

Intro to Parallelism

Running jobs in parallel means to use more than one core at a time to get the work done.

- Two main types
 - “embarrassingly parallel”
 - Tightly coupled parallelism

Intro to Parallelism (Cont.)

“Embarrassingly Parallel” vs. Tightly Coupled Parallel Jobs

- “embarrassingly parallel” (EP)
 - Multiple copies of the same code are simultaneously run.
 - Each run gets different inputs (that may differ slightly or greatly).
 - When an EP job is run, copies of the code are paired with the differing inputs, and each pair is then run on a different core.
 - This is known as EP due to the relative efficiency with which the entire job may be spread across multiple cores.

Intro to Parallelism (Cont.)

- Tightly coupled parallelism
 - Involved a code designed to process a single data domain using multiple cores.
 - The data domain is split up into subdomains.
 - Each subdomain is sent to a different core along with a copy of the code.
 - The core runs the code on the subdomain.
 - At every time-step of the code, the boundary conditions of each subdomain are exchanged with the boundary conditions of its neighboring subdomains.
 - Due to this data exchange a fast internal network is often essential for the timely execution of tightly coupled codes (vs. EP codes).
 - Domain decomposition