TOP500 Supercomputer Sites

13th Edition

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Abstract

To provide a better basis for statistics on high-performance computers, we list the sites that have the 500 most powerful computer systems installed. The best LINPACK benchmark performance achieved is used as a performance measure in ranking the computers.

1 Introduction and Objectives

Statistics on high-performance computers are of major interest to manufacturers, users, and potential users. These people wish to know not only the number of systems installed, but also the location of the various supercomputers within the high-performance computing community and the applications for which a computer system is being used. Such statistics can facilitate the establishment of collaborations, the exchange of data and software, and provide a better understanding of the high-performance computer market.

Statistical lists of supercomputers are not new. Every year since 1986 Hans Meuer [1] has published system counts of the major vector computer manufacturers, based principally on those at the Mannheim Supercomputer Seminar. Statistics based merely on the name of the manufacturer are no longer useful, however. New statistics are required that reflect the diversification of supercomputers, the enormous performance difference between low-end and high-end models, the increasing availability of massively parallel processing (MPP) systems, and the strong increase in computing power of the high-end models of workstation suppliers (SMP).

To provide this new statistical foundation, we have decided in 1993 to assemble and maintain a list of the 500 most powerful computer systems. Our list has been compiled twice a year since June 1993 with the help of high-performance computer experts, computational scientists, manufacturers, and the Internet community in general who responded to a questionnaire we sent out; we thank all the contributors for their cooperation.

In the present list (which we call the TOP500), we list computers ranked by their performance on the LINPACK Benchmark. While we make every attempt to verify the results obtained from users and vendors, errors are bound to exist and should be brought to our attention. We intend to continue to update this list half-yearly and, in this way, to keep track with the evolution of computers. Hence, we welcome any comments and information; please send electronic mail to *top500@rz.uni-mannheim.de*. The list is freely available by anonymous ftp to

ftp.uni-mannheim.de/top500/ or to www.netlib.org/benchmark/top500.ps. The interested reader can additionally create sublists out of the TOP500 database and can make statistics on his own by using the WWW interface at http://www.top500.org or http://www.netlib.org/benchmark/top500.html. Here you also have access to postscript versions of slides dealing with the interpretation of the present situation as well as with the evolution over time since we started this project.

2 The LINPACK Benchmark

As a yardstick of performance we are using the "best" performance as measured by the LINPACK Benchmark [2]. LINPACK was chosen because it is widely used and performance numbers are available for almost all relevant systems.

The LINPACK Benchmark was introduced by Jack Dongarra. A detailed description as well as a list of performance results on a wide variety of machines is available in postscript form from *netlib*. To retrieve a copy send electronic mail to *netlib@ornl.gov* and by typing the message *send performance from benchmark* or from any machine on the internet type:
rcp anon@netlib2.cs.utk.edu:benchmark/performance performance.

The benchmark used in the LINPACK Benchmark is to solve a dense system of linear equations. For the TOP500, we used that version of the benchmark that allows the user to scale the size of the problem and to optimize the software in order to achieve the best performance for a given machine. This performance does not reflect the *overall performance* of a given system, as no single number ever can. It does, however, reflect the *performance of a dedicated system for solving a dense system of linear equations.* Since the problem is very regular, the performance achieved is quite high, and the performance numbers give a good correction of peak performance.

By measuring the actual performance for different problem sizes n, a user can get not only the maximal achieved performance R_{max} for the problem size N_{max} but also the problem size $N_{1/2}$ where half of the performance R_{max} is achieved. These numbers together with the theoretical peak performance R_{peak} are the numbers given in the TOP500. In an attempt to obtain uniformity across all computers in performance reporting, the algorithm used in solving the system of equations in the benchmark procedure must confirm to the standard operation count for LU factorization with partial pivoting. In particular, the operation count for the algorithm must be $2/3n^3 + O(n^2)$ floating point operations. This excludes the use of a fast matrix multiply algorithm like "Strassian's Method". This is done to provide a comparable set of performance numbers across all computers. If in the future a more realistic metric finds widespread usage, so that numbers for all systems in question are available, we may convert to that performance measure.

3 The TOP500 List

Table 1 shows the 500 most powerful commercially available computer systems known to us. To keep the list as compact as possible, we show only a part of our information here:

• N_{world}	Position within the TOP500 ranking
• Manufacturer	Manufacturer or vendor
• Computer	Type indicated by manufacturer or vendor
• Installation Site	Customer
• Location	Location and country
• Year	Year of installation/last major update
• Field of Application	
• # Proc.	Number of processors[1]
• R_{max}	Maximal LINPACK performance achieved
• R_{peak}	Theoretical peak performance
• N_{max}	Problemsize for achieving R_{max}
• $N_{1/2}$	Problemsize for achieving half of R_{max}

If R_{max} from Table 3 of the LINPACK Report [2] is not available, we use the TPP performance given in Table 1 of the LINPACK Report [2] for solving a system of 1000 equations. To use a consistent yardstick for all systemwe we do not use results achieved by advanced parallel algorithm as defined in [2]. In case of the Cray T90, C90 and J90 systems we had to use older able 3 or Table 1 results. In a few cases we interpolated between two measured system sizes.

For models where we did not receive the requested data, the performance of the next smaller system measured is used.

If there should be any changes in the performances given in Table 1 we will update them.

In addition to cross checking different sources of information, we select randomly a statistical representative sample of the first 500 systems of our database. For these systems we ask the supplier of the information to establish direct contact between the installation site and us to verify the given information. This gives us basic information about the quality of the list in total.

As the TOP500 should provide a basis for statistics on the market of high-performance computers, we limit the number of systems installed at vendor sites. This is done for each vendor separately by limiting the accumulated performance of systems at vendor sites to a maximum of 5% of the total accumulated installed performance of this vendor. Rounding is done in favor of the vendor in question.

In Table 1, the computers are ordered first by their R_{max} value. In the case of equal performances (R_{max} value) for different computers, we have chosen to order by R_{peak}. For sites that have the same computer, the order is by memory size and then alphabetically.

TOP500 **Supercomputers - Worldwide**

N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
1	Intel ASCI Red	Sandia National Labs Albuquerque USA /1999	Research	9632	**2379.6** 3207	362880 75400
2	IBM ASCI Blue-Pacific SST, IBM SP 604e	Lawrence Livermore National Laboratory Livermore USA /1999	Research Energy	5808	**2144** 3868	431344 .
3	SGI ASCI Blue Mountain	Los Alamos National Laboratory Los Alamos USA /1998	Research	6144	**1608** 3072	374400 138000
4	Cray/SGI T3E1200	Government USA /1998	Classified	1084	**891.5** 1300.8	259200 26400
5	Hitachi SR8000/128	University of Tokyo Tokyo Japan /1999	Academic	128	**873.6** 1024	120000 16000
6	Cray/SGI T3E900	Government USA /1997	Classified	1324	**815.1** 1191.6	134400 26880
7	SGI ORIGIN 2000 250 MHz	Los Alamos National Laboratory/ACL Los Alamos USA /1999	Research	2048	**690.9** 1024	229248 80640
8	Cray/SGI T3E900	Naval Oceanographic Office (NAVOCEANO) Bay Saint Louis USA /1999	Research Weather	1084	**675.7** 975.6	. .
9	Cray/SGI T3E1200	Deutscher Wetterdienst Offenbach Germany /1999	Research Weather	812	**671.2** 974.4	. .
10	IBM SP Power3 222 MHz	UCSD/San Diego Supercomputer Center IBM/Poughkeepsie USA /1999	Research	960	**558.13** 852.4	200000 53000
11	Cray/SGI T3E900	United Kingdom Meteorological Office Bracknell UK /1997	Research Weather	876	**552.92** 788.4	. .
12	IBM SP PC604e 332 MHz	Charles Schwab USA /1999	Industry Finance	2000	**547** 1328	. .
13	Cray/SGI T3E1200	United Kingdom Meteorological Office Bracknell UK /1999	Research Weather	636	**526.6** 763.2	. .
14	Cray/SGI T3E1200	CSAR at the University of Manchester Manchester UK /1998	Academic	612	**509.9** 734.4	. .
15	Fujitsu VPP800/63	Kyoto University Kyoto Japan /1999	Academic	63	**482.5** 504	234360 12852
16	IBM ASCI Blue-Pacific CTR, IBM SP 604e	Lawrence Livermore National Laboratory Livermore USA /1998	Research Energy	1344	**468.2** 892	205000 65000
17	Hitachi SR8000/64	Tsukuba Advanced Computing Center/AIST Tsukuba Japan /1999	Research	64	**449.7** 512	92000 9160
18	Cray/SGI T3E	NASA/Goddard Space Flight Center 4 Greenbelt USA /1998	Research Weather	1084	**448.6** 650.4	119808 19008
19	Cray/SGI T3E1200	DOD/CEWES Vicksburg USA /1999	Research Mechanics	540	**447.8** 648	181440 17280
20	Cray/SGI T3E1200	Forschungszentrum Juelich (FZJ) Juelich Germany /1999	Research	540	**447.8** 648	181440 17280

