TOP500 Supercomputer Sites

12th 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} [Mflop/s]	N_{max} $N_{1/2}$
1	Intel ASCI Red	Sandia National Labs Albuquerque USA /1997	Research	9152	**1338000** 1830400	235000 63000
2	SGI T3E1200	Government USA /1998	Classified	1084	**891500** 1300800	259200 26400
3	SGI T3E900	Government USA /1997	Classified	1324	**815100** 1191600	134400 26880
4	SGI ASCI Blue Mountain	Los Alamos National Laboratory Los Alamos USA /1998	Research	6144	**690900** 3072000	229248 80640
5	SGI T3E900	United Kingdom Meteorological Office Bracknell UK /1997	Research Weather	876	**552920** 788400	. .
6	IBM SP Silver	IBM Poughkeepsie USA /1998	Vendor Energy	1952	**547000** 1296000	244000 58000
7	SGI T3E1200	UK Centre for Science Manchester UK /1998	Academic	612	**509900** 734400	. .
8	IBM ASCI Blue Pacific CTR SP Silver	Lawrence Livermore National Laboratory Livermore USA /1998	Research Energy	1344	**468200** 892000	205000 65000
9	SGI T3E900	Naval Oceanographic Office (NAVOCEANO) Bay Saint Louis USA /1997	Research Weather	700	**449000** 630000	. .
10	SGI T3E	NASA/Goddard Space Flight Center Greenbelt USA /1998	Research Weather	1084	**448600** 650400	119808 19008
11	SGI T3E1200	Silicon Graphics Chippewa Falls USA /1998	Vendor	540	**447800** 648000	181440 17280
12	SGI T3E900	NERSC/LBNL Berkeley USA /1997	Research	692	**444200** 622800	. .
13	SGI T3E1200	Deutscher Wetterdienst Offenbach Germany /1998	Research Weather	484	**401200** 558080	. .
14	Hitachi/Tsukuba CP-PACS/2048	Center for Computational Physics, Univ of Tsukuba Tsukuba Japan /1996	Academic	2048	**368200** 614000	103680 30720
15	SGI T3E	Max-Planck-Gesellschaft MPI/IPP Garching Germany /1997	Research	812	**355100** 487200	. .
16	SGI T3E900	HWW/Universitaet Stuttgart Stuttgart Germany /1996	Industry	540	**341300** 486000	. .
17	SGI T3E900	Pittsburgh Supercomputer Center Pittsburgh USA /1998	Research	540	**341300** 486000	. .
18	NEC SX-4/128M4	Atmospheric Environment Service (AES) Dorval Canada /1998	Research Weather	128	**244000** 256000	. .
19	NEC SX-4/128H4	Tohoku University Aramaki Japan /1997	Academic	128	**244000** 256000	. .
20	SGI T3E	Forschungszentrum Juelich (FZJ) Juelich Germany /1996	Research	540	**234900** 324000	86400 14400

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
21	SGI T3E	Silicon Graphics Eagan USA /1997	Vendor	540	**234900** 324000	86400 14400
22	Hitachi SR2201/1024	University of Tokyo Tokyo Japan /1996	Academic	1024	**232400** 307000	155520 34560
23	Fujitsu Numerical Wind Tunnel	NAL Japan /1996	Research Aerospace	167	**229700** 281000	66132 18018
24	SGI T3E1200	Government USA /1998	Classified	268	**221770** 321600	. .
25	SGI T3E1200	US Army HPC Research Center at NCS Minneapolis USA /1997	Research	268	**221770** 321600	. .
26	SGI T3E900	University of Edinburgh Edinburgh UK /1997	Academic	348	**218900** 313200	. .
27	Fujitsu VPP700/116	ECMWF Reading UK /1997	Research Weather	116	**213000** 255200	111360 18560
28	SGI T3E900	DOD/CEWES Vicksburg USA /1997	Research Mechanics	332	**208950** 298800	. .
29	IBM ASCI Blue Pacific TR SP Silver	Lawrence Livermore National Laboratory Livermore USA /1998	Research Energy	672	**198600** 446000	95000 37000
30	SGI T3E900	Forschungszentrum Juelich (FZJ) Juelich Germany /1997	Research	268	**169070** 241200	. .
31	SGI T3E900	Minnesota Supercomputer Center USA /1997	Industry	268	**169070** 241200	. .
32	SGI T3E750	Commissariat a l'Energie Atomique (CEA) Grenoble France /1997	Research Energy	300	**157500** 225000	. .
33	IBM SP PC604 332 MHz	IBM/Poughkeepsie Poughkeepsie USA /1998	Vendor	512	**156800** 329900	125000 27000
34	SGI ORIGIN 2000	NCSA Urbana-Champaign USA /1998	Research	512	**152000** 199680	. .
35	IBM SP P2SC 120 MHz	Pacific Northwest National Laboratoriy Richland USA /1998	Research	512	**151800** 226560	61000 22600
36	SGI T3E900	ZIB/Konrad Zuse-Zentrum fuer Informationstechnik Berlin Germany /1997	Academic	228	**143600** 205200	. .
37	Intel XP/S140	Sandia National Labs Albuquerque USA /1993	Research	3680	**143400** 184000	55700 20500
38	SGI T3E1200	CINECA Bologna Italy /1998	Academic	172	**142360** 206400	. .
39	Intel XP/S-MP 150	Oak Ridge National Laboratory Oak Ridge USA /1995	Research	3072	**127100** 154000	86000 17800
40	SGI T3E750	CSC (Center for Scientific Computing) Espoo Finland /1997	Academic	236	**123980** 177000	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
41	Sun HPC 10000 333 MHz	Sun Portland USA /1998	Vendor	256	**123900** 170400	80640 26880
42	NEC SX-4/64M2	National Institute of Fusion Science (NIFS) Japan /1997	Research	64	**122200** 128000	30080 4352
43	NEC SX-4/64M2	Osaka University Osaka Japan /1997	Academic	64	**122200** 128000	30080 4352
44	SGI T3E	CNRS/IDRIS Orsay France /1996	Academic	268	**117900** 160800	. .
45	SGI T3E	Government USA /1997	Classified	268	**117900** 160800	. .
46	SGI T3E	UCSD/San Diego Supercomputer Center San Diego USA /1996	Academic	268	**117900** 160800	. .
47	SGI T3E750	Government USA /1997	Classified	220	**115440** 165000	. .
48	Fujitsu VPP700/56	Kyushu University Fukuoka Japan /1996	Academic	56	**110300** 123200	109200 10752
49	Fujitsu VPP500/80	National Lab. for High Energy Physics Japan /1994	Research	80	**109800** 128000	46400 11030
50	Fujitsu/SNI VPP700/52	Leibniz Rechenzentrum Muenchen Germany /1998	Academic	52	**106300** 114400	. .
51	IBM SP P2SC 160 MHz	Maui High-Performance Computing Center (MHPCC) USA /1998	Research	243	**106115** 155520	. .
52	SGI T3E	Government USA /1997	Classified	236	**103500** 141600	. .
53	Intel XP/S-MP 125	Japan Atomic Energy Research Japan /1996	Research	2502	**103500** 125100	. .
54	SGI ORIGIN 2000 250 MHz	NASA/Ames Research Center/NAS Mountain View USA /1998	Research Aerospace	256	**101400** 128000	86400 13248
55	SGI ORIGIN 2000 250 MHz	NCSA Urbana-Champaign USA /1998	Research	256	**101400** 128000	86400 13248
56	SGI ORIGIN 2000 250 MHz	Silicon Graphics Eagan USA /1998	Vendor	256	**101400** 128000	86400 13248
57	SGI T3D MC1024-8	Government USA /1994	Classified	1024	**100500** 152000	81920 10224
58	SGI T3E	National Supercomputer Centre (NSC) Linkoping Sweden /1997	Academic	228	**99700** 136800	. .
59	Fujitsu VPP700/48E	ECMWF Reading UK /1998	Research Weather	48	**97500** 115200	. .
60	IBM SP P2SC 135 MHz	DOD/CEWES Vicksburg USA /1997	Research	256	**94190** 138240	. .

