

---

# Programming a Linux Cluster using a Parallel Java Framework (JPPF)

**John Hetherington**  
Bay of Plenty Polytechnic  
Private Bag 12001  
Tauranga 3143 NZ  
john.hetherington@boppoly.ac.nz

**Murray Foote**  
Bay of Plenty Polytechnic  
Private Bag 12001  
Tauranga 3143 NZ  
murray.foote@boppoly.ac.nz



## Abstract

This paper targets the construction, analysis and programming of a cluster of quad core machines using open source software. The intention is to firstly investigate the practical hardware problems of rapidly switching between machines with a master slave configuration, to tune and minimize packet transport times. Secondly to tackle the breaking of jobs of into tasks and scheduling the tasks to the slave machines for efficient processing using the Java Parallel programming framework.

## Keywords

Linux, cluster, programming, open source, parallel, tuning

## Introduction

The efficiency of small Business data processing could be enhanced using clusters of a few machines working in unison.

Our intention is to research the tuning factors affecting different job and data types then use AI techniques to optimize the process settings and create a general purpose computing cluster as against the current tuned, job and data specific configurations.

On the teaching and Education plane students urgently require hands on experience of setting up, programming and tuning of these multi-core systems for industrial use, they urgently need introducing to practical Parallel programming in the Polytechnic arena, sadly at the moment it is the remit solely of Universities.

---

This poster paper appeared at the 2nd annual conference of Computing and Information Technology Research and Education New Zealand (CITRENZ2011) incorporating the 24<sup>th</sup> Annual Conference of the National Advisory Committee on Computing Qualifications, Rotorua, New Zealand, July 6-8. Samuel Mann and Michael Verhaart (Eds).

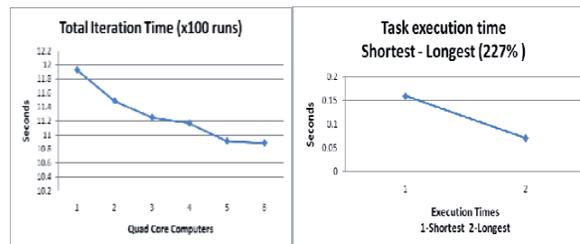
## Methodology

Using a practical hand-on approach (positivism) we seek to establish empirical methods and measurement of the functional capabilities of parallel processing and cluster networking concepts to meet modern business needs, perhaps challenging the current approaches that have been taken to date.

## Structure

In the poster paper we shall adopt the use of images of the Cluster construction, screen shots of code combined with Data Tables and Graphs of performance against cores, threads and the many job tuning factors

## Results



## Conclusion

In summary initial findings indicate the addition of more cores to the job shortens the job execution time but other tuning factors involved are the task size which affects network transport times, task scheduling algorithms used and the threads per CPU core.

## References

Blaise B (27/01/2009) *Introduction to Parallel Computing*, Lawrence Livermore National Laboratory, Retrieved 13th May 2011 from [http://computing.llnl.gov/tutorials/parallel\\_comp](http://computing.llnl.gov/tutorials/parallel_comp)

*Java Parallel Programming Framework (jppf)*(2011) Retrieved 13th May 2011 from <http://www.jppf.org/>

Google code University *Introduction to Parallel Programming and MapReduce* Retrieved 13<sup>th</sup> May 2011 from <http://code.google.com/edu/parallel/mapreduce-tutorial.html>