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
21	Cray/SGI T3E1200	Government USA /1998	Classified	540	**447.8** 648	181440 17280
22	Cray/SGI T3E1200	Silicon Graphics Chippewa Falls USA /1998	Vendor	540	**447.8** 648	181440 17280
23	Cray/SGI T3E900	NERSC/LBNL Berkeley USA /1997	Research	692	**444.2** 622.8	. .
24	Hitachi/Tsukuba CP-PACS/2048	Center for Computational Physics, Univ of Tsukuba Tsukuba Japan /1996	Academic	2048	**368.2** 614	103680 30720
25	Cray/SGI T3E	Max-Planck-Gesellschaft MPI/IPP Garching Germany /1997	Research	812	**355.1** 487.2	. .
26	IBM SP Power3 200 MHz	National Centers for Environmental Prediction Camp Spring USA /1999	Research Weather	768	**350.4** 614	113000 30000
27	Cray/SGI T3E900	HWW/Universitaet Stuttgart Stuttgart Germany /1996	Industry	540	**341.3** 486	. .
28	Cray/SGI T3E900	Pittsburgh Supercomputer Center Pittsburgh USA /1998	Research	540	**341.3** 486	. .
29	Cray/SGI T3E1200	Government USA /1999	Classified	404	**334.7** 484.8	. .
30	IBM SP Power3 200 MHz	NERSC/LBNL Berkeley USA /1999	Research	604	**310.3** 483.2	. .
31	IBM SP Power3 222 MHz	IBM Poughkeepsie USA /1999	Vendor	512	**307.63** 454.6	148000 35000
32	Fujitsu VPP5000/31	Meteo-France Toulouse France /1999	Research Weather	31	**286.9** 297.6	. .
33	Sun HPC 4500 Cluster	Sun Burlington USA /1998	Vendor	720	**272.1** 483.84	. .
34	Compaq AlphaServer SC	Compaq Computer Corporation Littleton USA /1999	Vendor Benchmarking	512	**271.4** 512	140000 .
35	IBM SP Power3 200 MHz	IBM Poughkeepsie USA /1999	Vendor	480	**270.5** 383.5	. .
36	Fujitsu VPP700/128E	Institute of Physical and Chemical Res. (RIKEN) Wako Japan /1999	Research	128	**268.9** 307.2	166400 23040
37	SGI ORIGIN 2000 195/250 MHz	NCSA Urbana-Champaign USA /1998	Research	1024	**264.9** 327.68	. .
38	Hitachi SR8000/36	Meteorological Research Institute Japan /1999	Research Weather	36	**255.9** 288	69000 5968
39	Cray/SGI T3E900	ZIB/Konrad Zuse-Zentrum fuer Informationstechnik Berlin Germany /1999	Academic	404	**253.8** 363.6	. .
40	NEC SX-4/128H4	Tohoku University Aramaki Japan /1997	Academic	128	**244** 256	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
41	Cray/SGI T3E1200	Government USA /1999	Classified	284	**235** 340.8	. .
42	Cray/SGI T3E	Forschungszentrum Juelich (FZJ) Juelich Germany /1996	Research	540	**234.9** 324	86400 14400
43	Cray/SGI T3E	Silicon Graphics Eagan USA /1997	Vendor	540	**234.9** 324	86400 14400
44	Self-made CPlant Cluster	Sandia National Laboratories Albuquerque USA /1999	Research	580	**232.6** 580	. .
45	Hitachi SR2201/1024	University of Tokyo Tokyo Japan /1996	Academic	1024	**232.4** 307	155520 34560
46	Fujitsu Numerical Wind Tunnel	NAL Japan /1996	Research Aerospace	167	**229.7** 281	66132 18018
47	Cray/SGI T3E1200	CINECA Bologna Italy /1999	Academic	268	**221.77** 321.6	. .
48	Cray/SGI T3E1200	US Army HPC Research Center at NCS Minneapolis USA /1997	Research	268	**221.77** 321.6	. .
49	Cray/SGI T3E900	University of Edinburgh Edinburgh UK /1997	Academic	348	**218.9** 313.2	. .
50	Fujitsu VPP700/116	ECMWF Reading UK /1997	Research Weather	116	**213** 255.2	111360 18560
51	SGI ORIGIN 2000 300 MHz	NASA/Ames Research Center/NAS Mountain View USA /1999	Research Aerospace	512	**195.6** 307.2	110592 23040
52	IBM SP Power3 200 MHz	North Carolina Supercomputing Center (NCSC) USA /1999	Academic	320	**183.9** 256	. .
53	NEC SX-4/96M3	Atmospheric Environment Service (AES) Dorval Canada /1999	Research Weather	96	**183** 192	. .
54	IBM SP P2SC 120/135 MHz	Pacific Northwest National Laboratory Richland USA /1998	Research	512	**180.906** 248.32	62000 .
55	Cray/SGI T3E900	Network Computing Services, Inc. USA /1997	Industry	268	**169.07** 241.2	. .
56	Cray/SGI T3E900	University of Alaska - ARSC Fairbanks USA /1999	Academic	268	**169.07** 241.2	. .
57	IBM SP Power3 200 MHz	NCAR (National Center for Atmospheric Research) Boulder USA /1999	Research	288	**166.6** 230.5	. .
58	Cray/SGI T3E750	Commissariat a l'Energie Atomique (CEA) Grenoble France /1997	Research Energy	300	**157.5** 225	. .
59	IBM SP Power3 200 MHz	Wright-Patterson Air Force Base/DoD ASC USA /1999	Research Defense	264	**153.6** 211.3	. .
60	SGI ORIGIN 2000	Wright-Patterson Air Force Base/DoD ASC USA /1999	Research	512	**152** 199.68	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
61	IBM SP Power3 200 MHz	State Farm USA /1999	Industry Database	260	**151.5** 208.1	. .
62	IBM SP Power3 200 MHz	Tsukuba Advanced Computing Center/AIST Tsukuba Japan /1999	Research	256	**149.36** 205	100000 18500
63	Hitachi SR8000/20	Institute of Statistical Mathematics Tokyo Japan /1999	Research	20	**144.5** 160	48000 4000
64	IBM SP PC604e 332 MHz	IBM UK /1999	Vendor	468	**143.3** 310.6	. .
65	Fujitsu VPP5000/15	Commissariat a l'Energie Atomique (CEA) Grenoble France /1999	Research Energy	15	**139.8** 144	. .
66	Fujitsu VPP5000/15	Taiwan Central Weather Bureau Taipei Taiwan /1999	Research Weather	15	**139.8** 144	. .
67	Sun HPC 10000 400 MHz	Sun Portland USA /1999	Vendor	256	**137.1** 204.8	. .
68	IBM SP PC604e 332 MHz	Air Force Weather Agency USA /1999	Research	440	**134.9** 292	. .
69	IBM SP PC604e 332 MHz	DeTeCSM Bielefeld Germany /1999	Industry Telecomm	420	**128.9** 278.8	. .
70	Intel XP/S-MP 150	Oak Ridge National Laboratory Oak Ridge USA /1995	Research	3072	**127.1** 154	86000 17800
71	Cray/SGI T3E750	CSC (Center for Scientific Computing) Espoo Finland /1997	Academic	236	**123.98** 177	. .
72	IBM SP Power3 222 MHz	Maui High-Performance Computing Center (MHPCC) USA /1999	Research	200	**123.9** 177.6	. .
73	NEC SX-5/16A	Atmospheric Environment Service (AES) Dorval Canada /1999	Research Weather	16	**123.3** 128	99840 1340
74	NEC SX-5/16A	CNRS/IDRIS Orsay France /1999	Academic	16	**123.3** 128	99840 1340
75	NEC SX-5/16A	Frontier Research System for Global Change Japan /1999	Research	16	**123.3** 128	99840 1340
76	NEC SX-5/16A	KMA Korea /1999	Research whea	16	**123.3** 128	99840 1340
77	NEC SX-5/16A	NEC Fuchu Plant Tokyo Japan /1999	Vendor Benchmarking	16	**123.3** 128	99840 1340
78	NEC SX-5/16A	ONERA France /1999	Research Aerospace	16	**123.3** 128	99840 1340
79	NEC SX-4/64M2	National Institute of Fusion Science (NIFS) Japan /1997	Research	64	**122.2** 128	30080 4352
80	NEC SX-4/64M2	Osaka University Osaka Japan /1997	Academic	64	**122.2** 128	30080 4352

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
81	Cray/SGI T3E	CNRS/IDRIS Orsay France /1996	Academic	268	**117.9** 160.8	. .
82	Cray/SGI T3E	Government USA /1997	Classified	268	**117.9** 160.8	. .
83	Cray/SGI T3E	National Supercomputer Centre (NSC) Linkoping Sweden /1997	Academic	268	**117.9** 160.8	. .
84	Cray/SGI T3E	UCSD/San Diego Supercomputer Center San Diego USA /1996	Academic	268	**117.9** 160.8	. .
85	Cray/SGI T3E750	Government USA /1997	Classified	220	**115.44** 165	. .
86	IBM SP PC604e 332 MHz	France Telecom France /1999	Industry Telecomm	368	**113.1** 244.2	. .
87	Fujitsu VPP700/56	Kyushu University Fukuoka Japan /1996	Academic	56	**110.3** 123.2	109200 10752
88	IBM SP P2SC 160 MHz	Atomic Weapons Establishment Aldermaston UK /1999	Classified	252	**109.9** 161.2	. .
89	Fujitsu VPP500/80	National Lab. for High Energy Physics Japan /1994	Research	80	**109.8** 128	46400 11030
90	Cray/SGI T3E1200	National Institute for Water and Atmospheric Resea Wellington New Zealand /1999	Research Weather	132	**109.3** 158.4	. .
91	IBM SP PC604e 332 MHz	FUNB USA /1999	Industry Finance	352	**108.2** 233.6	. .
92	IBM SP PC604e 332 MHz	Philips Lightning Netherlands /1998	Industry Electronics	348	**107** 230.9	. .
93	Fujitsu VPP700/52	Leibniz Rechenzentrum Muenchen Germany /1998	Academic	52	**106.3** 114.4	. .
94	IBM SP P2SC 160 MHz	Maui High-Performance Computing Center (MHPCC) USA /1998	Research	243	**106.115** 155.52	. .
95	IBM SP PC604e 332 MHz	DeTeCSM Germany /1999	Industry Telecomm	342	**105.2** 227	. .
96	IBM SP PC604e 332 MHz	IBM Germany /1999	Vendor	340	**104.6** 225.6	. .
97	Intel XP/S-MP 125	Japan Atomic Energy Research Japan /1996	Research	2502	**103.5** 125.1	. .
98	SGI ORIGIN 2000 300 MHz	Centre Informatique National (CINES) France /1999	Research	256	**101.4** 153.6	86400 13248
99	SGI ORIGIN 2000 300 MHz	Tohoku University, Institute of Fluid Science Aramaki Japan /1999	Academic	256	**101.4** 153.6	86400 13248
100	SGI ORIGIN 2000 250 MHz	NASA/Ames Research Center/NAS Mountain View USA /1998	Research Aerospace	256	**101.4** 128	86400 13248

