TOP500 Supercomputer Sites

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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.

To provide this new statistical foundation, we have decided to assemble and maintain a list of the 500 most powerful computer systems. Our list has been compiled 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. We have also used parts of statistical lists published by others for different purposes [2] [3].

In the present list (which we call the TOP500), we list computer 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 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*.

2 The LINPACK Benchmark

As a yardstick of performance we are using the "best" performance as measured by the LINPACK Benchmark [5]. 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 list, 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 list. 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
• 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 [5] is not available, we use the TPP performance given in Table 1 [5] for solving a system of 1000 equations. In a few cases we interpolated between two measured system sizes or we scaled by cycle times. For models where we did not receive the requested data (e.g., Hitachi S3800/480, KSR1-256, bigger models of Paragon XPS), the performance of the next smaller system measured is used.

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 alphabeticly.

Table 1: TOP500 List

Top500 Supercomputers - Worldwide

N_{world}	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
1	Fujitsu Numerical Wind Tunnel	NAL/Fujitsu Japan /1993	Research Aerospace	140	**124500** 236000	31920 11950
2	Thinking Machines CM-5/1024	Los Alamos National Laboratory Los Alamos USA / .	Research Energy	1024	**59700** 131000	52224 24064
3	Thinking Machines CM-5/544	Minnesota Supercomputer Center USA / .	Academic	544	**30400** 70000	36864 16384
4	Thinking Machines CM-5/512	NCSA Urbana-Champaign USA / .	Academic	512	**30400** 66000	36864 16384
5	Thinking Machines CM-5/512	National Security Agency USA / .	Classified	512	**30400** 66000	36864 16384
6	NEC SX-3/44R	NEC Fuchu Plant Japan /1990	Vendor	4	**23200** 26000	6400 830
7	NEC SX-3/44	Atmospheric Environment Service (AES) Dorval Canada /1991	Research Weather	4	**20000** 22000	6144 832
8	Intel XP/S135	Sandia National Labs Albuquerque USA /1993	Research	1840	**15200** 92000	23000 9000
9	Intel XP/S35	Oak Ridge National Laboratory Oak Ridge USA /1992	Research	512	**15200** 26000	23000 9000
10	Thinking Machines CM-5/256	Goverment USA /1993	Classified	256	**15100** 33000	26112 12032
11	Thinking Machines CM-5/256	Thinking Machines USA /1993	Vendor	256	**15100** 33000	26112 12032
12	Thinking Machines CM-5/256	US Naval Research Laboratory USA /1992	Research	256	**15100** 33000	26112 12032
13	Intel Delta	Caltech Pasadena USA / .	Academic	512	**13900** 20480	25000 7500
14	Cray Research Y-MP C916/16256	Cray Research Eagan USA / .	Vendor	16	**13700** 15238	10000 650
15	Cray Research Y-MP C916/16256	DOD/CEWES Vicksburg USA /1993	Research Mechanics	16	**13700** 15238	10000 650
16	Cray Research Y-MP C916/16256	DOE/Bettis Atomic Power Laboratory USA /1993	Research	16	**13700** 15238	10000 650
17	Cray Research Y-MP C916/16256	DOE/Knolls Atomic Power Laboratory USA /1993	Research	16	**13700** 15238	10000 650
18	Cray Research Y-MP C916/16128	ECMWF Reading UK /1993	Research Weather	16	**13700** 15238	10000 650
19	Cray Research Y-MP C916/161024	Government USA /1992	Classified	16	**13700** 15238	10000 650
20	Cray Research Y-MP C916/161024	Government USA /1992	Classified	16	**13700** 15238	10000 650

