

Java Parallel Programming Framework: JPPF

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This Poster explains the architecture and operation of the parallel framework, one of many Open Source developments that enable many individual computers to be networked or linked together to form a computing cluster with a much more powerful performance.

Java was chosen due to the fact that many Degree and Diploma students are taught this language, also because the new redesigned Java Virtual Machines now have a benchmarked program speed equal to that of C and C++ code.

Java is no longer slow in execution and Industry is beginning to employ it for real time control of Plant and Processes. Java is a multiplatform language and will run on many operating systems and servers, the libraries available for it are extensive indeed, it is also an expandable language.

Java is now open source as is the MySQL database server both of which are now under the Sun Systems umbrella.

Sun Systems certification in Java Programming is a much sought after and valued qualification by industry, especially at present in Wellington and Auckland. A goal of the Java programming was to reach a standard and tailor the courses so students could gain the Sun Systems Qualifications. Sadly this now unlikely to happen.

With the advent of the Research and Development Industrial Park planned for Tauranga in the near future the light may indeed dawn here shortly and skilled employment prospects brighten locally.

The Linux Operating System is already designed to cater for parallel architectures and has been since its inception, it is stable, open source and comparatively secure. Linux servers have low maintenance and operating costs.

Modern Notebooks, Laptops and Desktops already have multi-core cpu's so parallel programming is moving slowly closer by the day, fuzzy rule based heuristic programming waits for the day when architectures will cater for parallel execution of rules for which they were initially designed.

Neural Network programming and Genetic Algorithms

will then become practical every day industrial tools, the number of cores will increase, quad core is common now, 8 & 16 core are already in the pipeline.

Industrial demand for multi-core programmers and those with cluster construction and tuning skills will be vital in the years ahead, with this in mind our goal was to research and gain experience with the JPPF framework, develop a working cluster of between initially 6 increasing to 20 machines, document and present the findings at a later stage, then develop teaching notes on both practical cluster construction and networking using the Linux OS and multi-core parallel programming using Java which could be used to introduce students on both our Degree and Diploma modules to this important area.

Students need to have both the theoretical awareness of this area coupled with hands on experience and feeling for how these systems behave in real terms.

Until A.I can assist in automatic tuning of parallel clusters to solve particular problems and make them into general industrial problem solvers, this remains a dark art only mastered by hands on vocational approaches.

Keywords:

Multi-core programming, Parallel Programming, Cluster Construction, Java, Linux