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{ma}** R_{pea} [Gflop/
101	Cray/SGI T3D MC1024-8	Government USA /1994	Classified	1024	**100.** 15
102	Fujitsu VPP700/48E	ECMWF Reading UK /1998	Research Weather	48	**97.** 115
103	IBM SP PC604e 332 MHz	Banque National Paris France /1999	Industry Finance	316	**97.** 209
104	IBM SP Power3 200 MHz	University of Minnesota/Supercomputing Institute Minneapolis USA /1999	Academic	160	**94.** 12
105	IBM SP P2SC 135 MHz	DOD/CEWES Vicksburg USA /1997	Research	256	**94.1** 138.2
106	IBM SP P2SC 135 MHz	Wright-Patterson Air Force Base/DoD ASC USA /1997	Research	256	**94.1** 138.2
107	IBM SP PC604e 332 MHz	British Airways UK /1999	Industry Transportation	302	**93.** 200
108	IBM SP PC604e 332 MHz	IBM - Thomas Watson Research Center Yorktown Heights USA /1999	Research	296	**91.** 196
109	Cray/SGI T3E750	Government USA /1997	Classified	172	**89.** 12
110	IBM SP Power3 200 MHz	IBM - Thomas Watson Research Center Yorktown Heights USA /1999	Research	148	**88.** 11
111	IBM SP Power3 222 MHz	University of Minnesota/Supercomputing Institute Minneapolis USA /1999	Academic	136	**85.** 120
112	Hewlett-Packard V2500/HyperPlex	Hewlett-Packard CXTC Richardson USA /1999	Vendor Benchmarking	218	**84.** 225.2
113	IBM SP P2SC 160 MHz	Western Geophysical London UK /1999	Industry Geophysics	190	**83.** 121
114	IBM SP PC604e 332 MHz	Sprint USA /1999	Industry Telecomm	268	**82.** 177
115	IBM SP PC604e 332 MHz	Thyssen Germany /1999	Industry Mechanics	268	**82.** 177
116	Cray/SGI T3E900	KIST/System Engineering Research Institute (SSC) Korea /1997	Industry In.Pr. Service	132	**82.1** 118
117	Cray/SGI T3E900	NOAA/Geophysical Fluid Dynamics Laboratory (GFDL) Princeton USA /1997	Research Weather	132	**82.1** 118
118	IBM SP P2SC 160 MHz	State Farm USA /1998	Industry Database	186	**81.8** 11
119	Cray/SGI T3E	Commissariat a l'Energie Atomique (CEA) Limeil France /1997	Research	188	**81.3** 112
120	IBM ASCI White Nighthawk Prototype, SP Power3	Lawrence Livermore National Laboratory Livermore USA /1999	Research Energy	128	**80.8** 113

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
121	IBM SP Power3 222 MHz	UCSD/San Diego Supercomputer Center San Diego USA /1999	Academic	128	**80.83** 113.6	76000 15000
122	Sun HPC 10000 400 MHz	Rutgers University Piscataway USA /1999	Academic	128	**79.36** 102.4	57120 10752
123	IBM SP PC604e 332 MHz	BASF Ludwigshafen Germany /1998	Industry Chemistry	256	**79.17** 169.9	89000 18000
124	IBM SP PC604e 332 MHz	Bayer AG Germany /1999	Industry Chemistry	256	**79.17** 169.9	89000 18000
125	IBM SP PC604e 332 MHz	Bayer AG Germany /1999	Industry Chemistry	256	**79.17** 169.9	89000 18000
126	IBM SP PC604e 332 MHz	Japan Adv. Inst. of Science and Technology (JAIST) Hokuriku Japan /1999	Academic	256	**79.17** 169.9	89000 18000
127	IBM SP P2SC 160 MHz	Government UK /1999	Classified	178	**78.4** 113.9	. .
128	IBM SP PC604e 332 MHz	Alcatel France /1999	Industry Telecomm	252	**77.9** 167.2	. .
129	NEC SX-4/40H2	HWW/Universitaet Stuttgart Stuttgart Germany /1999	Industry	40	**77.2** 80	. .
130	IBM SP Power3 200 MHz	Deutsche Telekom AG Darmstadt Germany /1999	Industry Telecomm	128	**76.77** 102	89000 11500
131	IBM SP Power3 200 MHz	IBM Research Switzerland /1999	Research	128	**76.77** 102	89000 11500
132	IBM SP PC604e 332 MHz	Deere and Company USA /1999	Industry	246	**76.1** 163.2	. .
133	IBM SP PC604e 332 MHz	RWE Germany /1998	Industry	244	**75.5** 161.9	. .
134	IBM SP PC604e 332 MHz	Deutsche Telekom AG Darmstadt Germany /1999	Industry Telecomm	242	**74.9** 160.6	. .
135	Cray/SGI T3E	NRI for Earth Science and Disaster (NIED) Japan /1997	Research	172	**74.52** 103.2	. .
136	IBM SP Power3 200 MHz	Lockheed Martin USA /1999	Industry Aerospace	124	**74.4** 99.2	. .
137	IBM SP Power3 200 MHz	Oak Ridge National Laboratory Oak Ridge USA /1999	Research	124	**74.4** 99.2	. .
138	IBM SP PC604e 332 MHz	Chase Manhattan New York USA /1999	Industry Finance	232	**71.9** 153	. .
139	Cray/SGI T3E	Government USA /1997	Classified	164	**71.1** 98.4	. .
140	IBM SP Power3 222 MHz	CNUSC Montpellier France /1999	Academic	112	**71** 99.4	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
141	NEC SX-4/36H2	National Institute for Environmental Studies Tsukuba Japan /1997	Research Environment	36	**69.4** 72	. .
142	IBM SP2/402	Chip Manufacturer (B) USA /1997	Industry Electronics	402	**69.33** 106.53	. .
143	Sun HPC 10000 400 MHz Cluster	KT Freetel Seoul Korea /1999	Industry Telecomm	110	**68.77** 88	. .
144	IBM SP P2SC 120 MHz	CNUSC Montpellier France /1999	Academic	207	**67.8** 99.36	. .
145	Cray/SGI T3E900	Government USA /1998	Classified	108	**67.6** 97.2	. .
146	IBM SP PC604e 332 MHz	Whirlpool USA /1999	Industry Database	210	**65.3** 139.3	. .
147	IBM SP Power3 200 MHz	Volvo Gothenberg Sweden /1999	Industry Automotive	108	**65.2** 86.1	. .
148	IBM SP P2SC 160 MHz	KTH - Royal Institute of Technology Stockholm Sweden /1998	Research	146	**64.8** 93.44	. .
149	IBM SP PC604e 332 MHz	First USA USA /1999	Industry Finance	208	**64.7** 138	. .
150	SGI ORIGIN 2000	Sandia National Labs Albuquerque USA /1997	Research	208	**63.1** 81.12	. .
151	IBM SP PC604e 332 MHz	Krupp Hoesch Info. Germany /1999	Industry Database	202	**62.9** 134	. .
152	IBM SP Power3 200 MHz	Deutsche Telekom AG Darmstadt Germany /1999	Industry Telecomm	104	**62.9** 82.9	. .
153	IBM SP PC604e 332 MHz	Aetna Life Insurance Middletown USA /1999	Industry Database	200	**62.32** 132.8	. .
154	IBM SP PC604e 332 MHz	Prudential Insurance USA /1999	Industry Finance	200	**62.32** 132.8	. .
155	IBM SP PC604e 332 MHz	Sprint USA /1999	Industry Telecomm	200	**62.32** 132.8	. .
156	IBM SP PC604e 332 MHz	Sprint USA /1999	Industry Telecomm	200	**62.32** 132.8	. .
157	SGI ORIGIN 2000 300 MHz	CSC (Centre for Sientific Computing) Espoo Finland /1999	Academic	128	**62.25** 76.8	60032 9000
158	SGI ORIGIN 2000 300 MHz	DaimlerChrysler Detroit USA /1999	Industry Automotive	128	**62.25** 76.8	60032 9000
159	SGI ORIGIN 2000 300 MHz	DaimlerChrysler Detroit USA /1999	Industry Automotive	128	**62.25** 76.8	60032 9000
160	SGI ORIGIN 2000 300 MHz	Silicon Graphics Eagan USA /1999	Vendor	128	**62.25** 76.8	60032 9000

