

## CS596 HW4

Chieh Wen Chang 4155100480

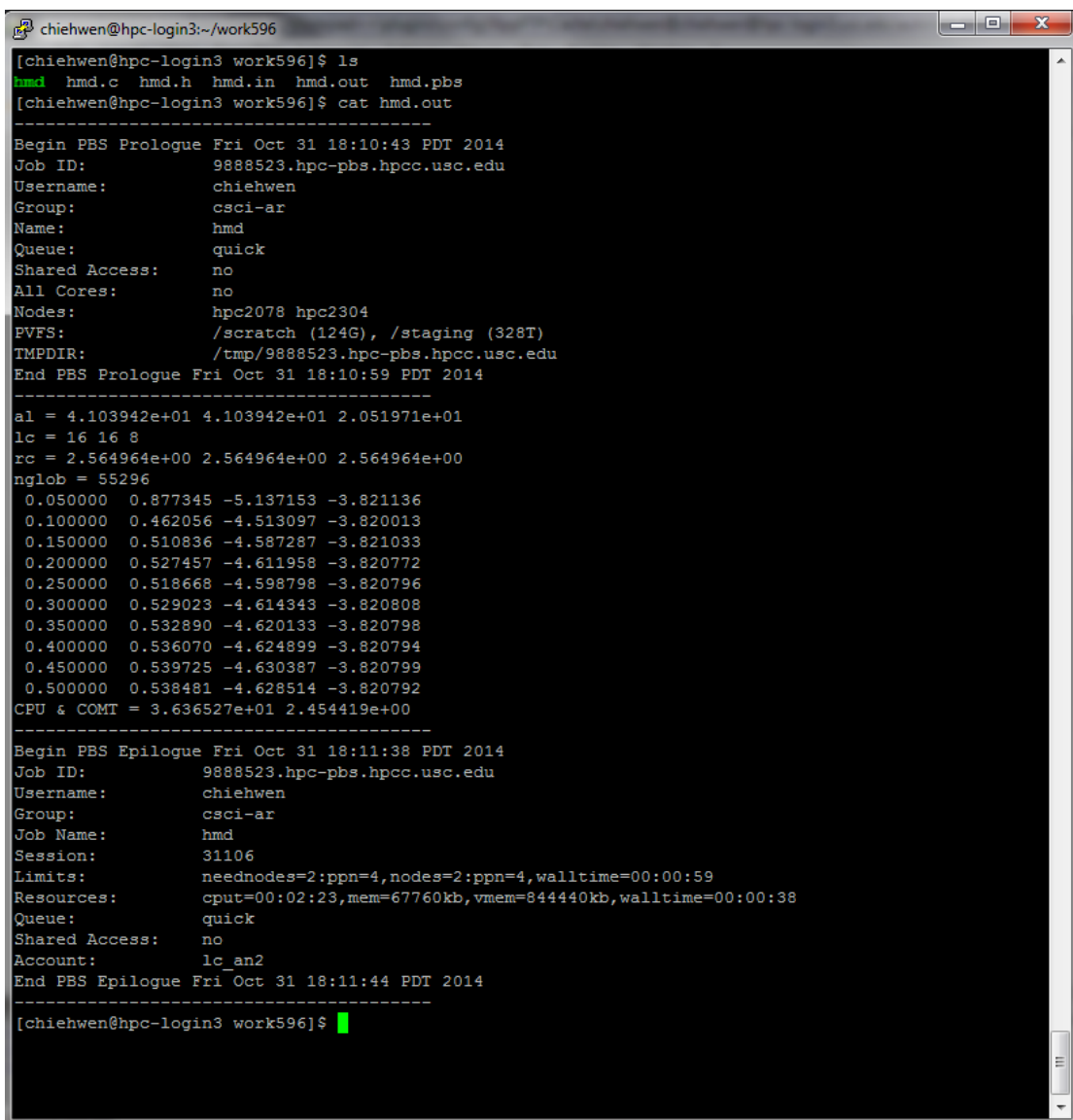
### README:

You should generate “hmd1” to “hmd8” for submit pbs. Change code in hmd.c.

