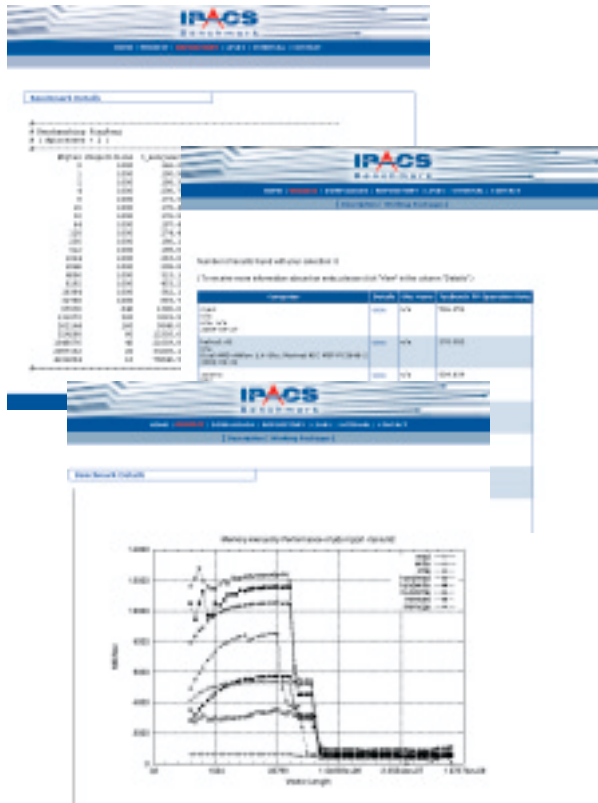


IPACS Benchmark Client and Server

A specific benchmark client will provide the essential configuration tasks to simplify the execution of the benchmarks. It will assist the user with the determination of the desired type of tests, it will load the necessary program code and finally publish the benchmark results on the web server. The benchmark client is available at www.ipacs-benchmark.org.



On the IPACS web server all benchmark results will be accessible. It will be possible to restrict the display of the results by various manual selections. Furthermore one will have the opportunity to receive very detailed information about the results as well as about the architecture where the benchmark was run.

"IPACS at a Glance"

- Development and Propagation of scalable, portable and realistic application benchmarks
- Low-level benchmarks to characterize the state of computer architectures
- Benchmark repository and clients to simplify the execution of benchmarks
- Benchmarks for commercial codes
- Performance prediction
- Improvement of analysis tools

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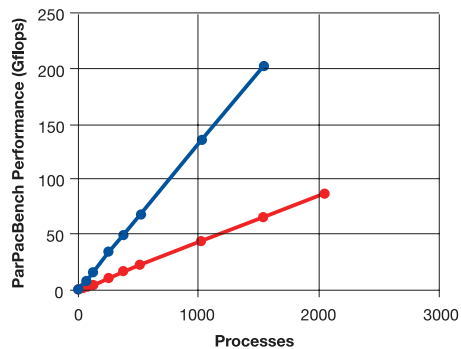


Benchmarks for Distributed Computer Systems

ParPacBench

ParPacBench is a lattice Boltzmann code, which simulates the dynamics of a fluid streaming through a porous structure. It calculates the structure's permeability and returns the calculation performance in Gflops.

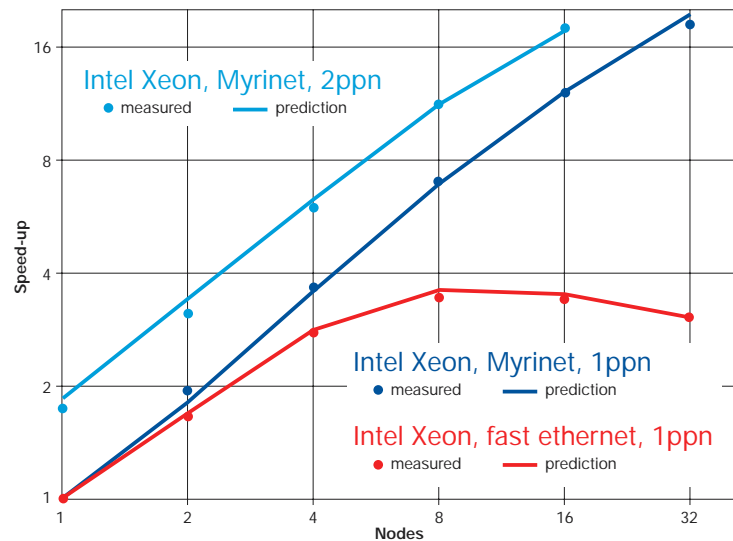
Intel P4 Cluster with Myrinet —●—
IBM SP Power3 —●—



ParPacBench performance of an Intel P4 Cluster with Myrinet compared to an IBM SP Power3 machine. In both cases the GNU compiler has been used.