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
161	SGI ORIGIN 2000 300 MHz	Silicon Graphics Eagan USA /1999	Vendor	128	**62.25** 76.8	60032 9000
162	SGI ORIGIN 2000 300 MHz	Silicon Graphics Eagan USA /1999	Vendor	128	**62.25** 76.8	60032 9000
163	SGI ORIGIN 2000 300 MHz	Tohoku University, Institute of Fluid Science Aramaki Japan /1999	Academic	128	**62.25** 76.8	60032 9000
164	SGI ORIGIN 2000 300 MHz	Tohoku University, Institute of Fluid Science Aramaki Japan /1999	Academic	128	**62.25** 76.8	60032 9000
165	SGI ORIGIN 2000 300 MHz	Tohoku University, Institute of Fluid Science Aramaki Japan /1999	Academic	128	**62.25** 76.8	60032 9000
166	SGI ORIGIN 2000 300 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1999	Research	128	**62.25** 76.8	60032 9000
167	SGI ORIGIN 2000 300 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1999	Research	128	**62.25** 76.8	60032 9000
168	NEC SX-4/32	Bureau of Meteorology / CISRO HPCCC Melbourne Australia /1997	Research Weather	32	**61.77** 64	20480 1688
169	Compaq Alphleet Cluster	Institute of Physical and Chemical Res. (RIKEN) Wako Japan /1999	Research	140	**61.3** 140	56000 22000
170	NEC SX-5/8B	National Aerospace Laboratory (NLR) Noordoostpolder Netherlands /1999	Research Aerospace	8	**59.62** 64	. .
171	Fujitsu VPP500/42	Japan Atomic Energy Research Japan /1994	Research	42	**59.6** 67.2	. .
172	Fujitsu VPP500/42	Nagoya University Nagoya Japan /1995	Academic	42	**59.6** 67.2	. .
173	IBM SP PC604e 332 MHz	Deutsche Bank Frankfurt Germany /1999	Industry Finance	188	**58.7** 124.7	. .
174	Hitachi SR2201/256	Hitachi Mechanical Engineering Res. Lab. Japan /1998	Research	256	**58.68** 77	77760 13440
175	Hitachi SR2201/256	Real World Computing (RWCP) Tokyo Japan /1997	Research	256	**58.68** 77	77760 13440
176	Hitachi SR2201/256	Tokyo University - Human Genome Center/IMS Tokyo Japan /1998	Academic	256	**58.68** 77	77760 13440
177	Hitachi SR2201/256	University of Cambridge Cambridge UK /1998	Academic	256	**58.68** 77	77760 13440
178	SGI ORIGIN 2000	Boston University Boston USA /1997	Academic	192	**58.6** 74.88	. .
179	Cray/SGI T3E	AWI (Alfred Wegener Institut) Bremerhaven Germany /1998	Research	134	**58.28** 80.4	. .
180	Cray/SGI T3E	Japan Adv. Inst. of Science and Technology (JAIST) Hokuriku Japan /1997	Academic	134	**58.28** 80.4	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
181	Cray/SGI T3E	Technical University Delft (TUD) Delft Netherlands /1997	Academic	134	**58.28** 80.4	. .
182	Fujitsu VPP700/26E	Meteo-France Toulouse France /1997	Research Weather	26	**58** 62.4	74880 5200
183	IBM SP PC604e 332 MHz	British Columbia Telecommunications Canada /1998	Industry Telecomm	184	**57.51** 122.13	. .
184	IBM SP PC604e 332 MHz	ISSC UK /1999	Industry	184	**57.51** 122.13	. .
185	Cray/SGI T3E	Ohio Supercomputer Center Columbus USA /1997	Academic	132	**57.42** 79.2	. .
186	IBM SP P2SC 160 MHz	Oracle/IBM France /1998	Industry Database	128	**57.24** 81.92	39000 9180
187	IBM SP P2SC 160 MHz	UCSD/San Diego Supercomputer Center San Diego USA /1997	Academic	128	**57.24** 81.92	39000 9180
188	Fujitsu VPP500/40	National Institute of Genetics Mishima Japan /1995	Research	40	**56.9** 64	. .
189	Fujitsu VPP500/40	Tokyo University - Inst. of Solid State Physics Tokyo Japan /1994	Academic	40	**56.9** 64	. .
190	IBM SP P2SC 160 MHz	Nichols Research Corp. Vicksburg USA /1998	Industry Defense	126	**56.37** 80.64	. .
191	Cray/SGI T3E1200	Environmental Protection Agency USA /1999	Research	68	**56.3** 81.6	. .
192	IBM SP Power3 200 MHz	Government UK /1998	Classified	92	**56** 73.4	. .
193	IBM SP P2SC 160 MHz	Government France /1999	Classified	124	**55.5** 79.3	. .
194	IBM SP PC604e 332 MHz	Bayer AG Germany /1999	Industry Chemistry	176	**55.1** 116.8	. .
195	Cray/SGI T3E900	The Scripps Research Institute La Jolla USA /1997	Research	86	**54.6** 77.4	. .
196	IBM SP PC604e 332 MHz	2 The Mart USA /1999	Industry	174	**54.5** 115.5	. .
197	IBM SP PC604e 332 MHz	BMW AG Muenchen Germany /1999	Industry Automotive	172	**53.9** 114.1	. .
198	IBM SP P2SC 120 MHz	Cornell Theory Center Ithaca USA /1997	Academic	160	**52.96** 76.8	. .
199	IBM SP PC604e 332 MHz	Deutsche Bank Switzerland /1999	Industry Finance	166	**52** 110.1	. .
200	SGI ONYX2 250 MHz	Argonne National Laboratory USA /1998	Research	128	**51.44** 64	61000 10000

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
201	SGI ORIGIN 2000 250 MHz	Computer Sciences Corporation (CSC) Farnborough UK /1998	Industry Aerospace	128	**51.44** 64	61000 10000
202	SGI ORIGIN 2000 250 MHz	Government USA /1999	Classified	128	**51.44** 64	61000 10000
203	SGI ORIGIN 2000 250 MHz	Government USA /1999	Classified	128	**51.44** 64	61000 10000
204	SGI ORIGIN 2000 250 MHz	Government USA /1999	Classified	128	**51.44** 64	61000 10000
205	SGI ORIGIN 2000 250 MHz	Government USA /1999	Classified	128	**51.44** 64	61000 10000
206	SGI ORIGIN 2000 250 MHz	Government USA /1999	Classified	128	**51.44** 64	61000 10000
207	SGI ORIGIN 2000 250 MHz	Government USA /1999	Classified	128	**51.44** 64	61000 10000
208	SGI ORIGIN 2000 250 MHz	Government USA /1999	Classified	128	**51.44** 64	61000 10000
209	SGI ORIGIN 2000 250 MHz	Lockheed Martin USA /1998	Industry Aerospace	128	**51.44** 64	61000 10000
210	SGI ORIGIN 2000 250 MHz	Lockheed Martin USA /1998	Industry Aerospace	128	**51.44** 64	61000 10000
211	SGI ORIGIN 2000 250 MHz	Lockheed Martin USA /1998	Industry Aerospace	128	**51.44** 64	61000 10000
212	SGI ORIGIN 2000 250 MHz	NCAR (National Center for Atmospheric Research) Boulder USA /1998	Research	128	**51.44** 64	61000 10000
213	SGI ORIGIN 2000 250 MHz	NCSA Urbana-Champaign USA /1999	Research	128	**51.44** 64	61000 10000
214	SGI ORIGIN 2000 250 MHz	NCSA Urbana-Champaign USA /1999	Research	128	**51.44** 64	61000 10000
215	SGI ORIGIN 2000 250 MHz	Naval Oceanographic Office (NAVOCEANO) Bay Saint Louis USA /1999	Research Aerospace	128	**51.44** 64	61000 10000
216	SGI ORIGIN 2000 250 MHz	Naval Research Laboratory (NRL) Washington D.C. USA /1997	Research	128	**51.44** 64	61000 10000
217	SGI ORIGIN 2000 250 MHz	Silicon Graphics Eagan USA /1999	Vendor	128	**51.44** 64	61000 10000
218	SGI ORIGIN 2000 250 MHz	Silicon Graphics Eagan USA /1999	Vendor	128	**51.44** 64	61000 10000
219	SGI ORIGIN 2000 250 MHz	Silicon Graphics Eagan USA /1999	Vendor	128	**51.44** 64	61000 10000
220	SGI ORIGIN 2000 250 MHz	UNITE Netherlands /1999	Academic	128	**51.44** 64	61000 10000

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
221	SGI ORIGIN 2000 250 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1999	Research	128	**51.44** 64	61000 10000
222	SGI ORIGIN 2000 250 MHz	White Sands Missile Range National Directorate White Sands USA /1998	Classified	128	**51.44** 64	61000 10000
223	IBM SP PC604e 332 MHz	DeTeCSM Bonn Germany /1999	Industry In.Pr. Service	164	**51.4** 108.8	. .
224	Hewlett-Packard Exemplar X-Class	Caltech/JPL Pasadena USA /1997	Research	256	**51.3** 184.32	46128 .
225	Hewlett-Packard Exemplar X-Class	Hewlett-Packard CXTC Richardson USA /1997	Vendor Benchmarking	128	**51.3** 92.16	46128 .
226	Hewlett-Packard V2500/SCA	Advanced Technology Center Japan /1999	Research	64	**51.2** 112.64	. .
227	Hewlett-Packard V2500/SCA	Caltech/JPL Pasadena USA /1999	Research	64	**51.2** 112.64	. .
228	Hewlett-Packard V2500/SCA	Caltech/JPL Pasadena USA /1999	Research	64	**51.2** 112.64	. .
229	Hewlett-Packard V2500/HyperPlex	American Airlines USA /1999	Industry Transportation	64	**51.2** 112.64	. .
230	Hewlett-Packard V2500/HyperPlex	American Airlines USA /1999	Industry Transportation	64	**51.2** 112.64	. .
231	Hewlett-Packard V2500/HyperPlex	Artmedia Berlin Germany /1999	Industry	64	**51.2** 112.64	. .
232	Hewlett-Packard V2500/HyperPlex	Autonation USA /1999	Industry	64	**51.2** 112.64	. .
233	Hewlett-Packard V2500/HyperPlex	Autonation USA /1999	Industry	64	**51.2** 112.64	. .
234	Hewlett-Packard V2500/HyperPlex	Delta Airlines Atlanta USA /1999	Industry Transportation	64	**51.2** 112.64	. .
235	Hewlett-Packard V2500/HyperPlex	Deutsche Telekom AG Darmstadt Germany /1999	Industry Telecomm	64	**51.2** 112.64	. .
236	Hewlett-Packard V2500/HyperPlex	Deutsche Telekom AG Darmstadt Germany /1999	Industry Telecomm	64	**51.2** 112.64	. .
237	Hewlett-Packard V2500/HyperPlex	Deutsche Telekom AG Darmstadt Germany /1999	Industry Telecomm	64	**51.2** 112.64	. .
238	Hewlett-Packard V2500/HyperPlex	Honda of America USA /1999	Industry Automotive	64	**51.2** 112.64	. .
239	Hewlett-Packard V2500/HyperPlex	I2 Technologies Inc. USA /1999	Industry In.Pr. Service	64	**51.2** 112.64	. .
240	Hewlett-Packard V2500/HyperPlex	I2 Technologies Inc. USA /1999	Industry In.Pr. Service	64	**51.2** 112.64	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
241	Hewlett-Packard V2500/HyperPlex	I2 Technologies Inc. USA /1999	Industry In.Pr. Service	64	**51.2** 112.64	. .
242	Hewlett-Packard V2500/HyperPlex	Lockheed Martin USA /1999	Industry Aerospace	64	**51.2** 112.64	. .
243	Hewlett-Packard V2500/HyperPlex	Lockheed Martin USA /1999	Industry Aerospace	64	**51.2** 112.64	. .
244	Hewlett-Packard V2500/HyperPlex	National Car Rental USA /1999	Industry Transportation	64	**51.2** 112.64	. .
245	Hewlett-Packard V2500/HyperPlex	Quest USA /1999	Industry Software	64	**51.2** 112.64	. .
246	Hewlett-Packard V2500/HyperPlex	Southwestern Bell USA /1999	Industry Telecomm	64	**51.2** 112.64	. .
247	Hewlett-Packard V2500/HyperPlex	US Office Products USA /1999	Industry Database	64	**51.2** 112.64	. .
248	Hewlett-Packard V2500/HyperPlex	United Airlines USA /1999	Industry Transportation	64	**51.2** 112.64	. .
249	Hewlett-Packard V2500/HyperPlex	Voicestream Wireless USA /1999	Industry Telecomm	64	**51.2** 112.64	. .
250	Hewlett-Packard V2500/HyperPlex	Volvo Gothenberg Sweden /1999	Industry Automotive	64	**51.2** 112.64	. .
251	Hewlett-Packard V2250/HyperPlex	Excel Communications USA /1998	Industry	128	**50.9** 122.88	. .
252	Hewlett-Packard V2250/HyperPlex	Excel Communications USA /1998	Industry	128	**50.9** 122.88	. .
253	IBM SP PC604e 332 MHz	BASF Ludwigshafen Germany /1999	Industry Chemistry	162	**50.8** 107.5	. .
254	Cray/SGI T3D MC512-8	Los Alamos National Laboratory Los Alamos USA /1994	Research Energy	512	**50.8** 76	57856 7136
255	Cray/SGI T3D MC512-8	Network Computing Services, Inc. USA /1995	Industry	512	**50.8** 76	57856 7136
256	Cray/SGI T3D MC512-8	Pittsburgh Supercomputing Center Pittsburgh USA /1994	Academic	512	**50.8** 76	57856 7136
257	IBM SP P2SC 120 MHz	Chip Manufacturer (A) USA /1997	Industry Electronics	152	**50.42** 72.96	. .
258	Hewlett-Packard N4000 440 MHz/HyperPlex	Government Germany /1999	Classified	80	**50.4** 140.8	. .
259	IBM SP PC604e 332 MHz	SOGEI Italy /1998	Government	160	**50.2** 106.2	. .
260	IBM SP PC604e 332 MHz	Telecom Italia Italy /1998	Industry Telecomm	160	**50.2** 106.2	. .

