Message Passing Interface (MPI)

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Overview

- What MPI is
- How to use MPI
- Hands-on with MPI

Ask any questions as you have them!

What is MPI?

- **MPI stands for Message Passing Interface**
  - A standard for parallel computing, passing information between computers over the network
  - This is the standard for multiprocessing across more than one system, the backbone for high-performance computing

How to use MPI

- **MPI has libraries and bindings for most popular programming languages with varying degrees of support**
  - We will be using C today, but you can use just about anything provided we have the libraries on the system
- **Compiling or running with mpirun will execute that program with MPI enabled**

MPI - Hands-On

- **Log into Laputa (10.92.51.56)**
  - ssh USERNAME@laputa
- **Setup the module**
  - module load mpi/openmpi-x86_64
  - This should give you access to mpirun (hopefully we can sort this out so we don’t have to do this step)

MPI - Hands-On

- **Try out mpirun**
  - mpirun hostname
  - Where “hostname” is the command to run. This will echo the name of the system we are running on, once for each process
- **Notice anything missing?**

MPI - Hands-On

- **Try out mpirun**
  - mpirun hostname
  - Where “hostname” is the command to run. This will echo the name of the system we are running on, once for each process
- **Notice anything missing?**

MPI - Hands-On

- **Add a hostfile**
  - Edit HOSTFILE within your home directory
  - Add a list of the IP addresses or hostnames for each node we want to use, each on it’s own line
    - In this case, it’s barus01 – barus08

MPI - Hands-On

- **Try mpirun again, with a hostfile**
  - mpirun –hostfile HOSTFILE hostname
  - This time it should show us all of the hostnames of both laputa but also all of the barus nodes available to us

MPI - Hands-On

- **MPI Scripts**
  - In /scratch is a file called mpi_hello.c, copy it to your home directory
    - cp /scratch/hello.c ~
  - Compile the program using mpicc
    - mpicc -o hello hello.c
  - Run with mpirun
    - mpirun –hostfile HOSTFILE ./hello