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61	IBM SP P2SC 135 MHz	Wright-Patterson Air Force Base USA /1997	Research	256	**94190** 138240	. .
62	SGI T3E750	Government USA /1997	Classified	172	**89800** 129000	. .
63	SGI T3E900	KIST/System Engineering Research Institute (SSC) Korea /1997	Industry	132	**82150** 118800	. .
64	IBM SP P2SC 160 MHz	State Farm USA /1998	Industry Database	186	**81890** 123500	. .
65	SGI T3E	Commissariat a l'Energie Atomique (CEA) Limeil France /1997	Research	188	**81360** 112800	. .
66	IBM SP PC604 332 MHz	BASF Ludwigshafen Germany /1998	Industry Chemistry	256	**79170** 169900	89000 18000
67	IBM SP PC604 332 MHz	IBM/Poughkeepsie Poughkeepsie USA /1998	Vendor	256	**79170** 169900	89000 18000
68	IBM SP PC604 332 MHz	University of Minnesota/Supercomputing Institute Minneapolis USA /1998	Academic	256	**79170** 169900	89000 18000
69	SGI T3E	NRI for Earth Science and Disaster (NIED) Japan /1997	Research	172	**74520** 103200	. .
70	IBM SP2/402	Chip Manufacturer (B) USA /1997	Industry Electronics	402	**69330** 106530	. .
71	IBM SP P2SC 160 MHz	KTH - Royal Institute of Technology Stockholm Sweden /1998	Research	146	**64800** 93440	. .
72	SGI T3E	Government USA /1997	Classified	148	**64260** 88800	. .
73	SGI T3E900	University of Alaska - ARSC Fairbanks USA /1997	Academic	100	**62930** 90000	. .
74	IBM SP PC604 332 MHz	Philips Research Netherlands /1998	Industry Electronics	200	**62320** 132800	. .
75	NEC SX-4/32	Bureau of Meterology Melbourne Australia /1997	Research Weather	32	**61770** 64000	20480 1688
76	NEC SX-4/32	HWW/Universitaet Stuttgart Stuttgart Germany /1996	Industry	32	**61770** 64000	20480 1688
77	NEC SX-4/32	NEC Fuchu Plant Tokyo Japan /1995	Vendor Benchmarking	32	**61770** 64000	20480 1688
78	NEC SX-4/32	National Institute for Environmental Studies Tsukuba Japan /1997	Research Environment	32	**61770** 64000	20480 1688
79	IBM SP PC604 332 MHz	Charles Schwab USA /1998	Industry Finance	192	**59920** 127440	. .
80	TMC CM-5/1056	Los Alamos National Laboratory Los Alamos USA /1993	Research Energy	1056	**59700** 135100	52224 24064

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81	Fujitsu VPP500/42	Japan Atomic Energy Research Japan /1994	Research	42	**59600** 67200	. .
82	Fujitsu VPP500/42	Nagoya University Nagoya Japan /1995	Academic	42	**59600** 67200	. .
83	Hitachi SR2201/256	Hitachi Mechanical Engineering Res. Lab. Japan /1998	Research	256	**58680** 77000	77760 13440
84	Hitachi SR2201/256	Real World Computing (RWCP) Tokyo Japan /1997	Research	256	**58680** 77000	77760 13440
85	Hitachi SR2201/256	Tokyo University - Human Genome Center/IMS Tokyo Japan /1998	Academic	256	**58680** 77000	77760 13440
86	Hitachi SR2201/256	University of Cambridge Cambridge UK /1998	Academic	256	**58680** 77000	77760 13440
87	SGI T3E	Japan Adv. Inst. of Science and Technology (JAIST) Hokuriku Japan /1997	Academic	134	**58280** 80400	. .
88	Fujitsu VPP700/26E	Direction de la Meteorologie Nationale Toulouse France /1997	Research Weather	26	**58000** 62400	74880 5200
89	IBM SP PC604 332 MHz	British Columbia Telecommunications Canada /1998	Industry Telecomm	184	**57510** 122130	. .
90	SGI T3E	Ohio Supercomputer Center Columbus USA /1997	Academic	132	**57420** 79200	. .
91	IBM SP P2SC 160 MHz	Oracle/IBM France /1998	Industry Database	128	**57240** 81920	39000 9180
92	IBM SP P2SC 160 MHz	UCSD/San Diego Supercomputer Center San Diego USA /1997	Academic	128	**57240** 81920	39000 9180
93	Fujitsu VPP500/40	National Institute of Genetics Mishima Japan /1995	Research	40	**56900** 64000	. .
94	Fujitsu VPP500/40	Tokyo University - Inst. of Solid State Physics Tokyo Japan /1994	Academic	40	**56900** 64000	. .
95	IBM SP P2SC 160 MHz	Nichols Research Corp. Vicksburg USA /1998	Industry Defense	126	**56370** 80640	. .
96	SGI T3E900	The Scripps Research Institute La Jolla USA /1997	Research	86	**54600** 77400	. .
97	Compaq CPlant Cluster	Sandia National Laboratories Albuquerque USA /1998	Research	150	**54240** 150000	. .
98	IBM SP P2SC 120 MHz	Cornell Theory Center Ithaca USA /1997	Academic	160	**52960** 76800	. .
99	SGI ONYX2 250 MHz	Argonne National Laboratory USA /1998	Research	128	**51440** 64000	61000 10000
100	SGI ORIGIN 2000 250 MHz	Computer Sciences Corporation (CSC) Farnborough UK /1998	Industry Aerospace	128	**51440** 64000	61000 10000

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101	SGI ORIGIN 2000 250 MHz	Lockheed Martin USA /1998	Industry Aerospace	128	**51440** 64000	61000 10000
102	SGI ORIGIN 2000 250 MHz	NCAR (National Center for Atmospheric Research) Boulder USA /1998	Research	128	**51440** 64000	61000 10000
103	SGI ORIGIN 2000 250 MHz	Naval Research Laboratory (NRL) Washington D.C. USA /1997	Research	128	**51440** 64000	61000 10000
104	SGI ORIGIN 2000 250 MHz	White Sands Missile Range National Directorate White Sands USA /1998	Classified	128	**51440** 64000	61000 10000
105	Hewlett-Packard Exemplar X-Class	Caltech/JPL Pasadena USA /1997	Research	128	**51300** 92160	46128 .
106	Hewlett-Packard Exemplar X-Class	Hewlett-Packard CXTC Richardson USA /1997	Vendor Benchmarking	128	**51300** 92160	46128 .
107	IBM SP P2SC 160 MHz	Chip Manufacturer (D) USA /1998	Industry Electronics	114	**51160** 72960	. .
108	SGI T3D MC512-8	Los Alamos National Laboratory Los Alamos USA /1994	Research Energy	512	**50800** 76000	57856 7136
109	SGI T3D MC512-8	Minnesota Supercomputer Center USA /1995	Industry	512	**50800** 76000	57856 7136
110	SGI T3D MC512-8	Pittsburgh Supercomputing Center Pittsburgh USA /1994	Academic	512	**50800** 76000	57856 7136
111	SGI T3D MC512-8	University of Edinburgh Edinburgh UK /1996	Academic	512	**50800** 76000	57856 7136
112	IBM SP P2SC 120 MHz	Chip Manufacturer (A) USA /1997	Industry Electronics	152	**50420** 72960	. .
113	Compaq Avalon Cluster	Los Alamos National Laboratory /CNLS Los Alamos USA /1998	Academic	140	**48600** 149400	62720 25200
114	NEC SX-4/25	NAL Japan /1997	Research	25	**48350** 50000	. .
115	SGI T3E	EXXON USA /1998	Industry Geophysics	108	**47100** 64800	. .
116	Fujitsu VPP500/32	The Angstrom Technology Partnership Tsukuba Japan /1993	Research	32	**46100** 51200	29760 5350
117	IBM SP P2SC 120 MHz	Chase Manhattan New York USA /1998	Industry Finance	133	**44700** 63840	. .
118	IBM SP PC604 332 MHz	Atomic Weapons Establishment Aldermaston UK /1998	Classified	140	**44270** 92950	. .
119	IBM SP PC604 332 MHz	Sears USA /1998	Industry Database	140	**44270** 92950	. .
120	IBM SP2/256	Universitaet/Forschungszentrum Karlsruhe Karlsruhe Germany /1997	Academic	256	**44200** 68000	53000 13500

