# To install mpi4py:  
#==============================  
  
module load openmpi.intel  
module load python2  
pip install --user mpi4py  
  
#hello world example:  
#==============================

03:28 PM login-0-2 ~/mpi4py-example> cat hw.py  
#!/usr/bin/env python  
  
from mpi4py import MPI  
  
  
comm = MPI.COMM\_WORLD  
  
print "Hello! I'm rank %d from %d running in total..." % (comm.rank, comm.size)  
  
comm.Barrier()   # wait for everybody to synchronize \_here\_

03:28 PM login-0-2 ~/mpi4py-example> mpirun -np 4 hw.py

03:28 PM login-0-2 ~/mpi4py-example> cat hw.slurm  
#!/bin/bash  
  
# Job name:  
#SBATCH --job-name=hello  
#  
# Project:  
#SBATCH --account=staff  
#  
# Wall clock limit:  
#SBATCH --time=0:02:00  
#  
# Max memory usage:  
#SBATCH --mem-per-cpu=1G  
  
#SBATCH --ntasks=4  
  
## Set up job environment:  
source /cluster/bin/jobsetup  
module purge   # clear any inherited modules  
set -o errexit # exit on errors  
  
module load openmpi.intel  
module load python2  
  
## Copy input files to the work directory:  
cp hw.py $SCRATCH  
  
## Do some work:  
cd $SCRATCH  
  
mpirun python hw.py  
03:29 PM login-0-2 ~/mpi4py-example> sbatch --ntasks 4 hw.slurm  
Submitted batch job 13750925  
03:32 PM login-0-2 ~/mpi4py-example> cat slurm-13750925.out  
Starting job 13750925 ("hello") on c2-[24,26] at Wed Jan 13 15:30:11 CET 2016  
Hello! I'm rank 0 from 4 running in total...  
Hello! I'm rank 3 from 4 running in total...  
Hello! I'm rank 1 from 4 running in total...  
Hello! I'm rank 2 from 4 running in total...  
  
Currently Loaded Modulefiles:  
  1) intel/2015.3          3) libffi/3.0.13  
  2) openmpi.intel/1.8.8   4) python2/2.7.10  
  
Job step resource usage:  
       JobID    JobName  AllocCPUS  MaxVMSize     MaxRSS    Elapsed ExitCode  
------------ ---------- ---------- ---------- ---------- ---------- --------  
13750925          hello          4                         00:00:07      0:0  
13750925.0         true          2    270464K      1540K   00:00:00      0:0  
13750925.1        orted          1          0          0   00:00:02      0:0  
  
Job 13750925 ("hello") completed on c2-[24,26] at Wed Jan 13 15:30:16 CET 2016  
03:33 PM login-0-2 ~/mpi4py-example>  
  
#Calculating-pi-with-selfspawning-master-and-separate-client-python-script:  
#==============================  
  
03:30 PM login-0-2 ~/mpi4py-example> cat mpi.py  
#!/usr/bin/env python  
from mpi4py import MPI  
import numpy  
import sys  
import os  
ntasks = int(os.environ["SLURM\_NTASKS"])  
print "number of processes", ntasks  
comm = MPI.COMM\_SELF.Spawn(sys.executable,  
                           args=['cpi.py'],  
                           maxprocs=ntasks-1)  
N = numpy.array(100, 'i')  
comm.Bcast([N, MPI.INT], root=MPI.ROOT)  
PI = numpy.array(0.0, 'd')  
comm.Reduce(None, [PI, MPI.DOUBLE],  
            op=MPI.SUM, root=MPI.ROOT)  
print(PI)  
comm.Disconnect()  
03:31 PM login-0-2 ~/mpi4py-example> cat cpi.py  
#!/usr/bin/env python  
from mpi4py import MPI  
import numpy  
  
comm = MPI.Comm.Get\_parent()  
size = comm.Get\_size()  
rank = comm.Get\_rank()  
  
N = numpy.array(0, dtype='i')  
comm.Bcast([N, MPI.INT], root=0)  
h = 1.0 / N; s = 0.0  
for i in range(rank, N, size):  
    x = h \* (i + 0.5)  
    s += 4.0 / (1.0 + x\*\*2)  
PI = numpy.array(s \* h, dtype='d')  
comm.Reduce([PI, MPI.DOUBLE], None,  
            op=MPI.SUM, root=0)  
  
comm.Disconnect()  
  
03:31 PM login-0-2 ~/mpi4py-example> cat mpi.slurm  
#!/bin/bash  
  
# Job name:  
#SBATCH --job-name=ppipy  
#  
# Project:  
#SBATCH --account=staff  
#  
# Wall clock limit:  
#SBATCH --time=0:02:00  
#  
# Max memory usage:  
#SBATCH --mem-per-cpu=1G  
  
#SBATCH --ntasks=4  
  
## Set up job environment:  
source /cluster/bin/jobsetup  
module purge   # clear any inherited modules  
set -o errexit # exit on errors  
  
module load openmpi.intel  
module load python2  
  
## Copy input files to the work directory:  
cp mpi.py cpi.py $SCRATCH  
  
## Do some work:  
cd $SCRATCH  
  
mpirun -np 1 python mpi.py  
03:31 PM login-0-2 ~/mpi4py-example> sbatch --ntasks 4 mpi.slurm  
Submitted batch job 13750931  
03:32 PM login-0-2 ~/mpi4py-example> cat slurm-13750931.out  
Starting job 13750931 ("ppipy") on c16-33 at Wed Jan 13 15:32:34 CET 2016  
number of processes 4  
3.14160098692  
  
Currently Loaded Modulefiles:  
  1) intel/2015.3          3) libffi/3.0.13  
  2) openmpi.intel/1.8.8   4) python2/2.7.10  
  
Job script resource usage:  
       JobID  MaxVMSize     MaxRSS  
------------ ---------- ----------  
13750931.ba+    813236K     25144K  
  
Job step resource usage:  
       JobID    JobName  AllocCPUS  MaxVMSize     MaxRSS    Elapsed ExitCode  
------------ ---------- ---------- ---------- ---------- ---------- --------  
13750931          ppipy          4                         00:00:05      0:0  
  
Job 13750931 ("ppipy") completed on c16-33 at Wed Jan 13 15:32:37 CET 2016  
03:32 PM login-0-2 ~/mpi4py-example>