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
21	Cray Research Y-MP C916/161024	Government USA /1992	Classified	16	**13700** 15238	10000 650
22	Cray Research Y-MP C916/161024	Government USA /1992	Classified	16	**13700** 15238	10000 650
23	Cray Research Y-MP C916	KIST/System Engineering Research Institute Korea /1993	Academic	16	**13700** 15238	10000 650
24	Cray Research Y-MP C916/16256	Lawrence Livermore National Laboratory NERSC USA /1992	Research Energy	16	**13700** 15238	10000 650
25	Cray Research Y-MP C916/16256	NASA/Ames Research Center/NAS Moffett Field USA /1993	Research	16	**13700** 15238	10000 650
26	Cray Research Y-MP C916/16256	Pittsburgh Supercomputing Center Pittsburgh USA /1992	Academic	16	**13700** 15238	10000 650
27	Cray Research Y-MP C916	US Naval Oceanographic Command Bay Saint Louis USA / .	Research Weather	16	**13700** 15238	10000 650
28	Intel XP/S30	UCSD/San Diego Supercomputer Center San Diego USA /1993	Academic	400	**11900** 20000	. .
29	NEC SX-3/24R	National Institute of Fusion Science (NIFS) Japan /1993	Research	2	**11600** 13000	4352 516
30	NEC SX-3/24	NEC Daito Supercomputer Center Japan /1991	Vendor	2	**10000** 11000	4352 500
31	Thinking Machines CM-200/64k	Los Alamos National Laboratory Los Alamos USA / .	Research Energy	2048	**9800** 20000	29696 11264
32	Thinking Machines CM-200/64k	Los Alamos National Laboratory Los Alamos USA / .	Research Energy	2048	**9800** 20000	29696 11264
33	Thinking Machines CM-200/64k	NCSA USA / .	Academic	2048	**9800** 20000	29696 11264
34	Cray Research Y-MP C916/11256	Ford Motor Company Dearborn USA /1992	Industry Automotive	11	**9418** 10476	. .
35	Thinking Machines CM-5/128	AMEX USA /1993	Industry	128	**7700** 16000	18432 8192
36	Thinking Machines CM-5/128	Goverment USA /1993	Classified	128	**7700** 16000	18432 8192
37	Thinking Machines CM-5/128	Institut de Physique du Globe de Paris (IPG) Paris France /1992	Research	128	**7700** 16000	18432 8192
38	Thinking Machines CM-5/128	MIT Cambridge USA / .	Research	128	**7700** 16000	18432 8192
39	Thinking Machines CM-5/128	Mobil / Technical Center Tulsa USA /1992	Industry Geophysics	128	**7700** 16000	18432 8192
40	Thinking Machines CM-5/128	NASA/Ames Research Center/NAS Moffett Field USA /1993	Research	128	**7700** 16000	18432 8192

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41	Thinking Machines CM-5/128	Schlumberger Well Services USA /1992	Industry Geophysics	128	**7700** 16000	18432 8192
42	Hitachi S-3800/480	Tokyo University Tokyo Japan /1993	Academic	4	**7016** 32000	10002 .
43	Cray Research Y-MP C916/8256	Minnesota Supercomputer Center USA / .	Academic	8	**6850** 7619	. .
44	Cray Research Y-MP C916/8256	NASA/Ames Research Center/CCF Moffett Field USA /1993	Research Aerospace	8	**6850** 7619	. .
45	Cray Research Y-MP C98/8128	NASA/Ames Research Center/NAS Moffett Field USA /1993	Research	8	**6850** 7619	. .
46	Cray Research Y-MP C916/8128	US Navy/Fleet Numerical Oceanography Center Monterey USA /1992	Research Weather	8	**6850** 7619	. .
47	Intel XP/S15	Intel SSD Development Centers USA /1993	Vendor	208	**6200** 10400	. .
48	Intel XP/S15	NASA/Ames Research Center/NAS Moffett Field USA /1992	Research	208	**6200** 10400	. .
49	NEC SX-3/14R	German Aerospace Labatory (DLR) Goettingen Germany /1993	Research Aerospace	1	**5800** 6400	2816 282
50	NEC SX-3/41R	Japan Atomic Energy Research Japan /1992	Research	4	**5800** 6400	3584 414
51	NEC SX-3/14R	Osaka University Osaka Japan /1993	Academic	1	**5800** 6400	2816 282
52	NEC SX-3/14R	Toyota Central Research Japan /1992	Industry Automotive	1	**5800** 6400	2816 282
53	Thinking Machines CM-2/64k	Brandeis University USA / .	Academic	2048	**5200** 14000	26624 11000
54	Thinking Machines CM-2/64k	Florida State University Tallahassee USA / .	Academic	2048	**5200** 14000	26624 11000
55	Thinking Machines CM-2/64k	SRC USA /1993	Industry	2048	**5200** 14000	26624 11000
56	Thinking Machines CM-200/32k	Minnesota Supercomputer Center USA / .	Academic	1024	**5000** 10000	21504 8192
57	NEC SX-3/22	Houston Advanced Research Center Houston USA / .	Research	2	**5000** 5500	3072 384
58	NEC SX-3/14	IBM Japan Tokyo Japan /1991	Industry Electronics	1	**5000** 5500	3072 384
59	NEC SX-3/22	National Aerospace Laboratory (NLR) Nordoostpolder Netherlands/1992	Research Aerospace	2	**5000** 5500	3072 384
60	NEC SX-3/14	National Institute of Environmental Studies Japan /1992	Research Environment	1	**5000** 5500	3072 384

