

Table of Contents

1 Evaluation and Performance

| | |
|--|-----------|
| Performance Issues of Distributed MPI Applications in a German Gigabit Testbed | 3 |
| T. Eickermann, H. Grund, and J. Henrichs | |
| Reproducible Measurements of MPI Performance Characteristics | 11 |
| W. Gropp and E. Lusk | |
| Performance Evaluation of the MPI/MBCF with the NAS Parallel Benchmarks | 19 |
| K. Morimoto, T. Matsumoto, and K. Hiraki | |
| Performance and Predictability of MPI and BSP Programs on the CRAY T3E | 27 |
| J.A. González, C. Rodríguez, J.L. Roda, D.G. Morales, F. Sande, F. Almeida, and C. León | |
| Automatic Profiling of MPI Applications with Hardware Performance Counters | 35 |
| R. Rabenseifner | |
| Monitor Overhead Measurement with SKaMPI | 43 |
| D. Kranzlmüller, R. Reussner, and Ch. Schaubschläger | |
| A Standard Interface for Debugger Access to Message Queue Information in MPI | 51 |
| J. Cownie and W. Gropp | |
| Towards Portable Runtime Support for Irregular and Out-of-Core Computations | 59 |
| M. Bubak and P. Łuszczek | |
| Enhancing the Functionality of Performance Measurement Tools for Message Passing Environments | 67 |
| M. Bubak, W. Funika, K. Iskra, R. Maruszewski, and R. Wismüller | |

| | |
|---|------------|
| Performance Modeling Based on PVM H. Mierendorff and H. Schwamborn | 75 |
| Efficient Replay of PVM Programs M. Neyman, M. Bukowski, and P. Kuzora | 83 |
| Relating the Execution Behaviour with the Structure of the Application A. Espinosa, F. Parcerisa, T. Margalef, and E. Luque | 91 |
| 2. Extensions and Improvements | |
| Extending PVM with Consistent Cut Capabilities: Application Aspects and Implementation Strategies A. Clematis and V. Gianuzzi | 101 |
| Flattening on the Fly: Efficient Handling of MPI Derived Datatypes J. L. Träff, R. Hempel, H. Ritzdorf, and F. Zimmermann | 109 |
| PVM Emulation in the Harness Metacomputing System: A Plug-In Based Approach M. Migliardi and V. Sunderam | 117 |
| Implementing MPI-2 Extended Collective Operations P. Silva and J. G. Silva | 125 |
| Modeling MPI Collective Communications on the AP3000 Multicomputer J. Touriño and R. Doallo | 133 |
| MPL*: Efficient Record/Replay of Nondeterministic Features of Message Passing Libraries J. Chassin de Kergommeaux, M. Ronsse, and K. De Bosschere | 141 |
| Comparison of PVM and MPI on SGI Multiprocessors in a High Bandwidth Multimedia Application R. Kutil and A. Uhl | 149 |

| | |
|--|------------|
| On Line Visualization or Combining the Standard ORNL PVM with a Vendor PVM Implementation | 157 |
| J. Borkowski | |
| Native Versus Java Message Passing | 165 |
| N. Stankovic and K. Zhang | |
| JPT: A Java Parallelization Tool | 173 |
| K. Beyls, E. D'Hollander, and Y. Yu | |
| Facilitating Parallel Programming in PVM Using Condensed Graphs | 181 |
| J. P. Morrison and R. W. Connolly | |
| Nested Bulk Synchronous Parallel Computing | 189 |
| F. de Sande, C. León, C. Rodríguez, J. Roda, and J. A. González | |
| | |
| 3. Implementation Issues | |
| | |
| An MPI Implementation on the Top of the Virtual Interface Architecture | 199 |
| M. Bertozzi, F. Boselli, G. Conte, and M. Reggiani | |
| MiMPI: A Multithread-Safe Implementation of MPI | 207 |
| F. García, A. Calderón, and J. Carretero | |
| Building MPI for Multi-Programming Systems Using Implicit Information | 215 |
| F. C. Wong, A.C. Arpaci-Dusseau, and D.E. Culler | |
| The Design for a High Performance MPI Implementation on the Myrinet Network | 223 |
| L. Prylli, B. Tourancheau, and R. Westrelin | |
| Implementing MPI's One-Sided Communications for WMPI | 231 |
| F. E. Mourão and J. G. Silva | |

4. Tools

| | |
|--|------------|
| A Parallel Genetic Programming Tool Based on PVM | 241 |
| F. Fernández , J. M. Sánchez, M. Tomassini, and J.A. Gómez | |
| Net-Console: A Web-Based Development Environment for MPI Programs | 249 |
| A. Papagapiou, P. Evripidou, and G. Samaras | |
| Visual MPI, A knowledge-Based System for Writing Efficient MPI Applications | 257 |
| D. Ferenc, J. Nabrzyski, M. Stroiński, and P. Wierzejewski | |

