Advanced MPI (Message Passing Interface)

Outline

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  - MPI_tsp_stat
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Definition and Use

The main concepts of MPI are:

. Used to create parallel SPMD programs on

- distributed-memory machines with explicit message passing

The Routines available for

point-to-point communication

collective communication

1-to-many

many-to-1

many-to-many

synchronization

Structure of MPI code

- #include <mpi.h>
- ...
- ierr=MPI_Init(&argc, &argv);
- ierr=MPI_Comm_size(MPI_COMM_WORLD,&npes);
- ierr=MPI_Comm_rank(MPI_COMM_WORLD,&iam);
- ...
- ierr=MPI_Finalize();

Structure of MPI Code

- A parallel “Hello, World” program
- – Initialize MPI
- – Have each node print out its node number
- – Quit MPI

- #include <mpi.h>
- …
- ierr=MPI_Init(&argc, &argv);
- ierr=MPI_Comm_size(MPI_COMM_WORLD,&npes);
- ierr=MPI_Comm_rank(MPI_COMM_WORLD,&iam);
- …
- ierr=MPI_Finalize();

Load the module (software application)

- module load OpenMPI
- sbatch myJobScript
- squeue –u haboudj

Job Script Code (SLURM)

Run the job script

Steps to Use a Super Computer (Example Template)

- **ssh username@hostname.ncsa.illinois.edu<ENTER>**
- **git clone \ https://github.com/aaronweeden/pi2018-submitting.git<ENTER>**
- **cd pi2018-submitting<ENTER>**
- **cc -o test.exe test.c<ENTER>**
- **cat test.pbs<ENTER>**
- **#!/bin/bash**
- **#PBS -l nodes=2:ppn=32:xe**
- **#PBS -l walltime=00:05:00**
- **#PBS -N test**
- **cd $PBS_O_WORKDIR**
- **aprun -n 4 ./test.exe|sort**

Running Job Script

- **cat test.pbs<ENTER>**
- **#!/bin/bash**
- **#PBS -l nodes=2:ppn=32:xe**
- **#PBS -l walltime=00:05:00**
- **#PBS -N test**
- **cd $PBS_O_WORKDIR**
- **aprun -n 4 ./test.exe|sort**

Error and Output Files

References

1. https://people.sc.fsu.edu/~jburkardt/c_src/laplace_mpi/laplace_mpi.html
2. Please see the TACC_CS395_COURSE_MATERIALS s1.
3. https://www.cs.usfca.edu/~peter/ipp/