

## HIGH PERFORMANCE LINPACK BENCHMARK

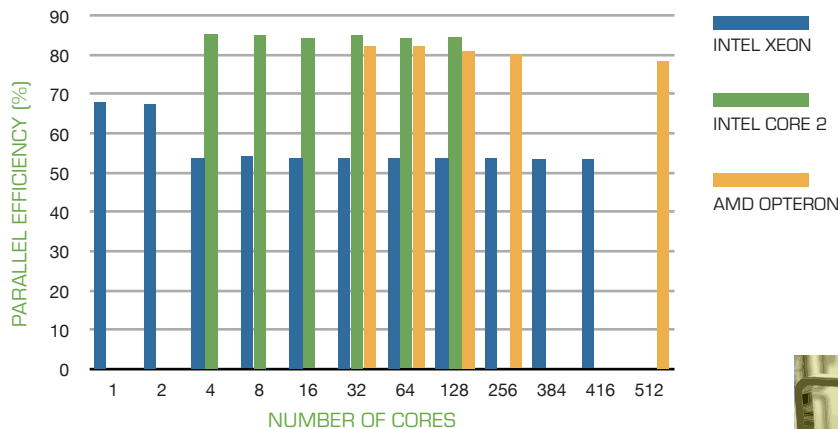
**HPL is a portable implementation of the High Performance LINPACK Benchmark for distributed memory computers.**

- Algorithm: recursive panel factorization, multiple lookahead depths, bandwidth reducing swapping
- Easy to install, only needs MPI+BLAS or VSIPL
- Highly scalable and efficient from the smallest cluster to the largest supercomputers in the world

Compaq 64 Node AlphaServer SC (4 EV67 667 MHz CPUs per node); constant memory load/CPU = 335 MiB

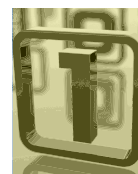
CPU/Nodes	N	N max	R max (Gflop/s)
1/1	150	6625	1
4/1	800	12350	4
16/4	2300	26500	17
64/16	5700	53000	67.5
256/64	14000	106000	263.6

### PARALLEL EFFICIENCY OF HPL



### HISTORY OF THE BENCHMARK

- 1974 LINPACK software is released**  
Solves systems of linear equations in FORTRAN 66
- 1977 LINPACK 100 released**  
Measures system performance in Mflop/s and solves 100x100 linear systems
- 1986 LINPACK 1000 released**  
Any language allowed and the linear system of size 1000 can be used
- 1989 LINPACKDv2 released**  
Extends random number generator from 16384 to 65536
- 1991 LINPACK Table 3 (Highly Parallel Computing)**  
Any size linear system is allowed
- 1993 TOP500 first released**  
With CM-5 running the LINPACK benchmark at nearly 60 Gflop/s
- 1996 9<sup>th</sup> TOP500 is released**  
With the 1<sup>st</sup> system breaking the 1 Tflop/s barrier: ASCI Red from Sandia National Laboratory
- 2000 HPLv1 is released**  
By Antoine Petitet, Jack Dongarra, Clint Whaley, and Andy Cleary
- 2008 31<sup>st</sup> TOP500 is released**  
With the 1<sup>st</sup> system breaking the 1 Pflop/s barrier: Roadrunner from Los Alamos National Laboratory
- 2008 HPLv2 is released**  
Random number generator is extended to 64 bits



**HPL was used to obtain a number of results in the current TOP500 list including the #1 entry.**

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