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61	NEC SX-3/22	Swiss Scientific Computing Center Manno Switzerland/1991	Research	2	**5000** 5500	3072 384
62	Cray Research Y-MP C98/6256	NASA/Goddard Space Flight Center Greenbelt USA /1993	Research Weather	6	**4630** 5715	. .
63	Intel XP/S10	Intel SSD Development Centers USA /1992	Vendor	140	**4100** 7000	. .
64	Fujitsu VP2600/10	Fuji Heavy Japan /1990	Industry Heavy Ind.	1	**4009** 5000	. .
65	Fujitsu VP2600/10	Japan Atomic Energy Research Japan /1991	Research	1	**4009** 5000	. .
66	Fujitsu VP2600/10	Japan Atomic Energy Research Japan /1991	Research	1	**4009** 5000	. .
67	Fujitsu VP2600/20	Kyoto University Kyoto Japan /1990	Academic	1	**4009** 5000	. .
68	Fujitsu VP2600/10	Kyushu University Kyushu Japan /1992	Academic	1	**4009** 5000	. .
69	Fujitsu VP2600/10	NAL (Space Technology) Japan /1990	Research	1	**4009** 5000	. .
70	Fujitsu VP2600/10	Nagoya University Nagoya Japan /1991	Academic	1	**4009** 5000	. .
71	Fujitsu VP2600/10	Reactor Nuclear Fuel Development Japan /1991	Research	1	**4009** 5000	. .
72	Fujitsu VP2600/10	Reactor Nuclear Fuel Development Japan /1991	Research	1	**4009** 5000	. .
73	Fujitsu VP2600/10	Taisei Construction Japan /1992	Industry Construction	1	**4009** 5000	. .
74	Siemens-Nixdorf S600/20	Universitaet Aachen Aachen Germany /1991	Academic	1	**4009** 5000	. .
75	Siemens-Nixdorf S600/20	Universitaet Karlsruhe Karlsruhe Germany /1990	Academic	1	**4009** 5000	. .
76	IBM 9076-005 SP1	Argonne Nat. Lab USA /1993	Academic	128	**3861** 16000	26500 8000
77	IBM 9076-004 SP1	Cornell University USA /1993	Academic	64	**3861** 8000	26500 8000
78	Thinking Machines CM-5/64	AMOCO Tulsa USA / .	Industry Geophysics	64	**3800** 8192	13056 6016
79	Thinking Machines CM-5/64	ATR Kyoto Japan / .		64	**3800** 8192	13056 6016
80	Thinking Machines CM-5/64	Australian National University Canberra Australia / .	Academic	64	**3800** 8192	13056 6016