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N $_{world}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
261	IBM SP PC604e 332 MHz	Government France /1999	Classified	158	**49.6** 104.89	. .
262	IBM SP Power3 200 MHz	Geco-Prakla Houston USA /1999	Industry Geophysics	80	**49.1** 63.9	. .
263	IBM SP PC604e 332 MHz	Federal Express USA /1999	Industry Database	156	**49** 103.5	. .
264	IBM SP PC604e 332 MHz	IBM - Olympic Games Australia /1999	Industry	156	**49** 103.5	. .
265	Self-made Avalon Cluster	Los Alamos National Laboratory /CNLS Los Alamos USA /1998	Academic	140	**48.6** 149.4	62720 25200
266	NEC SX-4/25	NAL Japan /1997	Research	25	**48.35** 50	. .
267	Cray/SGI T932/321024	Automotive Manufacturer (A) Tokyo Japan /1995	Industry Automotive	32	**47.85** 58	. .
268	Cray/SGI T932/321024	Government USA /1996	Classified	32	**47.85** 58	. .
269	Cray/SGI T932/321024	Government USA /1997	Classified	32	**47.85** 58	. .
270	Cray/SGI T932/321024	Government USA /1998	Classified	32	**47.85** 58	. .
271	Cray/SGI T932/321024	NRI for Earth Science and Disaster (NIED) Japan /1997	Research	32	**47.85** 58	. .
272	Cray/SGI T932/321024	Nippon Telegraph and Telephone (NTT) Tokyo Japan /1995	Industry Telecomm	32	**47.85** 58	. .
273	SGI ORIGIN 2000 300 MHz	Lunds Tekniska Hvgskola Sweden /1999	Academic	100	**47.7** 60	. .
274	Cray/SGI T3E	EXXON USA /1998	Industry Geophysics	108	**47.1** 64.8	. .
275	IBM SP PC604e 332 MHz	Sony Data UK /1999	Industry	148	**46.6** 98.25	. .
276	Hewlett-Packard V2250/HyperPlex	Excel Communications USA /1998	Industry	112	**46** 107.52	. .
277	Fujitsu VPP700/22	National Astronomical Observatory of Japan (NAOJ) Hilo USA /1999	Research	22	**45.9** 48.4	67320 4840
278	Hewlett-Packard N4000 440 MHz/HyperPlex	VW (Volkswagen AG) Wolfsburg Germany /1999	Industry Automotive	64	**45.6** 112.64	. .
279	Sun HPC 10000 400 MHz Cluster	Boeing IDS Group Orange County USA /1999	Industry Aerospace	72	**45.46** 57.6	. .
280	IBM SP PC604e 332 MHz	APAC Hong Kong (EHU) Netherlands /1999	Industry	144	**45.4** 95.6	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
281	IBM SP PC604e 332 MHz	EVE Bank Switzerland /1999	Industry Finance	144	**45.4** 95.6	. .
282	IBM SP PC604e 332 MHz	Merck Germany /1999	Industry Pharmaceutics	144	**45.4** 95.6	. .
283	IBM SP PC604e 332 MHz	Phillips Electronics USA /1999	Industry	144	**45.4** 95.6	. .
284	IBM SP PC604e 332 MHz	UBS AG Switzerland /1999	Industry Finance	144	**45.4** 95.6	. .
285	Fujitsu VPP700/20E	The Angstrom Technology Partnership Tsukuba Japan /1999	Research	20	**45.04** 48	. .
286	Hewlett-Packard V2500/HyperPlex	Pepsi USA /1999	Industry	56	**45** 98.56	. .
287	IBM SP PC604e 332 MHz	Atomic Weapons Establishment Aldermaston UK /1998	Classified	140	**44.27** 92.95	. .
288	IBM SP PC604e 332 MHz	Sears USA /1998	Industry Database	140	**44.27** 92.95	. .
289	IBM SP2/256	Universitaet/Forschungszentrum Karlsruhe Karlsruhe Germany /1997	Academic	256	**44.2** 68	53000 13500
290	Hewlett-Packard N4000 360 MHz/HyperPlex	Max-Planck-Gesellschaft MPI/Fritz-Haber-Institut Berlin Germany /1999	Research	80	**44.1** 115.2	. .
291	Hitachi SR8000/6	Suzuki Motor Japan /1999	Industry Automotive	6	**43.91** 48	28000 2000
292	Sun HPC 10000 400 MHz	ATT Alpharetta USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
293	Sun HPC 10000 400 MHz	Access Graphics Bensenville USA /1999	Industry	64	**43.82** 51.2	39936 4032
294	Sun HPC 10000 400 MHz	Aerotek Hanover USA /1999	Industry Manufacturing	64	**43.82** 51.2	39936 4032
295	Sun HPC 10000 400 MHz	Aerotek Hanover USA /1999	Industry Manufacturing	64	**43.82** 51.2	39936 4032
296	Sun HPC 10000 400 MHz	Agency for Health Care Administration Tallahassee USA /1999	Government	64	**43.82** 51.2	39936 4032
297	Sun HPC 10000 400 MHz	Ameritrade Inc. Omaha USA /1999	Industry Finance	64	**43.82** 51.2	39936 4032
298	Sun HPC 10000 400 MHz	Ameritrade Inc. Omaha USA /1999	Industry Finance	64	**43.82** 51.2	39936 4032
299	Sun HPC 10000 400 MHz	Baker Hughes Houston USA /1999	Industry Geophysics	64	**43.82** 51.2	39936 4032
300	Sun HPC 10000 400 MHz	Baker Hughes Houston USA /1999	Industry Geophysics	64	**43.82** 51.2	39936 4032

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N $_{world}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
301	Sun HPC 10000 400 MHz	Bank USA /1999	Industry Finance	64	**43.82** 51.2	39936 4032
302	Sun HPC 10000 400 MHz	BellSouth Tucker USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
303	Sun HPC 10000 400 MHz	Chase GlobalNet USA /1999	Industry Finance	64	**43.82** 51.2	39936 4032
304	Sun HPC 10000 400 MHz	Cincinnati Bell Information Systems (CBIS) Lake Mary USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
305	Sun HPC 10000 400 MHz	Commerzbank Frankfurt Germany /1999	Industry Finance	64	**43.82** 51.2	39936 4032
306	Sun HPC 10000 400 MHz	Commerzbank Kelsterbach Germany /1999	Industry Finance	64	**43.82** 51.2	39936 4032
307	Sun HPC 10000 400 MHz	Deutsche Bank Frankfurt USA /1999	Industry Finance	64	**43.82** 51.2	39936 4032
308	Sun HPC 10000 400 MHz	Deutsche Telekom AG Bamberg Germany /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
309	Sun HPC 10000 400 MHz	Deutsche Telekom AG Bamberg Germany /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
310	Sun HPC 10000 400 MHz	GTE Communications Fort Wayne USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
311	Sun HPC 10000 400 MHz	GTE Communications Sacramento USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
312	Sun HPC 10000 400 MHz	GTE Communications Sacramento USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
313	Sun HPC 10000 400 MHz	GTE Communications Sacramento USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
314	Sun HPC 10000 400 MHz	GTE Communications Temple Terrace USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
315	Sun HPC 10000 400 MHz	GTE Communications Temple Terrace USA /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
316	Sun HPC 10000 400 MHz	Lexis Nexis Miamisburg USA /1999	Industry Infor. Service	64	**43.82** 51.2	39936 4032
317	Sun HPC 10000 400 MHz	New York City - Human Resources USA /1999	Government	64	**43.82** 51.2	39936 4032
318	Sun HPC 10000 400 MHz	New York State Department of Labor USA /1999	Government	64	**43.82** 51.2	39936 4032
319	Sun HPC 10000 400 MHz	OfficeMax Shaker Heights USA /1999	Industry Database	64	**43.82** 51.2	39936 4032
320	Sun HPC 10000 400 MHz	OfficeMax Shaker Heights USA /1999	Industry Database	64	**43.82** 51.2	39936 4032