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
121	IBM SP P2SC 120 MHz	CNUSC Montpellier France /1998	Academic	127	**43100** 60960	. .
122	SGI T3E900	North Carolina Supercomputing Center (NCSC) USA /1998	Academic	66	**42700** 59400	. .
123	SGI T3E900	Phillips Petroleum Company Bartlesville USA /1997	Industry Geophysics	66	**42700** 59400	. .
124	IBM SP PC604 332 MHz	Pennsylvania State University USA /1998	Academic	134	**42470** 88970	. .
125	IBM SP PC604 332 MHz	Deutsche Telekom AG Darmstadt Germany /1998	Industry Telecomm	132	**41870** 87640	. .
126	IBM SP PC604 332 MHz	State of Ohio USA /1998	Government	132	**41870** 87640	. .
127	Sun HPC 6000 "Wildfire"	Sun Chelmsford USA /1998	Vendor	104	**41580** 52000	34944 9408
128	SGI T3E	Norwegian University of Science and Technology Trondheim Norway /1997	Academic	94	**41150** 56400	. .
129	IBM SP PC604 332 MHz	Motorola USA /1998	Industry Electronics	128	**40670** 84990	63000 12000
130	Fujitsu VPP500/28	Institute of Physical and Chemical Res. (RIKEN) Tokyo Japan /1993	Research	28	**40475** 44800	. .
131	IBM SP P2SC 160 MHz	Korean Telecom Korea /1998	Industry Telecomm	89	**40300** 56960	. .
132	SGI ORIGIN 2000	DOD/CEWES Vicksburg USA /1998	Research	128	**40250** 49920	60000 6000
133	SGI ORIGIN 2000	Kyoto University Kyoto Japan /1997	Academic	128	**40250** 49920	60000 6000
134	SGI ORIGIN 2000	Lockheed Martin USA /1998	Industry Aerospace	128	**40250** 49920	60000 6000
135	SGI ORIGIN 2000	Lockheed Martin USA /1998	Industry Aerospace	128	**40250** 49920	60000 6000
136	SGI ORIGIN 2000	Los Alamos National Laboratory/ACL Los Alamos USA /1998	Research	128	**40250** 49920	60000 6000
137	SGI ORIGIN 2000	Los Alamos National Laboratory/ACL Los Alamos USA /1998	Research	128	**40250** 49920	60000 6000
138	SGI ORIGIN 2000	Los Alamos National Laboratory/ACL Los Alamos USA /1998	Research	128	**40250** 49920	60000 6000
139	SGI ORIGIN 2000	Los Alamos National Laboratory/ACL Los Alamos USA /1998	Research	128	**40250** 49920	60000 6000
140	SGI ORIGIN 2000	Los Alamos National Laboratory/ACL Los Alamos USA /1998	Research	128	**40250** 49920	60000 6000

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
141	SGI ORIGIN 2000	Los Alamos National Laboratory/ACL Los Alamos USA /1998	Research	128	**40250** 49920	60000 6000
142	SGI ORIGIN 2000	Naval Oceanographic Office (NAVOCEANO) Bay Saint Louis USA /1997	Research Aerospace	128	**40250** 49920	60000 6000
143	SGI ORIGIN 2000	Sandia National Labs Albuquerque USA /1997	Research	128	**40250** 49920	60000 6000
144	SGI ORIGIN 2000	Silicon Graphics Eagan USA /1997	Vendor	128	**40250** 49920	60000 6000
145	SGI Onyx2	Silicon Graphics Mountain View USA /1998	Vendor Software	128	**40250** 49920	60000 6000
146	SGI ORIGIN 2000	US Army Research Laboratory (ARL) Aberdeen USA /1998	Research	128	**40250** 49920	60000 6000
147	SGI ORIGIN 2000	US Army Research Laboratory (ARL) Aberdeen USA /1998	Research	128	**40250** 49920	60000 6000
148	SGI ORIGIN 2000	US Army Space and Missile Defense Command Arlington USA /1998	Research	128	**40250** 49920	60000 6000
149	SGI ORIGIN 2000	University of Bergen Bergen Norway /1997	Academic	128	**40250** 49920	60000 6000
150	SGI ORIGIN 2000	University of Minnesota/Supercomputing Institute Minneapolis USA /1998	Academic	128	**40250** 49920	60000 6000
151	SGI ORIGIN 2000	University of Tokyo Tokyo Japan /1997	Academic	128	**40250** 49920	60000 6000
152	SGI ORIGIN 2000	University of Tokyo Tokyo Japan /1997	Academic	128	**40250** 49920	60000 6000
153	SGI ORIGIN 2000	Vertex Pharmaceuticals Cambridge USA /1997	Industry Pharmaceutics	128	**40250** 49920	60000 6000
154	SGI ORIGIN 2000	Wright-Patterson Air Force Base USA /1998	Research	128	**40250** 49920	60000 6000
155	SGI ORIGIN 2000	Wright-Patterson Air Force Base USA /1998	Research	128	**40250** 49920	60000 6000
156	IBM SP PC604 332 MHz	Deutsche Telekom AG Darmstadt Germany /1998	Industry Telecomm	124	**39430** 82330	. .
157	IBM SP2/224	Maui High-Performance Computing Center (MHPCC) USA /1994	Research	224	**39030** 59580	. .
158	SGI T3E900	Government USA /1998	Classified	60	**38930** 54130	. .
159	SGI ORIGIN 2000 250 MHz	Allied Signal Federal ManufacturingTechnologies Kansas City USA /1998	Industry Manufacturing	96	**38840** 48000	. .
160	SGI ORIGIN 2000 250 MHz	Nichols Research Corp. Vicksburg USA /1998	Industry Defense	96	**38840** 48000	. .

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TOP500 **Supercomputers - Worldwide**

N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
161	SGI ORIGIN 2000 250 MHz	Oak Ridge National Laboratory/Y-12 Oak Ridge USA /1998	Research	96	**38840** 48000	. .
162	NEC SX-4/20	Japan Marine Science and Technology Yokosuka Japan /1995	Research	20	**38760** 40000	. .
163	NEC SX-4/20	National Research Institute for Metals Tsukuba Japan /1996	Research	20	**38760** 40000	. .
164	NEC SX-4/20	Toyota Central Research Development Japan /1996	Industry Automotive	20	**38760** 40000	. .
165	Fujitsu VPP700/17E	Communications Res. Lab. (CRL) Tokyo Japan /1998	Research	17	**38560** 40800	. .
166	Sun HPC 6000 "Wildfire"	Naval Research Laboratory (NRL) Washington D.C. USA /1998	Research	96	**38130** 48000	29568 8064
167	SGI T3E	Technical University Delft (TUD) Delft Netherlands /1997	Academic	86	**37730** 51600	. .
168	SGI T3E	University of Texas Austin USA /1997	Academic	86	**37730** 51600	. .
169	Fujitsu VPP300/16E	Audi AG Ingolstadt Germany /1998	Industry Automotive	16	**36400** 38400	57600 3520
170	IBM SP PC604 332 MHz	Deutsche Telekom AG Darmstadt Germany /1998	Industry Telecomm	112	**35710** 74360	. .
171	IBM SP P2SC 160 MHz	SARA (Stichting Academisch Rekencentrum) Amsterdam Netherlands /1998	Research	76	**35540** 48640	. .
172	Sun HPC 10000 333 MHz	Baker Hughes Houston USA /1998	Industry Geophysics	64	**34170** 42600	20352 3648
173	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34170** 42600	20352 3648
174	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34170** 42600	20352 3648
175	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34170** 42600	20352 3648
176	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34170** 42600	20352 3648
177	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	64	**34170** 42600	20352 3648
178	Sun HPC 10000 333 MHz	Deutsche Morgan Grenfell London UK /1998	Industry Finance	64	**34170** 42600	20352 3648
179	Sun HPC 10000 333 MHz	Deutsche Morgan Grenfell London UK /1998	Industry Finance	64	**34170** 42600	20352 3648
180	Sun HPC 10000 333 MHz	National Center for Genome Resources Santa Fe USA /1998	Research	64	**34170** 42600	20352 3648