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81	Thinking Machines CM-5/64	Boston University Boston USA / .	Academic	64	**3800** 8192	13056 6016
82	Thinking Machines CM-5/64	EPS USA /1993	Industry	64	**3800** 8192	13056 6016
83	Thinking Machines CM-5/64	GMD Birlinghoven Germany /1993	Research	64	**3800** 8192	13056 6016
84	Thinking Machines CM-5/64	Japanese AIST Hokuriku Japan /1993		64	**3800** 8192	13056 6016
85	Thinking Machines CM-5/64	Real World Computing (RWCP) Tokyo Japan /1992		64	**3800** 8192	13056 6016
86	Thinking Machines CM-5/64	University of Wisconsin USA / .	Academic	64	**3800** 8192	13056 6016
87	Siemens-Nixdorf S400/40	Universitaet Darmstadt Darmstadt Germany /1991	Academic	2	**3624** 5000	10239 .
88	Siemens-Nixdorf S400/40	Universitaet Hannover Hannover Germany /1991	Academic	2	**3624** 5000	10239 .
89	KSR KSR1-256	KSR Boston USA /1992	Vendor	256	**3380** 10240	10240 1824
90	KSR KSR1-256	US Army Research Laboratory Aberdeen USA /1993	Research	256	**3380** 10240	10240 1824
91	KSR KSR1-128	Cornell Theory Center Ithaca USA /1992	Academic	128	**3380** 5120	10240 1824
92	Cray Research Y-MP C98/4256	Direction de la Meteorologie Nationale Toulouse France /1993	Research Weather	4	**3275** 3810	. .
93	NEC SX-3/12R	Institute of Space Science (INPE) Brazil /1993	Research Weather	1	**2900** 3200	2048 174
94	NEC SX-3/12R	NEC Scientific Information (NSIS) Japan /1992	Research	1	**2900** 3200	2048 174
95	NEC SX-3/21R	Obayashi Corporation Japan /1992	Industry	2	**2900** 3200	2560 257
96	Thinking Machines CM-2/32k	AMK Bonn Germany /1990	Classified	1024	**2600** 7000	. .
97	Intel iPSC/860	Alliant Techsystems Inc. USA /1990	Industry Biochemistry	128	**2600** 5120	12000 4500
98	Intel iPSC/860	Grant Tensor UK /1991	Industry Geophysics	128	**2600** 5120	12000 4500
99	Intel iPSC/860	Grant Tensor USA /1991	Industry Geophysics	128	**2600** 5120	12000 4500
100	Intel iPSC/860	Grant Tensor Houston USA /1992	Industry Geophysics	128	**2600** 5120	12000 4500

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101	Intel iPSC/860	Honeywell USA /1990	Industry	128	**2600** 5120	12000 4500
102	Intel iPSC/860	Lockheed Advanced Development Palmdale USA /1992	Industry Aerospace	128	**2600** 5120	12000 4500
103	Intel iPSC/860	NASA/Ames Research Center/NAS Moffett Field USA /1990	Research	128	**2600** 5120	12000 4500
104	Intel iPSC/860	NIH Frederick USA /1990	Research	128	**2600** 5120	12000 4500
105	Intel iPSC/860	ONERA Chatillon France /1991	Research Aerospace	128	**2600** 5120	12000 4500
106	Intel iPSC/860	Oak Ridge National Laboratory Oak Ridge USA /1989	Research	128	**2600** 5120	12000 4500
107	KSR KSR1-96	Florida State University Tallahassee USA /1993	Academic	96	**2535** 3840	. .
108	KSR KSR1-96	Lockheed USA /1993	Industry	96	**2535** 3840	. .
109	KSR KSR1-96	University of Cincinati USA /1993	Academic	96	**2535** 3840	. .
110	Thinking Machines CM-200/16k	INRIA - Sophia Antipolis Rennes France /1992	Research	512	**2400** 5000	14848 5632
111	Thinking Machines CM-200/16k	US Naval Research Laboratory USA /1987	Research	512	**2400** 5000	14848 5632
112	Thinking Machines CM-200/16k	University of Edinburgh Edinburgh UK / .	Research	512	**2400** 5000	14848 5632
113	Cray Research CRAY-2s/8-128	Lawrence Livermore National Laboratory NERSC USA /1990	Research Energy	8	**2171** 3902	. .
114	Cray Research Y-MP8E/8256	Arabian American Oil Company USA /1991	Industry Geophysics	8	**2144** 2667	. .
115	Cray Research Y-MP8/864	Atomic Weapons Establishment USA /1990	Classified	8	**2144** 2667	. .
116	Cray Research Y-MP8/8128	Cray Research Eagan USA / .	Vendor	8	**2144** 2667	. .
117	Cray Research Y-MP8/8128	Cray Research Eagan USA / .	Vendor	8	**2144** 2667	. .
118	Cray Research Y-MP8/832	Cray Research Eagan USA / .	Vendor	8	**2144** 2667	. .
119	Cray Research Y-MP8/864	DOE/Bettis Atomic Power Laboratory USA /1990	Research	8	**2144** 2667	. .
120	Cray Research Y-MP8/864	DOE/Knolls Atomic Power Laboratory USA /1990	Research	8	**2144** 2667	. .

