GPUBenchmark results for lorca

May 29, 2012

Abstract

This report shows the GPUBenchmark results obtained on lorca on May 29, 2012.

Contents

1 Introduction

GPUBenchmark has been used to evaluate different aspects of the lorca computer. Depending on its hardware architecture and the libraries available when GPUBenchmark was run, some or all of the following aspects will be reported in this document:

- Transfer speed between hard disk and main memory.

- Transfer speed between GPU and main memory.

- Transfer speed between two GPUs.

- Matrix-matrix multiplication performance.

- Matrix-vector multiplication performance.

The next section describes the hardware characteristics of lorca. Each one of the remainder sections will focus in one of the previously enumerated performance aspects.

2 Hardware description

This section shows the characteristics of the CPUs and GPU of lorca. The CPUs available at lorca have the next characteristics:

```
Intel(R) Xeon(R) CPU X3363 @ 2.83GHz
 cpu MHz     : 2833.020
 cache size : 6144 KB
 cpu cores  : 4
 bogomips   : 5668.12
```

```
Intel(R) Xeon(R) CPU X3363 @ 2.83GHz
 cpu MHz    : 2833.020
 cache size : 6144 KB
 cpu cores  : 4
 bogomips   : 5668.77

Intel(R) Xeon(R) CPU X3363 @ 2.83GHz
 cpu MHz    : 2833.020
 cache size : 6144 KB
 cpu cores  : 4
 bogomips   : 5668.80

Intel(R) Xeon(R) CPU X3363 @ 2.83GHz
 cpu MHz    : 2833.020
 cache size : 6144 KB
 cpu cores  : 4
 bogomips   : 5668.79
```

The GPU Device installed on lorca that has been used to perform some of the tests has the next characteristics:

3   Transfer speed between hard disk and main memory

To obtain the transfer speed from hard disk to main memory, and from main memory to hard disk, several matrices of floats with different number of rows and columns have been created, and the time required to transfer these matrices from hard disk to main memory, and viceversa, has been measured.

In order to obtain a more accurate measure, for each number of rows and columns, ten transfers were carried out in both directions. The median of the results for each case is reported.

Table 1 shows the transfer speed obtained for several numbers of rows and columns, from hard disk to main memory, and from main memory to hard disk. Note that the transfer speed is given in Mebibytes per second (MiB/s)[1]. These results are reported graphically in Figure 1.

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[1]A Mebibyte is defined as 2^{20} bytes

Rows	Columns	Size (MiB)	Hard disk → Main memory (MiB/s)	Main memory → Hard disk (MiB/s)
128	128	0.06	134.12	1.89
256	256	0.25	178.95	6.21
512	512	1.00	39.46	24.03
1024	1024	4.00	62.24	49.74
2048	2048	16.00	97.77	62.49
4096	4096	64.00	105.19	80.17
8192	8192	256.00	112.06	90.71
10240	10240	400.00	132.64	111.75

Table 1: Transfer speed from hard disk to main memory, and from main memory to hard disk, for different matrix sizes
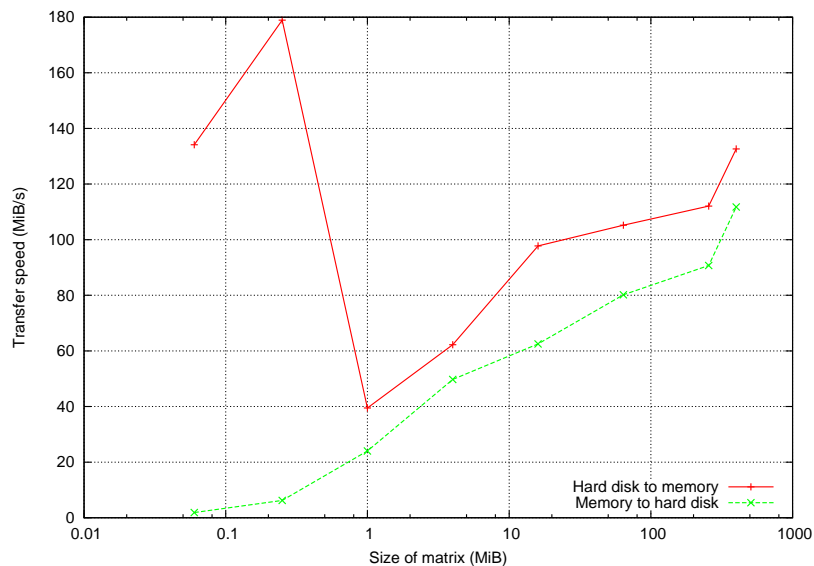

Figure 1: Transfer speed from hard disk to main memory, and from main memory to hard disk, for different matrix sizes