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
321	Sun HPC 10000 400 MHz	Optus Communications Sydney Australia /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
322	Sun HPC 10000 400 MHz	Optus Communications Sydney Australia /1999	Industry Telecomm	64	**43.82** 51.2	39936 4032
323	Sun HPC 10000 400 MHz	Prudential Insurance Dudley UK /1999	Industry Database	64	**43.82** 51.2	39936 4032
324	Sun HPC 10000 400 MHz	RAG Informatik Westminster USA /1999	Industry In.Pr. Service	64	**43.82** 51.2	39936 4032
325	Sun HPC 10000 400 MHz	RandomHouse Westminster USA /1999	Industry Database	64	**43.82** 51.2	39936 4032
326	Sun HPC 10000 400 MHz	Sonopress Inc Weaverville USA /1999	Industry Database	64	**43.82** 51.2	39936 4032
327	Sun HPC 10000 400 MHz	Stanford Linear Accelerator Center Stanford USA /1999	Research	64	**43.82** 51.2	39936 4032
328	Sun HPC 10000 400 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1999	Research	64	**43.82** 51.2	39936 4032
329	Sun HPC 10000 400 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1999	Research	64	**43.82** 51.2	39936 4032
330	Sun HPC 10000 400 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1999	Research	64	**43.82** 51.2	39936 4032
331	Sun HPC 10000 400 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1999	Research	64	**43.82** 51.2	39936 4032
332	Sun HPC 10000 400 MHz	W.W. Grainger Niles USA /1999	Industry Database	64	**43.82** 51.2	39936 4032
333	IBM SP PC604e 332 MHz	Deutsche Bank UK /1998	Industry Finance	138	**43.67** 91.62	. .
334	IBM SP PC604e 332 MHz	Oracle Corporation Redwood Shores USA /1999	Industry Database	136	**43.07** 90.2	. .
335	IBM SP PC604e 332 MHz	Procter and Gamble Belgium /1999	Industry	136	**43.07** 90.2	. .
336	Cray/SGI T3E900	North Carolina Supercomputing Center (NCSC) USA /1998	Academic	66	**42.7** 59.4	. .
337	Cray/SGI T3E900	Phillips Petroleum Company Bartlesville USA /1997	Industry Geophysics	66	**42.7** 59.4	. .
338	NEC SX-4/22H5	VW (Volkswagen AG) Wolfsburg Germany /1999	Industry Automotive	22	**42.6** 44	. .
339	Sun HPC 10000 400 MHz	University of Pittsburgh Pittsburgh USA /1998	Academic	62	**42.5** 49.6	. .
340	Sun HPC 10000 400 MHz	debis Systemhaus Stuttgart USA /1999	Industry Automotive	62	**42.5** 49.6	. .

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N $_{world}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
341	IBM SP PC604e 332 MHz	Axone France /1999	Industry	134	**42.47** 88.97	. .
342	IBM SP PC604e 332 MHz	Pennsylvania State University USA /1998	Academic	134	**42.47** 88.97	. .
343	IBM SP P2SC 160 MHz	Chip Manufacturer Israel /1999	Industry	94	**42.4** 60.16	. .
344	Hewlett-Packard V2250/HyperPlex	Delta Airlines Atlanta USA /1999	Industry Transportation	96	**42.3** 92.16	. .
345	Hewlett-Packard V2250/HyperPlex	Delta Airlines Atlanta USA /1999	Industry Transportation	96	**42.3** 92.16	. .
346	IBM SP Power3 200 MHz	Exeter University Exeter UK /1998	Academic	68	**42.2** 54.3	. .
347	IBM SP PC604e 332 MHz	Auchan France /1999	Industry Database	132	**41.87** 87.64	. .
348	IBM SP PC604e 332 MHz	State of Ohio USA /1998	Government	132	**41.87** 87.64	. .
349	IBM SP Power3 222 MHz	Forschungszentrum Karlsruhe Karlsruhe Germany /1999	Academic	64	**41.76** 56.8	53000 10000
350	IBM SP Power3 222 MHz	KTH - Royal Institute of Technology Stockholm Sweden /1999	Research	64	**41.76** 56.8	53000 10000
351	Fujitsu-Siemens hpcLine Cluster	Universitaet Paderborn - PC2 Paderborn Germany /1999	Academic	192	**41.45** 86.4	56480 11136
352	IBM SP PC604e 332 MHz	Alcatel France /1999	Industry Telecomm	130	**41.2** 86.3	. .
353	IBM SP PC604e 332 MHz	BASF Ludwigshafen Germany /1999	Industry Chemistry	130	**41.2** 86.3	. .
354	IBM SP PC604e 332 MHz	CompuNet Germany /1999	Industry	130	**41.2** 86.3	. .
355	Sun HPC 10000 400 MHz	ATT Kansas City USA /1999	Industry Telecomm	60	**41.19** 48	39936 3840
356	Sun HPC 10000 400 MHz	Bank USA /1999	Industry Finance	60	**41.19** 48	39936 3840
357	Sun HPC 10000 400 MHz	DaimlerChrysler Stuttgart USA /1999	Industry Automotive	60	**41.19** 48	39936 3840
358	Sun HPC 10000 400 MHz	debis Systemhaus Stuttgart USA /1999	Industry Automotive	60	**41.19** 48	39936 3840
359	Cray/SGI T3E	Norwegian University of Science and Technology Trondheim Norway /1997	Academic	94	**41.15** 56.4	. .
360	IBM SP P2SC 120 MHz	Dassault Aviation France /1999	Industry Aerospace	122	**40.9** 58.56	. .