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121	Cray Research Y-MP8/8256	DOE/National Security Agency USA / .	Classified	8	**2144** 2667	. .
122	Cray Research Y-MP8/864	Government Communications Headquarters Benhall UK / .	Classified	8	**2144** 2667	. .
123	Cray Research Y-MP8/832	KFA Juelich Germany /1989	Research	8	**2144** 2667	. .
124	Cray Research Y-MP8/8128	Lawrence Livermore National Laboratory Livermore USA /1991	Research	8	**2144** 2667	. .
125	Cray Research Y-MP8/864	Lawrence Livermore National Laboratory Livermore USA /1992	Research	8	**2144** 2667	. .
126	Cray Research Y-MP8/8128	Leibniz Rechenzentrum Muenchen Germany /1992	Academic	8	**2144** 2667	. .
127	Cray Research Y-MP8/8128	Los Alamos National Laboratory Los Alamos USA /1992	Research Energy	8	**2144** 2667	. .
128	Cray Research Y-MP8/8128	Los Alamos National Laboratory Los Alamos USA /1992	Research Energy	8	**2144** 2667	. .
129	Cray Research Y-MP8/864	Los Alamos National Laboratory Los Alamos USA /1992	Research Energy	8	**2144** 2667	. .
130	Cray Research Y-MP8/8256	NASA/Ames Research Center/NAS Moffett Field USA /1993	Research	8	**2144** 2667	. .
131	Cray Research Y-MP8E/8256	NASA/Langley Research Center Hampton USA /1992	Research	8	**2144** 2667	. .
132	Cray Research Y-MP8/8128	NASA/Lewis Research Center USA /1991	Research	8	**2144** 2667	. .
133	Cray Research Y-MP8/864	NOAA USA /1990	Research Weather	8	**2144** 2667	. .
134	Cray Research Y-MP8/832	NOAA/GFDL USA /1990	Research Weather	8	**2144** 2667	. .
135	Cray Research Y-MP8/8128	National Cancer Institute USA /1991	Research Chemistry	8	**2144** 2667	. .
136	Cray Research Y-MP8/864	National Center for Atmospheric Research Boulder USA /1990	Research Weather	8	**2144** 2667	. .
137	Cray Research Y-MP8E/8128	Navy POPS Supercomputing Facility Saint Louis USA / .	Research Weather	8	**2144** 2667	. .
138	Cray Research Y-MP8/864	Ohio Supercomputer Center Columbus USA /1989	Academic	8	**2144** 2667	. .
139	Cray Research Y-MP8I/8128	Rutherford Appleton Laboratory UK /1992	Research	8	**2144** 2667	. .
140	Cray Research Y-MP8/864	Sandia National Labs Albuquerque USA / .	Research	8	**2144** 2667	. .

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141	Cray Research Y-MP8/8128	Tohoku University, Institute of Fluid Science Aramaki Japan /1992	Academic	8	**2144** 2667	. .
142	Cray Research Y-MP8/864	UCSD/San Diego Supercomputer Center San Diego USA /1989	Academic	8	**2144** 2667	. .
143	Cray Research Y-MP8/864	United Kingdom Meteorological Office Bracknell UK /1991	Research Weather	8	**2144** 2667	. .
144	Cray Research Y-MP8/864	United Kingdom Meteorological Office Bracknell UK /1991	Research Weather	8	**2144** 2667	. .
145	Cray Research Y-MP8/864	University of Texas Austin USA /1990	Academic	8	**2144** 2667	. .
146	Fujitsu VPX240/10	CESGA Sant. de Compostella Spain /1992	Academic	1	**2110** 2500	. .
147	Fujitsu VPX240/20	Fujitsu San Jose USA / .	Vendor	1	**2110** 2500	. .
148	Fujitsu VPX240/10	High Performance Computing Center Alberta Canada / .	Research	1	**2110** 2500	. .
149	Siemens-Nixdorf S400/10	IFP (Institute Francais du Petrole) Rueil-Malmaison France /1992	Academic Geophysics	1	**2110** 2500	. .
150	Fujitsu VPX240/10	University of Manchester Manchester UK /1993	Academic	1	**2110** 2500	. .
151	IBM 9076-003 SP1	Penn State University USA /1993	Academic	32	**2033** 4000	15000 4390
152	Intel XP/S5	Boeing Seattle USA /1992	Industry Aerospace	66	**2000** 3300	8000 .
153	Intel XP/S5	Intel SSD Development Centers USA /1993	Vendor	66	**2000** 3300	8000 .
154	Intel XP/S5	KFA Juelich Germany /1992	Research	66	**2000** 3300	8000 .
155	Intel XP/S5-32	NASA/Langley Research Center Hampton USA /1992	Research	66	**2000** 3300	8000 .
156	Intel XP/S5	Oak Ridge National Laboratory Oak Ridge USA / .	Research	66	**2000** 3300	8000 .
157	Intel XP/S5	Prudential Bache Securities New York USA /1993	Industry	66	**2000** 3300	8000 .
158	Intel XP/S5	Real World Computing (RWC) Tokyo Japan /1993		66	**2000** 3300	8000 .
159	Intel XP/S5-32	Universitaet Stuttgart Stuttgart Germany /1992	Academic	66	**2000** 3300	8000 .
160	Thinking Machines CM-5/32	Booz-Allen Hamilton Washington DC USA / .	Industry Consulting	32	**1900** 4096	9216 4096