Performance Modeling

IPACS wants to build the foundation for users, especially industrial users, to predict the system performance of commercial applications. The methods developed are intended to be easy in use and are based on the results of low-level benchmark.

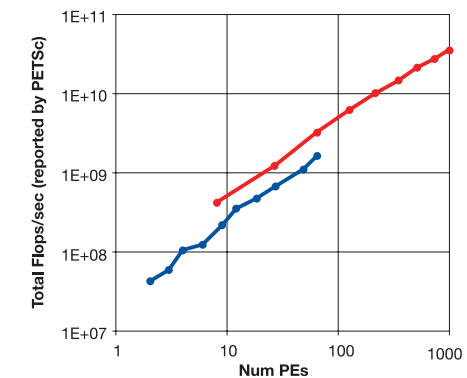


Measured and predicted Speed-up of a commercial CFD application (Fluent) on an Intel Xeon cluster. Results are shown for Myrinet and fast ethernet interconnection running 1 (1ppn) and 2 (2ppn) processes per node.

Fstruct

Fstruct is a FEM code for 3D linear elasticity. The body is split in subdomains, distributed over a set of PEs. The grid generation, also the impicite FEM-numerics, work in parallel within each SD.

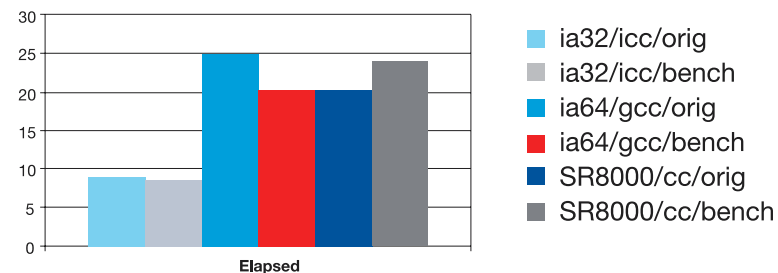
Performance on the old ITWMcluster (64 PEs, Pentium III 800 MHz) —●—
Performance on IBM RS6000/SP, seaborg.nersc.gov —●—



Performance results of Fstruct on two different computer systems.

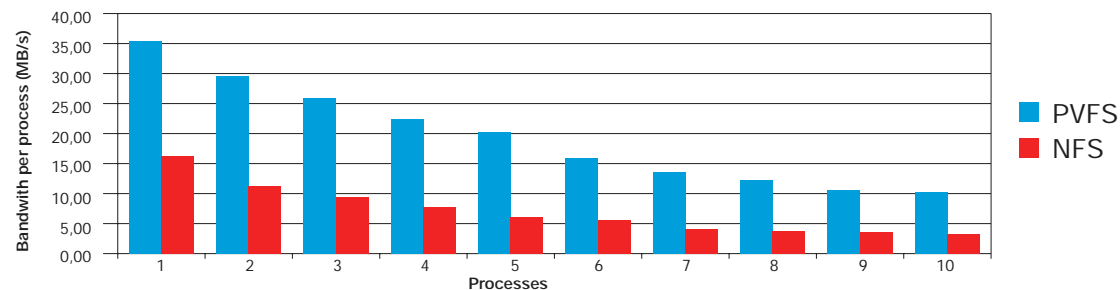
Taubench

The kernels of this unstructured grid benchmark are derived from Tau – a three-dimensional parallel hybrid multigrid solver which solves the Navier-Stokes equations via a finite volume scheme.



Performance runtime comparison between original tau solver and taubench.

PRIOmark is a highly configurable I/O benchmark. It measures performance of parallel, distributed and local file systems and disk I/O by means of MPI-IO as well as POSIX-I/O file system interfaces. The benchmark supports a complex I/O workload definition for various application categories. Its output allows a simple comparison of different I/O systems.



MPI-IO access performance to a common file on a 5 dual-node 1.4 GHz Pentium III cluster with UATA-100 disks for PVFS and a SCSI 3 disk array for NFS.