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N $_{world}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
361	IBM SP PC604e 332 MHz	GTE Communications USA /1998	Industry Telecomm	128	**40.67** 84.99	63000 12000
362	IBM SP PC604e 332 MHz	Government France /1999	Classified	128	**40.67** 84.99	63000 12000
363	IBM SP PC604e 332 MHz	Motorola Scottsdale USA /1998	Industry Electronics	128	**40.67** 84.99	63000 12000
364	Fujitsu VPP500/28	Institute of Physical and Chemical Res. (RIKEN) Wako Japan /1993	Research	28	**40.475** 44.8	. .
365	IBM SP P2SC 160 MHz	Korea Telecom Korea /1998	Industry Telecomm	89	**40.3** 56.96	. .
366	SGI ORIGIN 2000	DOD/CEWES Vicksburg USA /1998	Research	128	**40.25** 49.92	60000 6000
367	SGI ORIGIN 2000	Kyoto University Kyoto Japan /1997	Academic	128	**40.25** 49.92	60000 6000
368	SGI ORIGIN 2000	NCSA Urbana-Champaign USA /1999	Research	128	**40.25** 49.92	60000 6000
369	SGI ORIGIN 2000	NCSA Urbana-Champaign USA /1999	Research	128	**40.25** 49.92	60000 6000
370	SGI ORIGIN 2000	Naval Oceanographic Office (NAVOCEANO) Bay Saint Louis USA /1997	Research Aerospace	128	**40.25** 49.92	60000 6000
371	SGI ORIGIN 2000	US Army Space and Missile Defense Command Arlington USA /1998	Research	128	**40.25** 49.92	60000 6000
372	SGI ORIGIN 2000	University of Bergen Bergen Norway /1997	Academic	128	**40.25** 49.92	60000 6000
373	SGI ORIGIN 2000	University of Minnesota/Supercomputing Institute Minneapolis USA /1998	Academic	128	**40.25** 49.92	60000 6000
374	SGI ORIGIN 2000	University of Tokyo Tokyo Japan /1997	Academic	128	**40.25** 49.92	60000 6000
375	SGI ORIGIN 2000	University of Tokyo Tokyo Japan /1997	Academic	128	**40.25** 49.92	60000 6000
376	SGI ORIGIN 2000	Vertex Pharmaceuticals Cambridge USA /1997	Industry Pharmaceutics	128	**40.25** 49.92	60000 6000
377	Cray/SGI T932/261024	NOAA/Geophysical Fluid Dynamics Laboratory (GFDL) Princeton USA /1997	Research Weather	26	**40.25** 47.12	. .
378	Cray/SGI T932/261024	Naval Oceanographic Office (NAVOCEANO) Bay Saint Louis USA /1998	Research	26	**40.25** 47.12	. .
379	IBM SP PC604e 332 MHz	Bayer USA /1999	Industry	126	**40.05** 83.66	. .
380	IBM SP PC604e 332 MHz	Lufthansa Frankfurt Germany /1999	Industry Transportation	126	**40.05** 83.66	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
381	IBM SP Power3 200 MHz	ChonBok University Korea /1999	Academic	64	**39.9** 51.2	63000 7400
382	IBM SP Power3 200 MHz	Oil Company USA /1999	Industry Geophysics	64	**39.9** 51.2	63000 7400
383	IBM SP Power3 200 MHz	Princeton University Princeton USA /1999	Academic	64	**39.9** 51.2	63000 7400
384	Sun HPC 10000 333 MHz Cluster	Dutchtone Netherlands /1999	Industry Telecomm	78	**39.87** 46.8	. .
385	Sun HPC 10000 400 MHz	Bank USA /1999	Industry Finance	58	**39.86** 46.4	. .
386	Sun HPC 10000 400 MHz	eBay San Jose USA /1999	Industry WWW	58	**39.86** 46.4	. .
387	Hewlett-Packard V2500/HyperPlex	DaimlerChrysler USA /1999	Industry Automotive	48	**39.8** 84.48	. .
388	Hewlett-Packard V2500/HyperPlex	DaimlerChrysler USA /1999	Industry Automotive	48	**39.8** 84.48	. .
389	Hewlett-Packard V2500/HyperPlex	Delta Airlines Atlanta USA /1999	Industry Transportation	48	**39.8** 84.48	. .
390	Hewlett-Packard V2500/HyperPlex	Government Germany /1999	Classified	48	**39.8** 84.48	. .
391	Hewlett-Packard V2500/HyperPlex	Osaka University Osaka Japan /1999	Academic	48	**39.8** 84.48	. .
392	Hewlett-Packard V2500/HyperPlex	Pacific Bell USA /1999	Industry Telecomm	48	**39.8** 84.48	. .
393	Hewlett-Packard V2500/HyperPlex	Union Carbide USA /1999	Industry	48	**39.8** 84.48	. .
394	IBM SP PC604e 332 MHz	AI Informatics GmbH (AII) Austria /1999	Industry Database	124	**39.43** 82.33	. .
395	IBM SP PC604e 332 MHz	Bank of America USA /1999	Industry Finance	124	**39.43** 82.33	. .
396	IBM SP PC604e 332 MHz	Dickens/FM USA /1999	Industry	124	**39.43** 82.33	. .
397	SGI ORIGIN 2000 250 MHz - Eth-Cluster	The Sabre Group Ft Worth USA /1999	Industry Transportation	128	**39.4** 64	. .
398	IBM SP2/224	Maui High-Performance Computing Center (MHPCC) USA /1994	Research	224	**39.03** 59.58	. .
399	Sun HPC 10000 400 MHz Cluster	Computer Manufacturer USA /1999	Industry Electronics	64	**39.03** 51.2	. .
400	Sun HPC 10000 400 MHz Cluster	Semiconductor Company USA /1999	Industry Electronics	64	**39.03** 51.2	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{ma} $N_{1/}$
401	SGI ORIGIN 2000 250 MHz	Allied Signal Federal ManufacturingTechnologies Kansas City USA /1998	Industry Manufacturing	96	**38.84** 48	
402	SGI ORIGIN 2000 250 MHz	Lockheed Martin Energy Systems/ORNL Y-12 Oak Ridge USA /1998	Industry Mechanics	96	**38.84** 48	
403	NEC SX-4/20	Japan Marine Science and Technology Yokosuka Japan /1995	Research	20	**38.76** 40	
404	NEC SX-4/20	National Research Institute for Metals Tsukuba Japan /1996	Research	20	**38.76** 40	
405	NEC SX-4/20	Toyota Central Research Development Japan /1996	Industry Automotive	20	**38.76** 40	
406	Fujitsu VPP700/17E	Communications Res. Lab. (CRL) Tokyo Japan /1998	Research	17	**38.56** 40.8	
407	Sun HPC 10000 400 MHz	Commerzbank Kelsterbach Germany /1999	Industry Finance	56	**38.53** 44.8	3993 345
408	Sun HPC 10000 400 MHz	Mannesmann Mobilfunk Ratingen Germany /1999	Industry Telecomm	56	**38.53** 44.8	3993 345
409	Sun HPC 10000 400 MHz	Mannesmann Mobilfunk Ratingen Germany /1999	Industry Telecomm	56	**38.53** 44.8	3993 345
410	Sun HPC 10000 400 MHz	Sita Montreal Canada /1999	Industry Telecomm	56	**38.53** 44.8	3993 345
411	Sun HPC 10000 400 MHz	W.W. Grainger Niles USA /1999	Industry Database	56	**38.53** 44.8	3993 345
412	Sun HPC 6000 "Wildfire"	Naval Research Laboratory (NRL) Washington D.C. USA /1998	Research	96	**38.13** 48	2956 806
413	IBM SP PC604e 332 MHz	VF Services USA /1999	Industry	120	**38.1** 79.6	
414	IBM SP PC604e 332 MHz	Western Geophysical Houston USA /1999	Industry Geophysics	120	**38.1** 79.6	
415	Cray/SGI T3E	University of Texas Austin USA /1997	Academic	86	**37.73** 51.6	
416	Fujitsu VPP5000/4	Audi AG Ingolstadt Germany /1999	Industry Automotive	4	**37.6** 38.4	6038 158
417	IBM SP PC604e 332 MHz	Barclays Bank UK /1998	Industry Finance	118	**37.57** 78.34	
418	NEC SX-5/5B	IFP (Institute Francais du Petrole) Rueil-Malmaison France /1999	Academic Geophysics	5	**37.45** 40	
419	IBM SP Power3 200 MHz	China National Petroleum Corp-BGP China /1998	Industry Geophysics	60	**37.4** 48	
420	SGI ORIGIN 2000 300 MHz - Eth-Cluster	Industrial Light Magic USA /1999	Industry Image Proc./Rendering	128	**37.31** 76.8	5600 2300

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{ma} $N_{1/}$
421	SGI ORIGIN 2000 250 MHz - Eth-Cluster	Government USA /1998	Classified	144	**37.31** 72	
422	SGI ORIGIN 2000 250 MHz - Eth-Cluster	America On Line (AOL) USA /1999	Industry WWW	128	**37.31** 64	5600 2300
423	SGI ORIGIN 2000 250 MHz - Eth-Cluster	Industrial Light Magic USA /1999	Industry Image Proc./Rendering	128	**37.31** 64	5600 2300
424	SGI ORIGIN 2000 250 MHz - Eth-Cluster	NASA/Ames Research Center/NAS Mountain View USA /1999	Research Aerospace	128	**37.31** 64	5600 2300
425	Cray/SGI T932/24512	Commissariat a l'Energie Atomique (CEA) Limeil France /1997	Research	24	**37.21** 43.5	
426	Cray/SGI T932/241024	Ford Motor Company Dearborn USA /1996	Industry Automotive	24	**37.21** 43.5	
427	Sun HPC 10000 400 MHz	Cedel Bank Grande Duchesse Luxembourg /1999	Industry Finance	54	**37.18** 43.2	
428	Sun HPC 10000 400 MHz	Cedel Bank Grande Duchesse Luxembourg /1999	Industry Finance	54	**37.18** 43.2	
429	Sun HPC 10000 400 MHz	Deutsche Telekom AG Munich Germany /1999	Industry Telecomm	54	**37.18** 43.2	
430	Sun HPC 10000 400 MHz	Littlewoods Liverpool UK /1999	Industry Database	54	**37.18** 43.2	
431	IBM SP PC604e 332 MHz	TRW Cleveland USA /1999	Industry Automotive	116	**36.9** 77	
432	Fujitsu VPP300/16E	Audi AG Ingolstadt Germany /1998	Industry Automotive	16	**36.4** 38.4	5760 352
433	IBM SP PC604e 332 MHz	Atraxis AG Switzerland /1999	Industry	114	**36.33** 75.69	
434	IBM SP P2SC 160 MHz	Georgia Institute of Technology Atlanta USA /1997	Research	80	**36.3** 51.2	
435	Hewlett-Packard V2500/HyperPlex	CILEA Milano Italy /1999	Research	40	**36.1** 70.4	
436	Sun HPC 10000 400 MHz	ATT Morristown USA /1999	Industry Telecomm	52	**35.83** 41.6	3993 326
437	Sun HPC 10000 400 MHz	Financial Corporation San Francisco USA /1999	Industry Finance	52	**35.83** 41.6	3993 326
438	Sun HPC 10000 400 MHz	NewLook Dorset UK /1999	Industry Database	52	**35.83** 41.6	3993 326
439	Sun HPC 10000 400 MHz	OR Telematique Paris France /1999	Industry	52	**35.83** 41.6	3993 326
440	NEC SX-5S/10H3	Renault France /1999	Industry Automotive	5	**35.72** 40	

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
441	IBM SP PC604e 332 MHz	University of Louisville USA /1999	Academic	112	**35.71** 74.36	. .
442	IBM SP P2SC 160 MHz	SARA (Stichting Academisch Rekencentrum) Amsterdam Netherlands /1998	Research	76	**35.54** 48.64	. .
443	Sun HPC 10000 333 MHz Cluster	Gedas N.A. (VW) Mexico /1999	Industry Automotive	70	**35.17** 42	. .
444	SGI ORIGIN 2000	Chalmers University of Technology Goteborg Sweden /1999	Academic	110	**34.7** 42.9	. .
445	SGI ORIGIN 2000 250 MHz - Eth-Cluster	Government USA /1998	Classified	112	**34.47** 56	. .
446	Sun HPC 10000 400 MHz	California State Auto Association San Francisco USA /1999	Industry Database	50	**34.46** 40	. .
447	Sun HPC 10000 400 MHz	Pratt and Whitney Hartford USA /1999	Industry Aerospace	50	**34.46** 40	. .
448	Sun HPC 10000 400 MHz	Ryder TRS Richardson USA /1999	Industry Transportation	50	**34.46** 40	. .
449	Sun HPC 10000 400 MHz	Telecom Italia Mobile Torino Italy /1999	Industry Telecomm	50	**34.46** 40	. .
450	IBM SP PC604e 332 MHz	Bourse Luxembourg Luxembourg /1999	Industry Finance	108	**34.4** 71.7	. .
451	IBM SP PC604e 332 MHz	Cable Wireless USA /1999	Industry Telecomm	108	**34.4** 71.7	. .
452	IBM SP PC604e 332 MHz	France Telecom France /1999	Industry Telecomm	108	**34.4** 71.7	. .
453	IBM SP PC604e 332 MHz	Lidl Schwartz Germany /1999	Industry	108	**34.4** 71.7	. .
454	Self-made Parnass2 Cluster	University Bonn - Dep. of Applied Mathematics Bonn Germany /1999	Academic	128	**34.23** 57.6	64224 7200
455	Sun HPC 10000 333 MHz	ATT Alpharetta USA /1998	Industry Telecomm	64	**34.17** 42.6	20352 3648
456	Sun HPC 10000 333 MHz	Ameritrade Inc. Omaha USA /1999	Industry Finance	64	**34.17** 42.6	20352 3648
457	Sun HPC 10000 333 MHz	Baker Hughes Houston USA /1998	Industry Geophysics	64	**34.17** 42.6	20352 3648
458	Sun HPC 10000 333 MHz	Bank Frankfurt Germany /1999	Industry Finance	64	**34.17** 42.6	20352 3648
459	Sun HPC 10000 333 MHz	Cedel Bank Grande Duchesse Luxembourg /1999	Industry Finance	64	**34.17** 42.6	20352 3648
460	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34.17** 42.6	20352 3648

