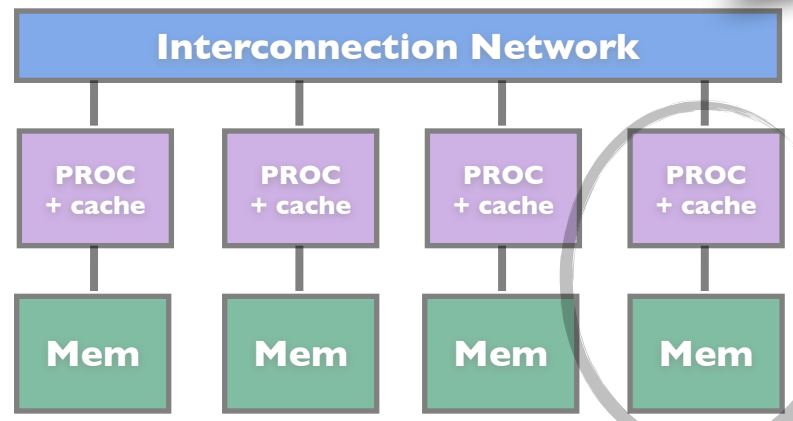
Focus on who owns what data and what communication is needed

Sockets  
MPI  
Hadoop

R

LAPACK  
BLAS

### Distributed Memory



RHIVE

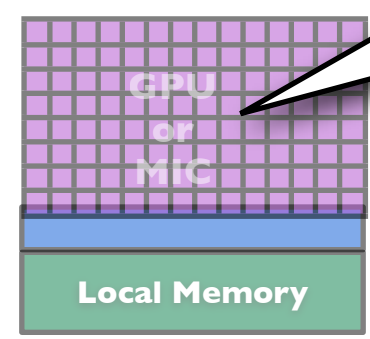
ScaLAPACK  
PBLAS  
BLACS

PETSc

Trilinos

pbdDMAT

### Co-Processor



Same Task on Blocks of data

GPU: Graphical Processing Unit  
MIC: Many Integrated Cores

CUDA  
OpenCL  
OpenACC

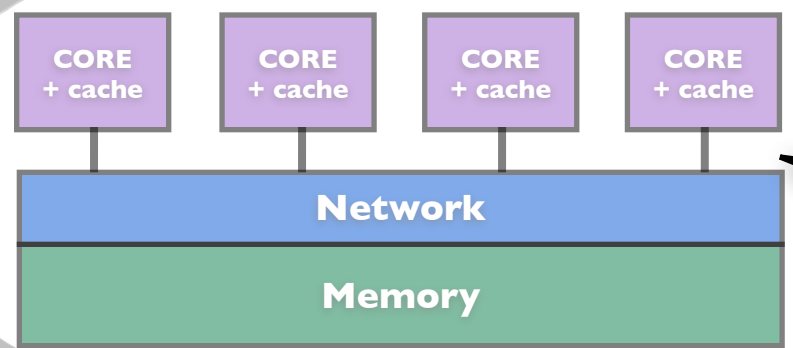
magma

CUBLAS

MAGMA

MKL  
ACML  
LibSci

### Shared Memory



.C  
.Call  
Rcpp  
OpenCL  
inline

OpenMP  
OpenACC

OpenMP  
Threads  
fork

HiPLARM

DPLASMA

Focus on which tasks can be parallel

R

snow + multicore = parallel

multicore  
(fork)

PLASMA