

Some ABAQUS Results on the New EM64T Cluster with GPFS

Yeo Eng Hee
(SVU/Acad Computing, Computer Centre)

I would like to share with you the recent test runs that I did on the new Xeon EM64T-based cluster with Infiniband interconnect and GPFS (Global Parallel File System). The new system is the latest addition to the family of high-performance servers in SVU and if you have not tried your compute-intensive programs on it, I strongly recommend you do, especially if your program is also I/O intensive (reads/writes to files heavily)

ABAQUS comes with an extensive set of example and benchmark programs, covering a wide range of areas such as dynamic stress analysis, vehicle and tyre analysis, heat transfer, piezoelectric, etc (see <http://panther4.nus.edu.sg:2080/v6.5/>). The procedure for calling up the sample input files is easy. Just use a simple abaqus command such as:

```
> abaqus fetch job=sample.inp
```

I ran two simulations, brake squeal analysis, and jack-up foundation analyses on the new cluster. Read about the details:

<http://panther4.nus.edu.sg:2080/v6.5/books/exa/ch02s02aex71.html>
<http://panther4.nus.edu.sg:2080/v6.5/books/exa/ch10s01aex115.html>

During the analysis runs, ABAQUS makes use of the scratch disk to write and read temporary analysis files. For the test runs above, three scratch disks were used for comparison: local hard disk (/scratch), NFS (/lsftmp) and GPFS (/svutmp. Note: only /svutmp on atlas2 is a GPFS filesystem). The jobs were launched from atlas2, using the following batch submission commands, to the linux64 queue:

Test program 1:

```
> abaqus fetch job=brake_squeal
> abaqus input=brake_squeal job=eh101 queue=linux64 scratch=/lsftmp/enghee
> abaqus input=brake_squeal job=eh102 queue=linux64 scratch=/svutmp/enghee
> abaqus input=brake_squeal job=eh103 queue=linux64 scratch=/scratch
```

Test program 2:

```
> abaqus fetch job=jackup
> abaqus input=jackup job=eh101 queue=linux64 scratch=/lsftmp/enghee
> abaqus input=jackup job=eh102 queue=linux64 scratch=/svutmp/enghee
> abaqus input=jackup job=eh103 queue=linux64 scratch=/scratch
```

The performance of each of the analysis runs are shown in the bar chart in Figure 1 below. As can be seen, the GPFS file system clearly out-performs NFS and even the local hard disk.

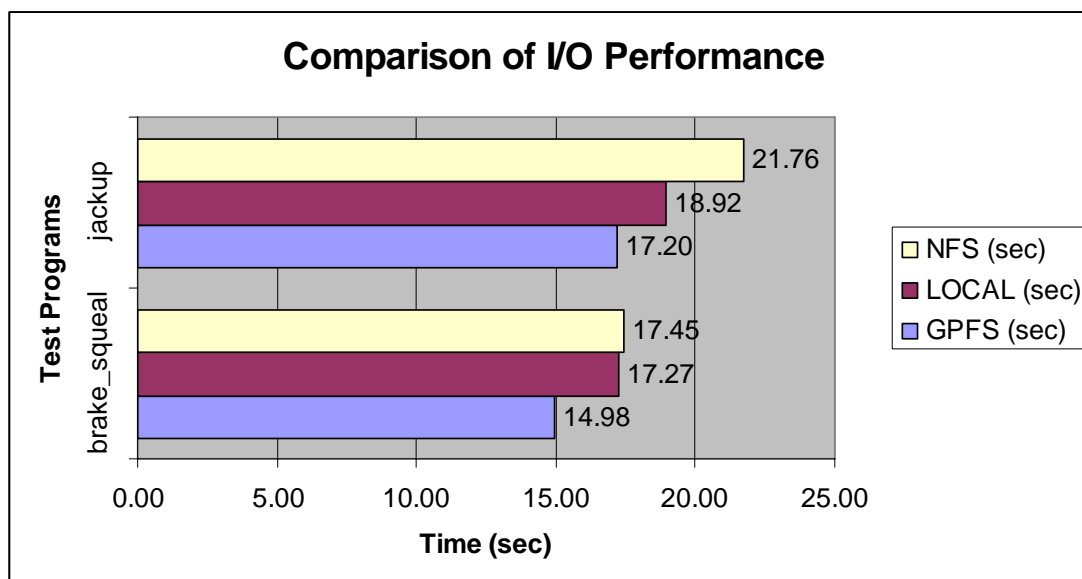


Figure 1: Comparison of Disk I/O Performance between local harddisk, NFS and GPFS file systems.