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High Performance Computing, Numerical Libraries, and Trends

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RANK	MANU- FACTURER	COMPUTER	RMAX [GF/S]	INSTALLATION SITE	COUNTRY	YEAR	AREA OF INSTALLATION	# PROC
1	Intel	ASCI Red	2379.6	Sandia National Labs Albuquerque	USA	1999	Research	9632
2	IBM	ASCI Blue- Pacific SST, IBM SP 604E	2144	Lawrence Livermore National Laboratory	USA	1999	Research	5808
3	SGI	ASCI Blue Mountain	1608	Los Alamos National Lab	USA	1998	Research	6144
4	Cray/SGI	T3E 1200	891.5	Government	USA	1998	Classified	1084
5	Hitachi	SR8000	873.6	University of Tokyo	Japan	1999	Academic	128
6	Cray/SGI	T3E 900	815.1	Government	USA	1997	Classified	1324
7	SGI	Orgin 2000	690.9	Los Alamos National Lab /ACL	USA	1999	Research	2048
8	Cray/SGI	T3E 900	675.7	Naval Oceanographic Office, Bay Saint Louis	USA	1999	Research Weather	1084
9	Cray/SGI	T3E 1200	671.2	Deutscher Wetterdienst	Germany	1999	Research Weather	812
10	IBM	SP Power3	558.13	UCSD/San Diego Supercomputer Center, IBM/Poughkeepsie	USA	1999	Research	1024





Architectures





Manufactures November 1999 Report

Customer Type





Clusters (Beowulf-Class) in the TOP500													
RANK	MANU- FACTURER	COMPUTER	RMAX	INSTALLATION SITE	COUNTRY	YEAR	AREA OF INSTALLATION	# PROC					
33	Sun	HPC 450 Cluster	272.1	Sun, Burlington	USA	1999	Vendor	720					
34	Compaq	Alpha Server SC	271.4	Compaq Computer Corp. Littleton	USA	1999	Vendor	512					
44	Self-made	Cplant Cluster	232.6	Sandia National Laboratories	USA	1999	Research	580					
169	Self-made	Alphleet Cluster	61.3	Institute of Physical and Chemical Res. (RIKEN)	Japan	1999	Research	140					
265	Self-made	Avalon Cluster	48.6	Los Alamos National Lab/ CNLS	USA	1998	Research	140					
351	Siemens	hpcLine Cluster	41.45	Universitaet Paderborn/PC2	Germany	1999	Academic	192					
454	Self-made	Parnass2 Cluster	34.23	University of Bonn/ Applied Mathematic	Germany	1999	Academic	128					













The Changing Face of Numerical Software and Libraries

- ? Have been involved with open source software
 - ?Linpack, BLAS, LAPACK, ScaLAPACK, ATLAS ?PVM, MPI
- ? Looking for mechanisms that will allow community to use software in an easy to use fashion.
- ? Allow for portability / heterogeneous / robust
- ? Grid aware

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NetSolve - MATLAB Interface

Synchronous Call

>> define sparse matrix A
>> define rhs
>> [x, its] = netsolve('itmeth','petsc', A, rhs, 1.e-6, 50);
...
>> [x, its] = petsc(A, rhs); % for PETSc
>> [x, its] = aztec(A, rhs); % for AZTEC
>> [x] = superlu(A, rhs); % for SuperLU
>> [x] = ma28(A, rhs); % for MA28

Asynchronous Calls also available













NetSolve: Features for the Future

- ? Software repositories
- ? Data encryption/compression mechanisms
- ? User authentication/security
- ? Access control or user accounting mechanisms (tokens, credits,..)
- ? Computational steering Software available see: http://www.netlib.org/netsolve/ (> 13K hits)

- ? Task migration and improved Faulttolerance
- ? Integration into other meta-computing infrastructure, Legion
- ? Port Agent and Server Windows NT/98/95 (client already there)







