

HPC Glossary

Bit = a binary digit – can store either 1 or 0

Byte = 8 binary digits – can store a value from 0 to 255

Cache = small area of memory that can reduce the time for CPU to access main memory if the required data is already present within the cache

CPU = basic computing hardware unit that performs both integer and floating point operations. A CPU processes machine code instructions to operate upon data within its registers. A CPU may contain multiple cores.

Core = a complete set of registers and functional units within a CPU, capable of independent processing. It will appear to the operating system as a distinct processing unit.

GPU = graphics processing unit = additional chip that can be used for handling graphics, or in a scientific program, used as an accelerator. The programmer has to decide which parts of the program should run on the CPU and which on the GPU, and how to move data back & forth. A GPU may contain its own separate RAM and usually contains a large number of very minimal cores, designed for processing image data.

Hyperthreading = a partial implementation of a core – not a full set of everything so can give a useful speedup for certain workloads. It may appear to the operating system as a distinct processing unit.

Node = element of building a parallel computer. A node is capable of operating as a standalone computer, and hence is a complete processing unit. It usually contains 1 motherboard with one or more CPUs and RAM, and may also contain disks, GPU, etc.

RAM = random access memory = main memory of the computer that is volatile, i.e. values are lost if power removed

Threading = a software mechanism for multiple tasks to operate within a time slicing approach. Different tasks within a program, or different programs, may be associated with different threads and then brought in/out of action as needed.