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
181	Sun HPC 10000 333 MHz	Nihon Sun Tokyo Japan /1998	Vendor	64	**34170** 42600	20352 3648
182	Sun HPC 10000 333 MHz	Nippon Telegraph and Telephone (NTT) Kanagawa Japan /1998	Industry Telecomm	64	**34170** 42600	20352 3648
183	Sun HPC 10000 333 MHz	Nippon Telegraph and Telephone (NTT) Kanagawa Japan /1998	Industry Telecomm	64	**34170** 42600	20352 3648
184	Sun HPC 10000 333 MHz	Owens Corning Toledo USA /1998	Industry Chemistry	64	**34170** 42600	20352 3648
185	Sun HPC 10000 333 MHz	Owens Corning Toledo USA /1998	Industry Chemistry	64	**34170** 42600	20352 3648
186	Fujitsu VPP300/16	Japan Atomic Energy Research Japan /1996	Research	16	**34100** 35200	59200 3520
187	Fujitsu VPP300/16	Japan Science and Technology Tokyo Japan /1996	Research	16	**34100** 35200	59200 3520
188	Fujitsu VPP300/16	Reactor Nuclear Fuel Development Japan /1996	Research	16	**34100** 35200	59200 3520
189	Fujitsu/SNI VPP300/16	Universitaet/Forschungszentrum Karlsruhe Karlsruhe Germany /1997	Academic	16	**34100** 35200	59200 3520
190	Intel XP/S-MP 41	Rome Laboratory USA /1995	Research	816	**33700** 40800	. .
191	Sun HPC 10000 333 MHz	Wright-Patterson Air Force Base/NAIC USA /1998	Research	61	**32745** 40660	. .
192	Sun HPC 10000 333 MHz	ATT CFO Orlando USA /1998	Industry Telecomm	60	**32270** 40000	20352 3456
193	Sun HPC 10000 333 MHz	Bell Canada Montreal Canada /1998	Industry Telecomm	60	**32270** 40000	20352 3456
194	IBM SP P2SC 120 MHz	Argonne National Laboratory USA /1996	Research	94	**32050** 45120	. .
195	IBM SP PC604 332 MHz	Lincoln Electric Cleveland USA /1998	Industry Electronics	100	**31990** 66400	. .
196	IBM SP PC604 332 MHz	Thyssen Germany /1998	Industry	100	**31990** 66400	. .
197	IBM SP PC604 332 MHz	ICAM/Alcatel France /1998	Industry	98	**31370** 65060	. .
198	NEC SX-4/16	Danish Meteorological Institute Copenhagen Denmark /1997	Research	16	**31100** 32000	20480 960
199	NEC SX-4/16	National Aerospace Laboratory (NLR) Noordoostpolder Netherlands /1996	Research Aerospace	16	**31100** 32000	20480 960
200	NEC SX-4/16	National Cardiovascular Center Japan /1996	Research	16	**31100** 32000	20480 960

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N $_{world}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
201	NEC SX-4/16	Swiss Scientific Computing Center (CSCS) Manno Switzerland /1996	Research	16	**31100** 32000	20480 960
202	Compaq AlphaServer 8400 Cluster	Sandia National Labs Albuquerque USA /1997	Research	84	**30900** 102900	30704 8360
203	Compaq AlphaServer 8400 Cluster	Lawrence Livermore National Laboratory Livermore USA /1998	Research	80	**30900** 98000	30704 8360
204	Compaq AlphaServer 8400 Cluster	Digital Equipment Corporation Maynard USA /1997	Vendor Benchmarking	64	**30900** 78400	30704 8360
205	IBM SP PC604 332 MHz	GTE Communications USA /1998	Industry Telecomm	96	**30750** 63740	. .
206	IBM SP PC604 332 MHz	Prudential Insurance USA /1998	Industry Finance	96	**30750** 63740	. .
207	IBM SP PC604 332 MHz	SAP USA /1998	Industry Software	96	**30750** 63740	. .
208	SGI ORIGIN 2000	Vastar Houston USA /1997	Industry Geophysics	96	**30500** 37440	. .
209	IBM SP P2SC 160 MHz	TRW Cleveland USA /1998	Industry Automotive	66	**30310** 42240	. .
210	Sun HPC 10000 333 MHz	Bell Canada Toronto Canada /1998	Industry Telecomm	56	**30270** 37290	20352 3264
211	Sun HPC 10000 333 MHz	Lexis Nexis Miamisburg USA /1998	Industry Infor. Service	56	**30270** 37290	20352 3264
212	IBM SP P2SC 160 MHz	EP Company (A) USA /1998	Industry Geophysics	64	**29450** 40960	27500 5700
213	IBM SP P2SC 160 MHz	EP Company (A) USA /1998	Industry Geophysics	64	**29450** 40960	27500 5700
214	IBM SP P2SC 160 MHz	EP Company (A) USA /1998	Industry Geophysics	64	**29450** 40960	27500 5700
215	IBM SP P2SC 160 MHz	EP Company (A) USA /1998	Industry Geophysics	64	**29450** 40960	27500 5700
216	IBM SP P2SC 160 MHz	EP Company (A) USA /1998	Industry Geophysics	64	**29450** 40960	27500 5700
217	IBM SP P2SC 160 MHz	IBM/Poughkeepsie Poughkeepsie USA /1998	Vendor	64	**29450** 40960	27500 5700
218	SGI T932/321024	Automotive Manufacturer (A) Tokyo Japan /1995	Industry Automotive	32	**29360** 58000	. .
219	SGI T932/321024	Government USA /1996	Classified	32	**29360** 58000	. .
220	SGI T932/321024	Government USA /1997	Classified	32	**29360** 58000	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
221	SGI T932/321024	Government USA /1998	Classified	32	**29360** 58000	. .
222	SGI T932/321024	NRI for Earth Science and Disaster (NIED) Japan /1997	Research	32	**29360** 58000	. .
223	SGI T932/321024	Nippon Telegraph and Telephone (NTT) Tokyo Japan /1995	Industry Telecomm	32	**29360** 58000	. .
224	Sun HPC 10000 333 MHz	SMVG Bern Germany /1998	Industry Finance	54	**29290** 35960	. .
225	IBM SP P2SC 135 MHz	Western Geophysical London UK /1998	Industry Geophysics	76	**29240** 40500	. .
226	SGI T3E	EDS/General Motors Auburn Hills USA /1996	Industry Automotive	66	**29160** 39600	. .
227	IBM SP P2SC 120 MHz	UKI IS UK /1998	Industry	84	**29070** 40320	. .
228	IBM SP P2SC 160 MHz	ETH Zuerich Switzerland /1998	Research	62	**28540** 39680	. .
229	IBM SP P2SC 160 MHz	Georgia Institute of Technology Atlanta USA /1997	Research	62	**28540** 39680	. .
230	Hitachi S-3800/480	Hitachi Ltd. GPCD Japan /1994	Vendor Software	4	**28400** 32000	15500 830
231	Hitachi S-3800/480	Japan Meteorological Agency Japan /1995	Research Weather	4	**28400** 32000	15500 830
232	Hitachi S-3800/480	University of Tokyo Tokyo Japan /1993	Academic	4	**28400** 32000	15500 830
233	Sun HPC 10000 333 MHz	Bell Canada Toronto Canada /1998	Industry Telecomm	52	**28320** 34632	20352 3072
234	Sun HPC 10000 333 MHz	Commerzbank Frankfurt Germany /1998	Industry Finance	52	**28320** 34632	20352 3072
235	Sun HPC 10000 333 MHz	KPMG Peat Marwick Montvale USA /1998	Industry Finance	52	**28320** 34632	20352 3072
236	SGI T3E	Technische Universitaet Dresden Dresden Germany /1998	Academic	64	**28310** 38400	29952 4032
237	IBM SP PC604 332 MHz	Government USA /1998	Classified	88	**28270** 58420	. .
238	IBM SP PC604 332 MHz	Montgomery Ward USA /1998	Industry	88	**28270** 58420	. .
239	IBM SP PC604 332 MHz	Origin IT UK /1998	Industry	88	**28270** 58420	. .
240	Compaq AlphaServer 8400 Cluster	Sandia National Labs Albuquerque USA /1997	Research	60	**28145** 73500	. .