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
461	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34.17** 42.6	20352 3648
462	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34.17** 42.6	20352 3648
463	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34.17** 42.6	20352 3648
464	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34.17** 42.6	20352 3648
465	Sun HPC 10000 333 MHz	Commerzbank Frankfurt Germany /1999	Industry Finance	64	**34.17** 42.6	20352 3648
466	Sun HPC 10000 333 MHz	Commerzbank Kelsterbach Germany /1999	Industry Finance	64	**34.17** 42.6	20352 3648
467	Sun HPC 10000 333 MHz	Deutsche Morgan Grenfell Frankfurt Germany /1999	Industry Finance	64	**34.17** 42.6	20352 3648
468	Sun HPC 10000 333 MHz	Deutsche Morgan Grenfell London UK /1998	Industry Finance	64	**34.17** 42.6	20352 3648
469	Sun HPC 10000 333 MHz	Deutsche Morgan Grenfell London UK /1998	Industry Finance	64	**34.17** 42.6	20352 3648
470	Sun HPC 10000 333 MHz	EDS Auburn Hills USA /1999	Industry Telecomm	64	**34.17** 42.6	20352 3648
471	Sun HPC 10000 333 MHz	EDS/ SAP Plano USA /1999	Industry Finance	64	**34.17** 42.6	20352 3648
472	Sun HPC 10000 333 MHz	Enron Capital Houston USA /1999	Industry Energy	64	**34.17** 42.6	20352 3648
473	Sun HPC 10000 333 MHz	Ford Motor Company Dearborn USA /1999	Industry Automotive	64	**34.17** 42.6	20352 3648
474	Sun HPC 10000 333 MHz	GTE Communications Temple Terrace USA /1999	Industry Telecomm	64	**34.17** 42.6	20352 3648
475	Sun HPC 10000 333 MHz	Hughes Space Communication El Segundo USA /1999	Industry Aerospace	64	**34.17** 42.6	20352 3648
476	Sun HPC 10000 333 MHz	Mississippi State University Starkville USA /1998	Academic	64	**34.17** 42.6	20352 3648
477	Sun HPC 10000 333 MHz	Motorola Scottsdale USA /1999	Industry Electronics	64	**34.17** 42.6	20352 3648
478	Sun HPC 10000 333 MHz	Motorola Scottsdale USA /1999	Industry Electronics	64	**34.17** 42.6	20352 3648
479	Sun HPC 10000 333 MHz	National Center for Genome Resources Santa Fe USA /1998	Research	64	**34.17** 42.6	20352 3648
480	Sun HPC 10000 333 MHz	Nippon Telegraph and Telephone (NTT) Kanagawa Japan /1998	Industry Telecomm	64	**34.17** 42.6	20352 3648

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Gflop/s]	N_{max} $N_{1/2}$
481	Sun HPC 10000 333 MHz	Nippon Telegraph and Telephone (NTT) Kanagawa Japan /1998	Industry Telecomm	64	**34.17** 42.6	20352 3648
482	Sun HPC 10000 333 MHz	Omnitel Pronto Italia Milano Italy /1999	Industry Telecomm	64	**34.17** 42.6	20352 3648
483	Sun HPC 10000 333 MHz	Owens Corning Toledo USA /1998	Industry Chemistry	64	**34.17** 42.6	20352 3648
484	Sun HPC 10000 333 MHz	Owens Corning Toledo USA /1998	Industry Chemistry	64	**34.17** 42.6	20352 3648
485	Sun HPC 10000 333 MHz	RIPS Ibarakiken Japan /1999	Research	64	**34.17** 42.6	20352 3648
486	Sun HPC 10000 333 MHz	Recruit Tokyo Japan /1999	Industry WWW	64	**34.17** 42.6	20352 3648
487	Sun HPC 10000 333 MHz	The Sabre Group Ft Worth USA /1999	Industry Transportation	64	**34.17** 42.6	20352 3648
488	Sun HPC 10000 333 MHz	UCSD/San Diego Supercomputer Center San Diego USA /1999	Academic	64	**34.17** 42.6	20352 3648
489	Sun HPC 10000 333 MHz	eBay San Jose USA /1999	Industry WWW	64	**34.17** 42.6	20352 3648
490	SGI ORIGIN 2000	National Research Counsil Canada /1999	Research	108	**34.15** 42.12	. .
491	Fujitsu VPP300/16	Japan Atomic Energy Research Japan /1996	Research	16	**34.1** 35.2	59200 3520
492	Fujitsu VPP300/16	Japan Science and Technology Tokyo Japan /1996	Research	16	**34.1** 35.2	59200 3520
493	Fujitsu VPP300/16	Reactor Nuclear Fuel Development Japan /1996	Research	16	**34.1** 35.2	59200 3520
494	Fujitsu VPP300/16	Universitaet/Forschungszentrum Karlsruhe Karlsruhe Germany /1997	Academic	16	**34.1** 35.2	59200 3520
495	IBM SP P2SC 120 MHz	UNI-C Lyngby Denmark /1999	Academic	100	**33.9** 48	. .
496	Intel XP/S-MP 41	Air Force Research Laboratory/Information Director Rome USA /1995	Research	816	**33.7** 40.8	. .
497	IBM SP PC604e 332 MHz	Autozone Memphis USA /1999	Industry Database	104	**33.2** 69	. .
498	IBM SP PC604e 332 MHz	Nabisco USA /1999	Industry Database	104	**33.2** 69	. .
499	Sun HPC 10000 400 MHz	ATT Kirkland USA /1999	Industry Telecomm	48	**33.09** 38.4	39936 3072
500	Sun HPC 10000 400 MHz	Bank USA /1999	Industry Finance	48	**33.09** 38.4	39936 3072

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4 Statistics on Manufacturers and Continents

As basic statistics of the complete list, we give the number of systems installed with respect to the different manufacturers in the different countries or continents (Table 2) as well as the accumulated R_{max} values (Table 3) and R_{peak} values (Table 4) for those systems. More extensive analyses of the situation and its evolution over time can be found in the series of TOP500Reports (TOP500Report 1993 [3], 1994 [4], 1995 [5] and, 1996 [6]). Customized statistics can be obtained by using WWW at http://www.top500.org or http://www.netlib.org/benchmark/top500.html.

Table 2: Number of Systems Installed

TOP500 Statistics — Number of Systems Installed					
	USA/Canada	Europe	Japan	others	Total
IBM	67	67	2	5	141
SGI/Cray	92	27	12	2	133
SGI only	53	7	7		67
Cray only	39	20	5	2	66
Sun	76	29	4	4	113
Hewlett-Packard	33	10	2		45
Fujitsu	1	9	15	1	26
NEC	2	7	10	2	21
Hitachi		1	10		11
others	6	2	2		10
Total	277	152	57	14	500

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Table 3: Installed $\mathbf{R_{max}}$

TOP500 Statistics — Installed R_{max} [Gflop/s]					
	USA/Canada	Europe	Japan	others	Total
IBM	9134.9	4103.9	228.5	209.0	13676
SGI/Cray	13143.4	5516.9	685.3	191.5	19536.6
SGI only	5304.5	389.2	408.9		6102.6
Cray only	7838.9	5127.7	276.4	191.5	13434
Sun	3402.9	1073.6	136.7	191.6	4804.8
Hewlett-Packard	1636.2	472.0	91.0		2199.2
Fujitsu	45.9	1009.6	1660.6	139.8	2855.9
NEC	306.3	499.2	969.0	185.1	1959.6
Hitachi		58.7	2544.3		2602.9
others	3093.0	75.7	164.8		3333.5
Total	30763	12810	6480.1	916.9	50969

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Table 4: Installed $\mathbf{R_{peak}}$

TOP500 Statistics — Installed R_{peak} [Gflop/s]					
	USA/Canada	Europe	Japan	others	Total
IBM	16063	7858.5	374.9	319.8	24616
SGI/Cray	19264.5	7812.3	891.4	277.2	28245.5
SGI only	8044.5	511.2	533.8		9089.5
Cray only	11220	7301.1	357.6	277.2	19156
Sun	4260.2	1287.0	170.4	232.4	5950.0
Hewlett-Packard	3700.5	1086.7	197.1		4984.3
Fujitsu	48.4	1100.8	1845.0	144.0	3138.2
NEC	320.0	524.0	1010.0	192.0	2046.0
Hitachi		77.0	3184.0		3261.0
others	4643.2	144.0	265.1		5052.3
Total	48300	19890	7937.9	1165.4	77294

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References

[1] H. W. Meuer, *The Mannheim Supercomputer Statistics 1986—1992* in [3]

[2] J. J. Dongarra, *Performance of Various Computers Using Standard Linear Equations Software*, Computer Science Department, University of Tennessee, CS-89-85, 1994

[3] J. J. Dongarra, H. W. Meuer and E. Strohmaier, eds.
TOP500 Report 1993, University of Mannheim, 1994

[4] J. J. Dongarra, H. W. Meuer and E. Strohmaier, eds.
TOP500 Report 1994, SUPERCOMPUTER 60/61, volumne 11, number 2/3, June 1995

[5] J. J. Dongarra, H. W. Meuer and E. Strohmaier, eds.
TOP500 Report 1995, SUPERCOMPUTER , volumne 12, number 1, January 1996

[6] J. J. Dongarra, H. W. Meuer and E. Strohmaier, eds.
TOP500 Report 1996, SUPERCOMPUTER , volumne 13, number 1, January 1997