Test of job submission to cluster

1. Sample parallel testing program

Two items are provided:

- cxxpi.cxx: A sample parallel MPI c++ program for calculating Pi [* the program is modified from the example program from the open source MPICH3], and
- slurm_job.sh: a batch job submission script.

Try to compile the code and submit to the cluster. Check if your MPI parallel program can run in the cluster properly.

1.1 Load the intel MPI library

First you have to load the intel MPI library

```
[r2@access2 ~]$ source /opt/intel/compilers_and_libraries_2017/linux/mpi/bin64/mpivars.sh
```

Use the command "which" to check if the intel MPI commands (e.g. mpirun) are loaded properly. Check with the version of the library.

```
[r2@access2 ~]$ which mpirun
/opt/intel/compilers_and_libraries_2017.2.174/linux/mpi/intel64/bin/mpirun

[r2@access2 ~]$ mpirun --version
Intel(R) MPI Library for Linux* OS, Version 2017 Update 2 Build 20170125 (id: 16752)
Copyright (C) 2003-2017, Intel Corporation. All rights reserved.
```

1.2 Compilation of the sample program

Copy the sample program to your own directory to avoid modifying the original copy. Check if the files are properly copied.

```
[r2@access2 ~]$ cp -r /r2/sample_program $HOME
[r2@access2 ~]$ cd $HOME/sample_program
[r2@access2 sample_program]$ ls
cxxpi.cxx  slurm_job.sh
```

Compile the sample code with g++ compiler (with MPI lib loaded) and output as executable "parallel_pi.out"

```
[r2@access2 sample_program]$ mpicxx cxxpi.cxx -o parallel_pi.out
[r2@access2 sample_program]$ ls
cxxpi.cxx  parallel_pi.out  slurm_job.sh
```

1.3 Job submission

Finally, submit your job to the cluster using command sbatch:

```
[r2@access2 sample_program]$ sbatch -p vhpc-hko-r2 slurm_job.sh
Submitted batch job 64837
```

After the job is complete, a log file (paratest_XXXXX.log) will be saved in your working directory as shown:

```
[r2@access2 sample_program]$ ls
cxxpi.cxx  parallel_pi.out  paratest_64837.log  slurm_job.sh
```

Check the contents of the log file to see if a correct result is obtained:

```
[r2@access2 sample_program]$ cat paratest_64837.log
change dir to:
/r2/sample_program
Calculating Pi parallely with 2 nodes each with 2 cores
Process Process Process 1 of 4 is on r630-235.super.clustertech.com
3 of 4 is on r630-235.super.clustertech.com
Process 0 of 4 is on r630-234.super.clustertech.com
2 of 4 is on r630-234.super.clustertech.com
pi is approximately 3.14159 the calculation delta is 8.33331e-10
wall clock time = 0.00155997
```