5. Algorithms

| | |
|---|------------|
| Solving Generalized Boundary Value Problems with Distributed Computing and Recursive Programming | 267 |
| I. Szeberényi and G. Domokos | |
| Hyper-Rectangle Distribution Algorithm for Parallel Multi-Dimensional Numerical Integration | 275 |
| R. Čiegis, R. Šablinskas, and J. Waśniewski | |
| Parallel Monte Carlo Algorithms for Sparse SLAE Using MPI | 283 |
| V. Alexandrov and A. Karaivanova | |
| A Method for Model Parameter Identification Using Parallel Genetic Algorithms | 291 |
| J. I. Hidalgo, M. Prieto, J. Lanchares, F. Tirado, B. de Andrés, S. Esteban, and D. Rivera | |
| Large-Scale FE Modelling in Geomechanics: A Case Study in Parallelization | 299 |
| R. Blaheta, O. Jakl, and J. Starý | |
| A Parallel Robust Multigrid Algorithm Based on Semi-Coarsening | 307 |
| M. Prieto, R. Santiago, I. M. Lorente, and F. Tirado | |

6. Applications in Science and Engineering

| | |
|--|------------|
| PLIERS: A Parallel Information Retrieval System Using MPI | 317 |
| A. MacFarlane, J. A. McCann , and S.E. Robertson | |
| Parallel DSIR Text Retrieval System | 325 |
| A. Rungsawang, A. Tangpong , and P. Laohawee | |
| PVM Implementation of Heterogeneous ScaLAPACK Dense Linear Solvers | 333 |
| V. Boudet, F. Rastello, and Y. Robert | |
| Using PMD to Parallel Solve Large-Scale Navier-Stokes Equations. Performance Analysis on SGI/CRAY-T3E Machine | 341 |
| J. Chergui | |
| Implementation Issues of Computational Fluid Dynamics Algorithms on Parallel Computers | 349 |
| J. Płażek, K. Banaś, and J. Kitowski | |
| A Scalable Parallel Gauss-Seidel and Jacobi Solver for Animal Genetics | 356 |
| M. Larsen and P. Madsen | |
| Parallel Approaches to a Numerically Intensive Application Using PVM | 364 |
| R. Baraglia, R. Ferrini, D. Laforenza, and A. Laganà | |
| Solving the Inverse Toeplitz Eigenproblem Using ScaLAPACK and MPI | 372 |
| J. M. Badía and A. M. Vidal | |
| A Parallel Implementation of the Eigenproblem for Large, Symmetric and Sparse Matrices | 380 |
| E.M. Garzón and I. García | |
| Parallel Computation of the SVD of a Matrix Product | 388 |
| J. M. Claver, M. Mollar, and V. Hernández | |
| Porting Generalized Eigenvalue Software on Distributed Memory Machines Using Systolic Model Principles | 396 |
| P. Bassomo, I. Sakho, and A. Corbel | |

| | |
|---|------------|
| Heading for an Asynchronous Parallel Ocean Model J. Schuele | 404 |
| Distributed Collision Handling for Particle-Based Simulation G. Frugoli, A. Fava, E. Fava, and G. Conte | 410 |
| Parallel Watershed Algorithm on Images from Cranial CT-Scans Using PVM and MPI on a Distributed Memory System C. Nicolescu, B. Albers, and P. Jonker | 418 |
| MPIPOV: A Parallel Implementation of POV-Ray Based on MPI A. Fava, M. Fava, and M. Bertozzi | 426 |
| Minimum Communication Cost Fractal Image Compression on PVM P. -Y. Wu | 434 |
| Cluster Computing Using MPI and Windows NT to Solve the Processing of Remotely Sensed Imagery J. A. Gallud, J. M. García, and J. García-Consuegra | 442 |
| Ground Water Flow Modelling in PVM L. Hluchý, V. D. Tran, L. Halada, and M. Dobrucký | 450 |
| 7. Networking | |
| Virtual BUS: A Simple Implementation of an Effortless Networking System Based on PVM S. Ishihara, S. Tani, and A. Takahara | 461 |
| Collective Communication on Dedicated Clusters of Workstations L. P. Huse | 469 |
| Experiences Deploying a Distributed Parallel Processing Environment over a Broadband Multiservice Network J. Corbacho-Lozano., O.-I. Lepe-Aldama., J. Solé-Pareta, and J. Domingo-Pascual | 477 |

| | |
|---|------------|
| Asynchronous Communications in MPI – the BIP/Myrinet Approach | 485 |
| F. Chaussumier, F. Desprez, and L. Prylli | |
| Parallel Computing on PC Clusters – An Alternative to Supercomputers for Industrial Applications | 493 |
| M. Eberl, W. Karl, C. Trinitis, and A. Blaszczyk | |
| Benchmarking the PVM Group Communication Efficiency | 499 |
| M.R.Matuszek, A. Mazurkiewicz, and P. W. Umiński | |
| 8. Heterogeneous Distributed Systems | |
| Dynamic Assignment with Process Migration in Distributed Environments | 509 |
| P. Czarnul and H. Krawczyk | |
| Parallelizing of Sequential Annotated Programs in PVM Environment | 517 |
| A. Godlevsky, M. Gažák, and L. Hluchý | |
| Di_pSystem: A Parallel Programming System for Distributed Memory Architectures | 525 |
| F. Silva, H. Paulino, and L. Lopes | |
| Parallel NLP Strategies Using PVM on Heterogeneous Distributed Environments | 533 |
| G. E. Vazquez and N. B. Brignole | |
| Using PVM for Distributed Logic Minimization in a Network of Computers | 541 |
| L. Parrilla, J. Ortega, and A. Lloris | |
| Author Index | 549 |