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N $_{world}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
241	IBM SP P2SC 120 MHz	o.tel.o Essen Germany /1998	Industry Telecomm	80	**27770** 38400	. .
242	Fujitsu VPP300/13	Australian National University Canberra Australia /1996	Academic	13	**27720** 28600	. .
243	Hewlett-Packard Exemplar X-Class	Caltech/JPL Pasadena USA /1997	Research	64	**27560** 46080	29956 4584
244	Hewlett-Packard Exemplar X-Class	Caltech/JPL Pasadena USA /1997	Research	64	**27560** 46080	29956 4584
245	Hewlett-Packard Exemplar X-Class	HTC Babelsberg Germany /1997	Industry Image Proc.	64	**27560** 46080	29956 4584
246	Hewlett-Packard Exemplar X-Class	NCSA Urbana-Champaign USA /1997	Academic	64	**27560** 46080	29956 4584
247	Hewlett-Packard Exemplar X-Class	Naval Research Laboratory (NRL) Washington D.C. USA /1997	Classified	64	**27560** 46080	29956 4584
248	Hewlett-Packard Exemplar X-Class	Samsung Korea /1998	Industry Electronics	64	**27560** 46080	29956 4584
249	Hewlett-Packard Exemplar X-Class	University of Kentucky Lexington USA /1998	Academic	64	**27560** 46080	29956 4584
250	SGI T3E900	NOAA/Geophysical Fluid Dynamics Laboratory (GFDL) Princeton USA /1997	Research Weather	42	**27310** 38540	. .
251	SGI T3E900	Universitaet Rostock Germany /1997	Academic	42	**27310** 38540	. .
252	NEC SX-4/14A	ONERA France /1998	Research Aerospace	14	**27180** 28000	. .
253	IBM SP PC604 332 MHz	Sprint USA /1998	Industry Telecomm	84	**27030** 55770	. .
254	SGI T932/261024	NOAA/Geophysical Fluid Dynamics Laboratory (GFDL) Princeton USA /1997	Research Weather	26	**26960** 47120	. .
255	SGI T932/261024	Naval Oceanographic Office (NAVOCEANO) Bay Saint Louis USA /1998	Research	26	**26960** 47120	. .
256	SGI ORIGIN 2000	Oxford University Oxford UK /1998	Academic	84	**26843** 32760	. .
257	Sun HPC 10000	ATT USA /1997	Industry Telecomm	64	**26450** 32000	19968 3072
258	Sun HPC 10000	ATT USA /1997	Industry Telecomm	64	**26450** 32000	19968 3072
259	Sun HPC 10000	ATT USA /1997	Industry Telecomm	64	**26450** 32000	19968 3072
260	Sun HPC 10000	Chalmers University of Technology Goteborg Sweden /1997	Academic	64	**26450** 32000	19968 3072

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
261	Sun HPC 10000	GTE Communications USA /1997	Industry Telecomm	64	**26450** 32000	19968 3072
262	Sun HPC 10000	Kawasaki Heavy Industrie Japan /1998	Industry Manufacturing	64	**26450** 32000	19968 3072
263	Sun HPC 10000	Motorola USA /1997	Industry Electronics	64	**26450** 32000	19968 3072
264	Sun HPC 10000	Texas Instruments USA /1998	Industry Electronics	64	**26450** 32000	19968 3072
265	Sun HPC 10000	Tokyo Mitsubishi Bank London UK /1997	Industry Finance	64	**26450** 32000	19968 3072
266	Sun HPC 10000	University of Tokyo Tokyo Japan /1997	Academic	64	**26450** 32000	19968 3072
267	Sun HPC 10000	Virginia Social USA /1997	Research Database	64	**26450** 32000	19968 3072
268	IBM SP PC604 332 MHz	Bayer AG Germany /1998	Industry Chemistry	82	**26410** 54440	. .
269	Sun HPC 10000 333 MHz	Financial Corporation (A) New York USA /1998	Industry Finance	48	**26380** 31960	20352 2880
270	Sun HPC 10000 333 MHz	France Telecom Brie sur Marne France /1998	Industry Telecomm	48	**26380** 31960	20352 2880
271	Sun HPC 10000 333 MHz	GTE Communications Temple Terrace USA /1998	Industry Telecomm	48	**26380** 31960	20352 2880
272	Sun HPC 10000 333 MHz	Telcel Mexico City Mexico /1998	Industry Telecomm	48	**26380** 31960	20352 2880
273	Sun HPC 10000 333 MHz	University of Minnesota Minneapolis USA /1998	Academic	48	**26380** 31960	20352 2880
274	SGI ORIGIN 2000 250 MHz	BMW AG Muenchen Germany /1998	Industry Automotive	64	**26240** 32000	43520 5200
275	SGI ORIGIN 2000 250 MHz	C4 / Centre Europeo del Parallelismo de Barcelona Barcelona Spain /1998	Academic	64	**26240** 32000	43520 5200
276	SGI ORIGIN 2000 250 MHz	Ford Motor Company USA /1998	Industry Automotive	64	**26240** 32000	43520 5200
277	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	64	**26240** 32000	43520 5200
278	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	64	**26240** 32000	43520 5200
279	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	64	**26240** 32000	43520 5200
280	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	64	**26240** 32000	43520 5200

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
281	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	64	**26240** 32000	43520 5200
282	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	64	**26240** 32000	43520 5200
283	SGI ORIGIN 2000 250 MHz	Government USA /1998	Industry Defense	64	**26240** 32000	43520 5200
284	SGI ORIGIN 2000 250 MHz	NASA/Ames Research Center/NAS Mountain View USA /1998	Research Aerospace	64	**26240** 32000	43520 5200
285	SGI ORIGIN 2000 250 MHz	NASA/Ames Research Center/NAS Mountain View USA /1998	Research Aerospace	64	**26240** 32000	43520 5200
286	SGI ORIGIN 2000 250 MHz	NASA/Ames Research Center/NAS/DAO Mountain View USA /1998	Research	64	**26240** 32000	43520 5200
287	SGI ORIGIN 2000 250 MHz	NASA/Ames Research Center/NAS/DAO Mountain View USA /1998	Research	64	**26240** 32000	43520 5200
288	SGI ORIGIN 2000 250 MHz	NASA/Goddard Space Flight Center Greenbelt USA /1998	Research Aerospace	64	**26240** 32000	43520 5200
289	SGI ORIGIN 2000 250 MHz	Raytheon Garland USA /1998	Industry Electronics	64	**26240** 32000	43520 5200
290	SGI ORIGIN 2000 250 MHz	US Army Research Laboratory (ARL) Aberdeen USA /1998	Research	64	**26240** 32000	43520 5200
291	SGI ORIGIN 2000 250 MHz	Western Geophysical London UK /1998	Industry Geophysics	64	**26240** 32000	43520 5200
292	SGI T932/24512	Commissariat a l'Energie Atomique (CEA) Limeil France /1997	Research	24	**26170** 43500	. .
293	SGI T932/241024	Ford Motor Company Dearborn USA /1996	Industry Automotive	24	**26170** 43500	. .
294	IBM SP PC604 332 MHz	American Express USA /1998	Industry Finance	80	**25790** 53110	. .
295	IBM SP PC604 332 MHz	Finance Corp. (A) Japan /1998	Industry Finance	80	**25790** 53110	. .
296	Fujitsu VPP300/12	Japan Atomic Energy Research Japan /1996	Research	12	**25600** 26400	. .
297	IBM SP2 77 MHz wide	Pacific Northwest National Laboratoriy Richland USA /1997	Research	128	**25420** 39420	. .
298	Sun HPC 10000 333 MHz	American Express Belgium /1998	Industry	46	**25370** 30630	. .
299	SGI T3D MC256-8/464	Bear Stearns USA /1996	Industry Finance	256	**25300** 38000	40960 4918
300	SGI T3D SC256-8/264	Caltech/JPL Pasadena USA /1994	Research	256	**25300** 38000	40960 4918