### REPORT:

1. I use “////////////////////modified////////////////////” to indicate where I modified.

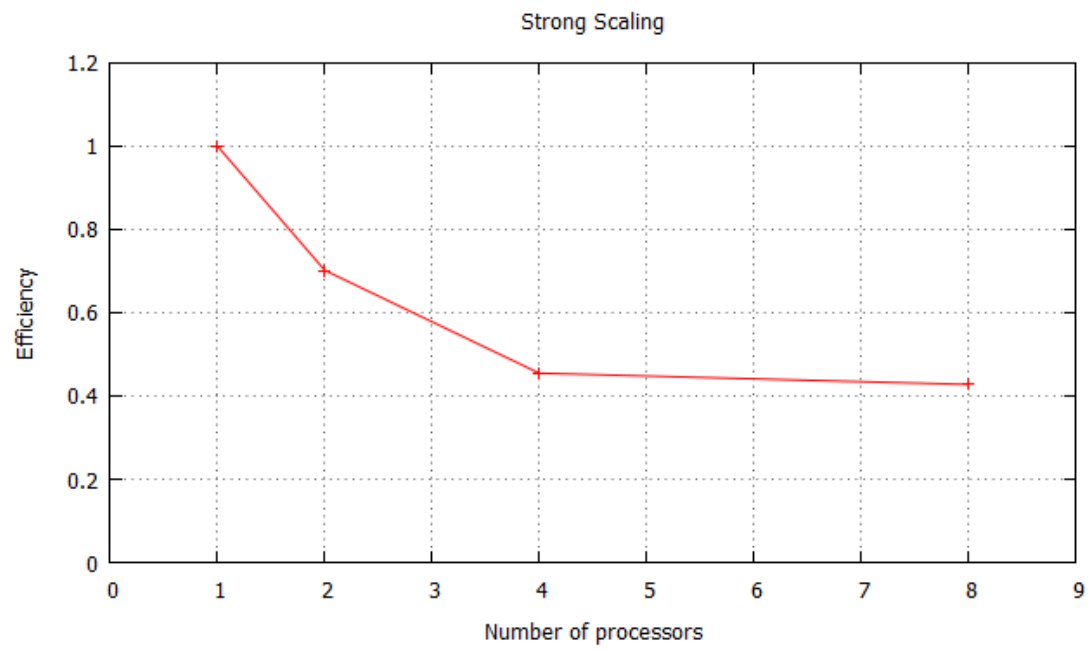
2.



```
chiehwen@hpc-login3:~/work596
[chiehwen@hpc-login3 work596]$ ls
hmd hmd.c hmd.h hmd.in hmd.out hmd.pbs
[chiehwen@hpc-login3 work596]$ cat hmd.out
-----
Begin PBS Prologue Fri Oct 31 18:10:43 PDT 2014
Job ID:          9888523.hpc-pbs.hpcc.usc.edu
Username:        chiehwen
Group:           csci-ar
Name:            hmd
Queue:           quick
Shared Access:   no
All Cores:       no
Nodes:           hpc2078 hpc2304
PVFS:            /scratch (124G), /staging (328T)
TMPDIR:          /tmp/9888523.hpc-pbs.hpcc.usc.edu
End PBS Prologue Fri Oct 31 18:10:59 PDT 2014
-----
al = 4.103942e+01 4.103942e+01 2.051971e+01
lc = 16 16 8
rc = 2.564964e+00 2.564964e+00 2.564964e+00
nglob = 55296
 0.050000  0.877345 -5.137153 -3.821136
 0.100000  0.462056 -4.513097 -3.820013
 0.150000  0.510836 -4.587287 -3.821033
 0.200000  0.527457 -4.611958 -3.820772
 0.250000  0.518668 -4.598798 -3.820796
 0.300000  0.529023 -4.614343 -3.820808
 0.350000  0.532890 -4.620133 -3.820798
 0.400000  0.536070 -4.624899 -3.820794
 0.450000  0.539725 -4.630387 -3.820799
 0.500000  0.538481 -4.628514 -3.820792
CPU & COMT = 3.636527e+01 2.454419e+00
-----
Begin PBS Epilogue Fri Oct 31 18:11:38 PDT 2014
Job ID:          9888523.hpc-pbs.hpcc.usc.edu
Username:        chiehwen
Group:           csci-ar
Job Name:        hmd
Session:         31106
Limits:          neednodes=2:ppn=4,nodes=2:ppn=4,walltime=00:00:59
Resources:       cput=00:02:23,mem=67760kb,vmem=844440kb,walltime=00:00:38
Queue:           quick
Shared Access:   no
Account:         lc_an2
End PBS Epilogue Fri Oct 31 18:11:44 PDT 2014
-----
[chiehwen@hpc-login3 work596]$
```

3.

```
chiehwen@hpc-login3:~/work596
Begin PBS Prologue Fri Oct 31 18:55:42 PDT 2014
Job ID: 9888943.hpc-pbs.hpcc.usc.edu
Username: chiehwen
Group: csci-ar
Name: hmd
Queue: quick
Shared Access: no
All Cores: no
Nodes: hpc2306
TMPDIR: /tmp/9888943.hpc-pbs.hpcc.usc.edu
End PBS Prologue Fri Oct 31 18:55:42 PDT 2014
-----
8 threads
al = 4.103942e+01 4.103942e+01 4.103942e+01
lc = 16 16 16
rc = 2.564964e+00 2.564964e+00 2.564964e+00
nglob = 55296
CPU & COMT = 2.252941e+01 1.540825e-01
4 threads
al = 4.103942e+01 4.103942e+01 4.103942e+01
lc = 16 16 16
rc = 2.564964e+00 2.564964e+00 2.564964e+00
nglob = 55296
CPU & COMT = 4.238237e+01 1.552823e-01
2 threads
al = 4.103942e+01 4.103942e+01 4.103942e+01
lc = 16 16 16
rc = 2.564964e+00 2.564964e+00 2.564964e+00
nglob = 55296
CPU & COMT = 5.490612e+01 1.406898e-01
1 threads
al = 4.103942e+01 4.103942e+01 4.103942e+01
lc = 16 16 16
rc = 2.564964e+00 2.564964e+00 2.564964e+00
nglob = 55296
CPU & COMT = 7.706167e+01 1.108973e-01
-----
Begin PBS Epilogue Fri Oct 31 18:59:01 PDT 2014
Job ID: 9888943.hpc-pbs.hpcc.usc.edu
Username: chiehwen
Group: csci-ar
Job Name: hmd
Session: 17820
Limits: neednodes=1:ppn=8,nodes=1:ppn=8,walltime=00:20:00
Resources: cput=00:08:19,mem=40564kb,vmem=383728kb,walltime=00:03:20
Queue: quick
Shared Access: no
Account: lc_an2
End PBS Epilogue Fri Oct 31 18:59:01 PDT 2014
-----
[chiehwen@hpc-login3 work596]$
```



Discussion:

More processors has better performance in Hybrid MPI OpenMP.