Introduction to Parallel Processing

Dr. Guy Tel-Zur

Home assignment #2

Subject: Parallel Matrix-Matrix Multiplication using MPI

1) Download the `mm_pblas.c` code from the course web site.

2) Increase the matrix size to: `M=12000`, `N=10000` and `L=15000`.

3) Compile the code on the "`hobbits`" using the following syntax:

```
mpicc -o mm_pblas mm_pblas.c -L/usr/local/lib -L/usr/lib64/atlas
-lscalapack -lptf77blas
```

4) Execute the program using a machine file and repeat the computation for n=2,3,4,..,12 tasks.

For each run record the "user" time and the "real" time from the output of the `time` command:

```
time mpirun -np n -machinefile ./machines ./mm_pblas
```

(be patient the execution may take several minutes...)

5) Make a figure with multiple plots of the execution real_time, user_time, real_time/n, user_time/n, speedup and efficiency vs. n, the number of tasks.

What are your conclusions?

6) Do you think the same problem could be solved on a single computer (try it on Matlab)?

7) Compile the program again for tracing with `jumpshot` using the following syntax:

```
mpecc -o mm_pblas mm_pblas.c -L/usr/local/lib -L/usr/lib64/atlas
-lscalapack -lptf77blas -mpilog
```

attach a screen capture of jumpshot for 12 tasks.

9) Compile again the code with `scalasca` instrumentation and attach a screen capture of scalasca, again for 12 tasls. Conclusions….

Submit all the above plots, figure and conclusions within two weeks.