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
301	SGI T3D MC256-8	Defense Research Agency (DRA) Farnborough UK /1994	Classified	256	**25300** 38000	40960 4918
302	SGI T3D MC256-8	EXXON USA /1995	Industry Geophysics	256	**25300** 38000	40960 4918
303	SGI T3D MC256-8	Ecole Polytechnique Federale de Lausanne Lausanne Switzerland /1994	Academic	256	**25300** 38000	40960 4918
304	IBM SP PC604 332 MHz	ATAC France /1998	Industry	78	**25170** 51780	. .
305	Compaq AlphaServer 8400 Cluster	Lawrence Livermore National Laboratory Livermore USA /1997	Research	54	**24780** 66150	. .
306	SGI T3E900	CIEMAT Spain /1998	Research	38	**24730** 35070	. .
307	IBM SP PC604 332 MHz	Telecommunications Corp. Japan /1998	Industry Telecomm	76	**24550** 50450	. .
308	Sun HPC 10000 333 MHz	Eli Lilly and Company Indianapolis USA /1998	Industry Pharmaceutics	44	**24360** 29300	20352 2688
309	Sun HPC 10000 333 MHz	Xerox Webster USA /1997	Industry	44	**24360** 29300	20352 2688
310	SGI T3E	AWI (Alfred Wegener Institut) Bremerhaven Germany /1996	Research	54	**23840** 32400	. .
311	Sun HPC 10000 333 MHz	ATT CMD Kansas City USA /1998	Industry Telecomm	43	**23830** 28638	. .
312	Sun HPC 10000 333 MHz	ATT CMD Kansas City USA /1998	Industry Telecomm	43	**23830** 28638	. .
313	Fujitsu VPP500/16	Reactor Nuclear Fuel Development Japan /1996	Research	16	**23600** 25600	21120 3360
314	IBM SP PC604 332 MHz	Finance Corp. (C) Japan /1998	Industry Finance	72	**23310** 47800	. .
315	IBM SP PC604 332 MHz	Manufacturing Corp. Japan /1998	Industry Manufacturing	72	**23310** 47800	. .
316	IBM SP PC604 332 MHz	Miele GmbH Germany /1998	Industry	72	**23310** 47800	. .
317	IBM SP PC604 332 MHz	Moodys USA /1998	Industry	72	**23310** 47800	. .
318	IBM SP PC604 332 MHz	Sprint USA /1998	Industry Telecomm	72	**23310** 47800	. .
319	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	42	**23310** 27970	. .
320	NEC SX-4/12A	Veritas DGC Crawley UK /1997	Industry Geophysics	12	**23260** 24000	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
321	IBM SP P2SC 120 MHz	University of Umea / HPC2N Sweden /1997	Academic	66	**23180** 31680	. .
322	IBM SP P2SC 120 MHz	Western Geophysical Houston USA /1998	Industry Geophysics	66	**23180** 31680	. .
323	IBM SP P2SC 120 MHz	o.tel.o Essen Germany /1998	Industry Telecomm	66	**23180** 31680	. .
324	SGI T932/202048	Automotive Manufacturer (B) Japan /1995	Industry Automotive	20	**23075** 36250	. .
325	Fujitsu VPP300/10E	FDK Corporation Japan /1997	Industry Electronics	10	**23050** 24000	. .
326	IBM SP P2SC 120 MHz	University of Houston USA /1997	Academic	64	**22550** 30720	27400 6500
327	IBM SP P2SC 120 MHz	University of Utah Salt Lake City USA /1998	Academic	64	**22550** 30720	27400 6500
328	Hewlett-Packard Exemplar X-Class	Arnold Engineering Development Center (AEDC) Arnold AFB USA /1997	Research	48	**22310** 34560	29956 .
329	Hewlett-Packard Exemplar X-Class	S. A. IT Korea /1998	Research	48	**22310** 34560	29956 .
330	Hewlett-Packard Exemplar X-Class	Tohoku University Aramaki Japan /1997	Academic	48	**22310** 34560	29956 .
331	Hewlett-Packard Exemplar X-Class	Universitaet Leipzig Leipzig Germany /1997	Academic	48	**22310** 34560	29956 .
332	Hewlett-Packard Exemplar X-Class	Universitaet Mainz Mainz Germany /1997	Academic	48	**22310** 34560	29956 .
333	Sun HPC 10000 333 MHz	ATT Mesa USA /1998	Industry Telecomm	40	**22270** 26640	20352 2496
334	Sun HPC 10000 333 MHz	ATT Mesa USA /1998	Industry Telecomm	40	**22270** 26640	20352 2496
335	Sun HPC 10000 333 MHz	ATT CFO Alpharetta USA /1998	Industry Telecomm	40	**22270** 26640	20352 2496
336	Sun HPC 10000 333 MHz	Commerzbank Germany /1998	Industry Finance	40	**22270** 26640	20352 2496
337	Sun HPC 10000 333 MHz	Deutsche Bahn AG Berlin Germany /1998	Industry Transportation	40	**22270** 26640	20352 2496
338	Sun HPC 10000 333 MHz	Dresdner Bank Neu Isenburg Germany /1998	Industry Finance	40	**22270** 26640	20352 2496
339	Sun HPC 10000 333 MHz	Hughes Space Communication El Segundo USA /1998	Industry Aerospace	40	**22270** 26640	20352 2496
340	Sun HPC 10000 333 MHz	Recruit Tokyo Japan /1998	Industry WWW	40	**22270** 26640	20352 2496

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N $_{world}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
341	Sun HPC 10000 333 MHz	eBay Santa Clara USA /1998	Industry WWW	40	**22270** 26640	20352 2496
342	IBM SP P2SC 160 MHz	Ensign UK /1998	Industry Geophysics	48	**22190** 30720	. .
343	IBM SP P2SC 160 MHz	Government Japan /1998	Classified	48	**22190** 30720	. .
344	IBM SP P2SC 160 MHz	Queen's University of Belfast/Trinity College Dub. Belfast UK /1998	Academic	48	**22190** 30720	. .
345	IBM SP P2SC 160 MHz	University of Hong Kong Hong Kong Hong Kong /1998	Academic	48	**22190** 30720	. .
346	SGI T3E900	MIT/Lincoln Laboratory Cambridge USA /1997	Academic	34	**22150** 31610	. .
347	Fujitsu VPP500/15	Kyoto University Kyoto Japan /1994	Academic	15	**22150** 24000	. .
348	IBM SP PC604 332 MHz	Sprint USA /1998	Industry Telecomm	68	**22070** 45140	. .
349	SGI T3E	Mobil / Technical Center Dallas USA /1997	Industry Geophysics	50	**22060** 30000	. .
350	IBM SP P2SC 160 MHz	Baker Hughes Houston USA /1998	Industry Geophysics	47	**21730** 30080	. .
351	Sun HPC 10000	INEM Spain /1997	Research	52	**21680** 26000	19968 2496
352	Sun HPC 10000	Micron Technology Boise USA /1997	Industry Electronics	52	**21680** 26000	19968 2496
353	Sun HPC 10000	Viag Interkom Germany /1998	Industry Telecomm	52	**21680** 26000	19968 2496
354	Sun HPC 10000	Viag Interkom Germany /1998	Industry Telecomm	52	**21680** 26000	19968 2496
355	Hitachi S-3800/380	Hokkaido University Sapporo Japan /1994	Academic	3	**21600** 24000	15680 760
356	Hitachi S-3800/380	Institute for Materials Research/Tohoku University Japan /1994	Academic	3	**21600** 24000	15680 760
357	IBM SP P2SC 160 MHz	Indiana University USA /1998	Academic	46	**21280** 29440	. .
358	Sun HPC 10000	Allstate Insurance Chicago USA /1997	Industry Database	50	**21050** 25000	19968 2496
359	Sun HPC 10000	GTE Communications USA /1997	Industry Telecomm	50	**21050** 25000	19968 2496
360	IBM SP PC604 332 MHz	Deutsche Telekom AG Darmstadt Germany /1998	Industry Telecomm	64	**20830** 42490	44800 7800

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TOP500 **Supercomputers - Worldwide**

N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
361	IBM SP PC604 332 MHz	GTE Communications USA /1998	Industry Telecomm	64	**20830** 42490	44800 7800
362	IBM SP PC604 332 MHz	Government Japan /1998	Classified	64	**20830** 42490	44800 7800
363	IBM SP PC604 332 MHz	Lufthansa Frankfurt Germany /1998	Industry Transportation	64	**20830** 42490	44800 7800
364	IBM SP PC604 332 MHz	Proctor and Gamble USA /1998	Industry	64	**20830** 42490	44800 7800
365	IBM SP PC604 332 MHz	Sobeys Canada /1998	Industry	64	**20830** 42490	44800 7800
366	IBM SP PC604 332 MHz	UCLA Los Angeles USA /1998	Academic	64	**20830** 42490	44800 7800
367	IBM SP PC604 332 MHz	Witco USA /1998	Industry Chemistry	64	**20830** 42490	44800 7800
368	SGI ORIGIN 2000	Arnold Engineering Development Center (AEDC) Arnold AFB USA /1998	Research	64	**20750** 24960	43520 4608
369	SGI ORIGIN 2000	Automotive Manufacturer Japan /1997	Industry Automotive	64	**20750** 24960	43520 4608
370	SGI ORIGIN 2000	Automotive Manufacturer Japan /1998	Industry Automotive	64	**20750** 24960	43520 4608
371	SGI ORIGIN 2000	Boston University Boston USA /1997	Academic	64	**20750** 24960	43520 4608
372	SGI ORIGIN 2000	Boston University Boston USA /1997	Academic	64	**20750** 24960	43520 4608
373	SGI ORIGIN 2000	Boston University Boston USA /1997	Academic	64	**20750** 24960	43520 4608
374	SGI ORIGIN 2000	Centre de Res. Inform. de Haute Normandie (CRIHAN) Rouen France /1997	Research	64	**20750** 24960	43520 4608
375	SGI ORIGIN 2000	Chalmers University of Technology Goteborg Sweden /1997	Academic	64	**20750** 24960	43520 4608
376	SGI ORIGIN 2000	Compagnie Generale de Geophysique (CGG) Londres UK /1997	Industry Geophysics	64	**20750** 24960	43520 4608
377	SGI ORIGIN 2000	E-Systems/Raytheon Lexington USA /1997	Industry Electronics	64	**20750** 24960	43520 4608
378	SGI ORIGIN 2000	E-Systems/Raytheon Lexington USA /1998	Industry Electronics	64	**20750** 24960	43520 4608
379	SGI ORIGIN 2000	E-Systems/Raytheon Lexington USA /1998	Industry Electronics	64	**20750** 24960	43520 4608
380	SGI ORIGIN 2000	EDS USA /1997	Research	64	**20750** 24960	43520 4608

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
381	SGI ORIGIN 2000	Ecole Polytechnique Federale de Lausanne Lausanne Switzerland /1998	Academic	64	**20750** 24960	43520 4608
382	SGI ORIGIN 2000	Government USA /1998	Classified	64	**20750** 24960	43520 4608
383	SGI ORIGIN 2000	Government USA /1998	Classified	64	**20750** 24960	43520 4608
384	SGI ORIGIN 2000	INRIA-Lorraine/Centre Charles Hermite Nancy France /1997	Research	64	**20750** 24960	43520 4608
385	SGI ORIGIN 2000	Indiana University Bloomington USA /1997	Academic	64	**20750** 24960	43520 4608
386	SGI ORIGIN 2000	Lockheed Martin USA /1997	Industry Aerospace	64	**20750** 24960	43520 4608
387	SGI ORIGIN 2000	NASA/Ames Research Center/NAS/DAO Mountain View USA /1997	Research	64	**20750** 24960	43520 4608
388	SGI ORIGIN 2000	NASA/Ames Research Center/NAS/DAO Mountain View USA /1998	Research	64	**20750** 24960	43520 4608
389	SGI ORIGIN 2000	NASA/Langley Research Center Langley USA /1997	Research	64	**20750** 24960	43520 4608
390	SGI ORIGIN 2000	NERSC/LBNL Berkeley USA /1998	Research	64	**20750** 24960	43520 4608
391	SGI ORIGIN 2000	NSWC USA /1997	Research	64	**20750** 24960	43520 4608
392	SGI ORIGIN 2000	Princeton University Princeton USA /1997	Academic	64	**20750** 24960	43520 4608
393	SGI ORIGIN 2000	Raytheon Garland USA /1998	Industry Electronics	64	**20750** 24960	43520 4608
394	SGI ORIGIN 2000	Raytheon Garland USA /1998	Industry Electronics	64	**20750** 24960	43520 4608
395	SGI ORIGIN 2000	Sandia National Labs Albuquerque USA /1997	Research	64	**20750** 24960	43520 4608
396	SGI ORIGIN 2000	Sylvest Management Systems Greenbelt USA /1997	Industry Service	64	**20750** 24960	43520 4608
397	SGI ORIGIN 2000	Texaco Houston USA /1998	Industry Geophysics	64	**20750** 24960	43520 4608
398	SGI ORIGIN 2000	US Air Force San Antonio USA /1997	Classified	64	**20750** 24960	43520 4608
399	SGI ORIGIN 2000	US Army Space and Missile Defense Command Arlington USA /1998	Research	64	**20750** 24960	43520 4608
400	SGI ORIGIN 2000	University of Queensland St Lucia Australia /1998	Academic	64	**20750** 24960	43520 4608

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
401	SGI ORIGIN 2000	University of Utah Salt Lake City USA /1997	Academic	64	**20750** 24960	43520 4608
402	SGI ORIGIN 2000	University of Valencia Valencia Spain /1997	Academic	64	**20750** 24960	43520 4608
403	SGI ORIGIN 2000	Wright-Patterson Air Force Base USA /1996	Research	64	**20750** 24960	43520 4608
404	SGI ORIGIN 2000	Wright-Patterson Air Force Base USA /1997	Research	64	**20750** 24960	43520 4608
405	SGI ORIGIN 2000	Wright-Patterson Air Force Base USA /1997	Research	64	**20750** 24960	43520 4608
406	IBM SP2/110	National Center for High Performance Computing Hsinchu Taiwan /1998	Academic	110	**20370** 29210	. .
407	Sun HPC 10000	ATT BMD USA /1998	Industry Telecomm	48	**20300** 24000	19968 2496
408	Sun HPC 10000	American Airlines USA /1998	Industry Transportation	48	**20300** 24000	19968 2496
409	Sun HPC 10000	Cincinnati Bell Information Systems (CBIS) Cleveland USA /1997	Industry Telecomm	48	**20300** 24000	19968 2496
410	Sun HPC 10000	Daiei Information Japan /1997	Industry Database	48	**20300** 24000	19968 2496
411	Sun HPC 10000	Daiei Information Japan /1998	Industry Database	48	**20300** 24000	19968 2496
412	Sun HPC 10000	IRS TAPS Detroit USA /1998	Government	48	**20300** 24000	19968 2496
413	Sun HPC 10000	Kwiksave UK /1998	Industry Database	48	**20300** 24000	19968 2496
414	Sun HPC 10000	Lockheed Martin USA /1998	Industry Aerospace	48	**20300** 24000	19968 2496
415	Sun HPC 10000	Ministry of the Interior Seoul Korea /1997	Classified	48	**20300** 24000	19968 2496
416	Sun HPC 10000	Ministry of the Interior Seoul Korea /1997	Classified	48	**20300** 24000	19968 2496
417	Sun HPC 10000	National Reserve Bank Moscow Russian Federation/1997	Industry Finance	48	**20300** 24000	19968 2496
418	Sun HPC 10000	Oracle Corporation Redwood Shores USA /1997	Industry Database	48	**20300** 24000	19968 2496
419	Sun HPC 10000	Oracle Corporation Redwood Shores USA /1997	Industry Database	48	**20300** 24000	19968 2496
420	Sun HPC 10000	Toshiba Tokyo Japan /1997	Industry Electronics	48	**20300** 24000	19968 2496

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
421	Sun HPC 10000 333 MHz	EDS de Mexico Mexico Mexico /1998	Industry Transportation	36	**20110** 23900	20352 2304
422	Sun HPC 10000 333 MHz	Government USA /1998	Classified	36	**20110** 23900	20352 2304
423	Sun HPC 10000 333 MHz	R.L. Polk Southfield USA /1998	Industry Infor. Service	36	**20110** 23900	20352 2304
424	Sun HPC 10000 333 MHz	Tennessee Valley Authority (TVA) Chattanooga USA /1998	Industry Energy	36	**20110** 23900	20352 2304
425	Sun HPC 10000 333 MHz	University Northern Arizona Flagstaff USA /1998	Academic	36	**20110** 23900	20352 2304
426	Sun HPC 10000 333 MHz	W.W. Grainger Niles USA /1998	Industry Database	36	**20110** 23900	20352 2304
427	SGI T916/161024	Forschungszentrum Juelich (FZJ) Juelich Germany /1998	Research	16	**19980** 29000	. .
428	SGI T916/16512	Nissan Motor Kanagawa Japan /1997	Industry Automotive	16	**19980** 29000	. .
429	Sun HPC 10000	ATT Solution Center USA /1997	Industry Telecomm	23	**19860** 11500	. .
430	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	48	**19730** 24000	. .
431	SGI ORIGIN 2000 250 MHz	Government USA /1998	Classified	48	**19730** 24000	. .
432	SGI ORIGIN 2000 250 MHz	Western Geophysical Houston USA /1998	Industry Geophysics	48	**19730** 24000	. .
433	Sun HPC 10000 333 MHz	Emery Worldwide Portland USA /1998	Industry Transportation	35	**19560** 23310	. .
434	Sun HPC 10000 333 MHz	Medline Industries Mundelein USA /1998	Industry Manufacturing	35	**19560** 23310	. .
435	Sun HPC 10000 333 MHz	RAG Informatik Germany /1998	Industry In.Pr. Service	35	**19560** 23310	. .
436	Sun HPC 10000 333 MHz	Sprint Dallas USA /1998	Industry Telecomm	35	**19560** 23310	. .
437	IBM SP PC604 332 MHz	DVG Hannover Germany /1998	Industry	60	**19510** 39830	. .
438	Sun HPC 10000	American Express USA /1998	Industry Database	46	**19480** 23000	. .
439	IBM SP P2SC 160 MHz	Centre de Supercomputacio de Catalunya Barcelona Spain /1998	Academic	42	**19460** 26880	. .
440	IBM SP P2SC 160 MHz	Telecom Denmark (Danadata) Denmark /1997	Industry Telecomm	42	**19460** 26880	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**R_{max}** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
441	Sun HPC 6500 Cluster	Cisco Santa Clara USA /1998	Industry Electronics	48	**19420** 24000	18816 5376
442	IBM SP2/104	MCI USA /1994	Industry Telecomm	104	**19340** 27620	. .
443	IBM SP2/104	NIH (National Institutes of Health) Bethesda USA /1997	Research	104	**19340** 27620	. .
444	Fujitsu VPP300/9	ECMWF Reading UK /1997	Research Weather	9	**19225** 19800	. .
445	Sun HPC 10000 333 MHz	Lucent Technologies Atlanta USA /1998	Industry Electronics	34	**19010** 22640	. .
446	Sun HPC 10000 333 MHz	State of Georgia Atlanta USA /1998	Government	34	**19010** 22640	. .
447	SGI ORIGIN 2000 250 MHz	Lunds Tekniska Hvgskola Sweden /1998	Academic	46	**18910** 23000	. .
448	SGI ORIGIN 2000 250 MHz	Universitaet Freiburg Freiburg Germany /1998	Academic	46	**18910** 23000	. .
449	IBM SP PC604 332 MHz	Krupp Hoesch Info. Germany /1998	Industry Database	58	**18860** 38500	. .
450	Sun HPC 10000	Ameritech USA /1998	Industry Telecomm	44	**18670** 22000	19968 2496
451	Sun HPC 10000	Worldcom USA /1998	Industry Telecomm	44	**18670** 22000	19968 2496
452	Fujitsu VPP300/8E	Kansai University Japan /1997	Academic	8	**18600** 19200	41600 2400
453	Fujitsu VPP300/8E	Osaka Gas., Ltd Osaka Japan /1998	Industry Chemistry	8	**18600** 19200	41600 2400
454	IBM SP P2SC 160 MHz	US West Communications Englewood USA /1998	Industry Telecomm	40	**18560** 26560	. .
455	IBM SP P2SC 160 MHz	USAA USA /1998	Industry	40	**18560** 26560	. .
456	SGI POWER CHALLENGEarray	US Army Research Laboratory (ARL) Aberdeen USA /1995	Research	96	**18455** 28800	53000 20000
457	IBM SP2/98	Citicorp USA /1996	Industry Finance	98	**18310** 26030	. .
458	IBM SP PC604 332 MHz	Sprint USA /1998	Industry Telecomm	56	**18200** 37170	. .
459	SGI ORIGIN 2000 250 MHz	Cambridge University Cambridge UK /1997	Academic	44	**18100** 22000	. .
460	IBM SP P2SC 120 MHz	Axone/IBM France /1998	Industry	51	**18010** 24480	. .

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N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
461	IBM SP2/96	Maui High-Performance Computing Center (MHPCC) USA /1994	Research	96	**17970** 25500	. .
462	Compaq AlphaServer 4100 Cluster	NCAR (National Center for Atmospheric Research) Boulder USA /1998	Research Weather	32	**17960** 39200	25624 4088
463	Compaq AlphaServer 4100 Cluster	University of Rochester USA /1998	Academic	32	**17960** 39200	25624 4088
464	Sun HPC 10000 333 MHz	Becton Dickinson Cary USA /1998	Industry Manufacturing	32	**17910** 21310	20352 2112
465	Sun HPC 10000 333 MHz	Bristol-Myers Squibb Pennington USA /1995	Industry Pharmaceutics	32	**17910** 21310	20352 2112
466	Sun HPC 10000 333 MHz	DoD USA /1998	Classified	32	**17910** 21310	20352 2112
467	Sun HPC 10000 333 MHz	Geophysical Development Houston USA /1998	Industry Geophysics	32	**17910** 21310	20352 2112
468	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
469	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
470	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
471	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
472	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
473	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
474	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
475	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
476	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
477	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
478	Sun HPC 10000 333 MHz	Government USA /1998	Classified	32	**17910** 21310	20352 2112
479	Sun HPC 10000 333 MHz	Informatikzentrum Niedersachsen (IZN) Hannover Germany /1998	Government	32	**17910** 21310	20352 2112
480	Sun HPC 10000 333 MHz	Micron Technology Nampa USA /1998	Industry Electronics	32	**17910** 21310	20352 2112

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TOP500 **Supercomputers - Worldwide**

N *world*	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	$\mathbf{R_{max}}$ R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
481	Sun HPC 10000 333 MHz	Mississippi State University Starkeville USA /1998	Academic	32	**17910** 21310	20352 2112
482	Sun HPC 10000 333 MHz	NatWest Markets London UK /1998	Industry Finance	32	**17910** 21310	20352 2112
483	Sun HPC 10000 333 MHz	The Sabre Group Ft Worth USA /1998	Industry Transportation	32	**17910** 21310	20352 2112
484	Sun HPC 10000 333 MHz	Toronto Stock Exchange Markham Canada /1998	Industry Finance	32	**17910** 21310	20352 2112
485	Sun HPC 10000 333 MHz	Toronto Stock Exchange Ontario Canada /1998	Industry Finance	32	**17910** 21310	20352 2112
486	Sun HPC 10000 333 MHz	UCSD/San Diego Supercomputer Center San Diego USA /1997	Academic	32	**17910** 21310	20352 2112
487	Sun HPC 10000 333 MHz	Union Bank of Switzerland Switzerland /1998	Industry Finance	32	**17910** 21310	20352 2112
488	Sun HPC 10000 333 MHz	West Deutsche Landesbank London UK /1998	Industry Finance	32	**17910** 21310	20352 2112
489	Sun HPC 10000	MediaOne Providence USA /1998	Industry Media	42	**17890** 21000	. .
490	SGI/SNI ORIGIN 2000	Technische Universitaet Dresden Dresden Germany /1997	Academic	56	**17800** 21840	. .
491	SGI T916/14512	UCSD/San Diego Supercomputer Center San Diego USA /1997	Academic	14	**17700** 25370	. .
492	NEC SX-3/34R	National Inst. for Molecular Science Okazaki Japan /1993	Research	3	**17400** 19500	6144 691
493	SGI ORIGIN 2000 250 MHz	Imperial College of Science, Technology Medicine London UK /1998	Academic	42	**17280** 21000	. .
494	Sun HPC 10000	ATT CDW USA /1998	Industry Telecomm	40	**17120** 20500	19968 2496
495	Sun HPC 10000	Delta Airlines Atlanta USA /1998	Industry Transportation	40	**17120** 20500	19968 2496
496	Sun HPC 10000	Delta Airlines Atlanta USA /1998	Industry Transportation	40	**17120** 20500	19968 2496
497	Sun HPC 10000	Enron Capital Houston USA /1997	Industry Energy	40	**17120** 20500	19968 2496
498	Sun HPC 10000	Federal Express USA /1997	Industry Database	40	**17120** 20500	19968 2496
499	Sun HPC 10000	Koeln Universitaet Koeln Germany /1997	Academic	40	**17120** 20500	19968 2496
500	Sun HPC 10000	Financial Corporation (B) USA /1998	Industry Finance	40	**17120** 20500	19968 2496

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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
SGI	126	43	12	2	183
IBM	63	32	6	3	104
Sun	86	28	9	4	127
Fujitsu		7	19	1	27
NEC	1	6	11	1	19
Hewlett-Packard	8	3	1	2	14
Hitachi		1	10		11
others	14		1		15
Total	298	120	69	13	500

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

TOP500 Statistics — Installed R_{max} [Gflop/s]					
	USA/Canada	Europe	Japan	others	Total
SGI	9920.7	4393.1	426.2	102.9	14843.3
IBM	3429.3	1056.1	140.0	82.9	4985.1
Sun	2022.7	705.5	238.6	87.1	3053.9
Fujitsu		564.5	1041.8	27.7	1634.1
NEC	244.0	205.5	825.1	61.8	1336.4
Hewlett-Packard	262.7	72.2	22.3	49.9	407.1
Hitachi		58.7	905.0		963.7
others	1986.3		103.5		2089.8
Total	18153	7056.0	3702.5	412.2	29324.0

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

TOP500 Statistics — Installed R_{peak} [Gflop/s]					
	USA/Canada	Europe	Japan	others	Total
SGI	15837.3	6136.7	622.5	143.8	22740.6
IBM	6903.6	1862.1	272.4	116.9	9154.9
Sun	2447.0	858.3	290.4	103.9	3699.6
Fujitsu		640.6	1175.4	28.6	1844.6
NEC	256.0	212.0	861.5	64.0	1393.5
Hewlett-Packard	449.3	115.2	34.6	80.6	679.7
Hitachi		77.0	1296.0		1373.0
others	3141.1		125.1		3266.2
Total	29047	9901.9	4677.9	537.8	44164.0

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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