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
161	Thinking Machines CM-5/32	CRIEPI Japan /1993		32	**1900** 4096	9216 4096
162	Thinking Machines CM-5/32	Columbia University New York City USA / .	Academic	32	**1900** 4096	9216 4096
163	Thinking Machines CM-5/32	Compagnie Generale de Geophysique (CGG) Massy France /1993	Industry Geophysics	32	**1900** 4096	9216 4096
164	Thinking Machines CM-5/32	Duke University Durham USA / .	Academic	32	**1900** 4096	9216 4096
165	Thinking Machines CM-5/32	JPL Pasadena USA / .	Research	32	**1900** 4096	9216 4096
166	Thinking Machines CM-5/32	Madentech USA /1993	Industry	32	**1900** 4096	9216 4096
167	Thinking Machines CM-5/32	NPAC USA /1993	Research	32	**1900** 4096	9216 4096
168	Thinking Machines CM-5/32	National Center for Atmospheric Research Boulder USA / .	Research Weather	32	**1900** 4096	9216 4096
169	Thinking Machines CM-5/32	Oregon State University USA / .	Academic	32	**1900** 4096	9216 4096
170	Thinking Machines CM-5/32	RUG (Rijksuniversiteit Groningen) Groningen Netherlands/1993	Academic	32	**1900** 4096	9216 4096
171	Thinking Machines CM-5/32	Site Experimental Hyperparallelisme (SEH/ETCA) Arcueil France / .	Research	32	**1900** 4096	9216 4096
172	Thinking Machines CM-5/32	Stanford University USA / .	Academic	32	**1900** 4096	9216 4096
173	Thinking Machines CM-5/32	Syracuse University Syracuse USA / .	Academic	32	**1900** 4096	9216 4096
174	Thinking Machines CM-5/32	TEC USA /1993	Industry	32	**1900** 4096	9216 4096
175	Thinking Machines CM-5/32	Tokyo University, Medical Lab Tokyo Japan /1993	Academic	32	**1900** 4096	9216 4096
176	Thinking Machines CM-5/32	Universitaet Wuppertal Wuppertal Germany /1992	Academic	32	**1900** 4096	9216 4096
177	Thinking Machines CM-5/32	University of Adelaide Adelaide Australia / .	Academic	32	**1900** 4096	9216 4096
178	Thinking Machines CM-5/32	University of California at Berkeley USA / .	Academic	32	**1900** 4096	9216 4096
179	Thinking Machines CM-5/32	University of Maryland USA / .	Academic	32	**1900** 4096	9216 4096
180	Thinking Machines CM-5/32	University of New South Wales Kensington Australia / .	Academic	32	**1900** 4096	9216 4096

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
181	Thinking Machines CM-5/32	University of Tennessee Knoxville USA / .	Academic	32	**1900** 4096	9216 4096
182	nCube nCUBE2	Sandia National Labs Albuquerque USA / .	Research	1024	**1900** 2400	21376 3193
183	KSR KSR1-64	Caltech Pasadena USA /1992	Academic	64	**1838** 2560	9216 1536
184	KSR KSR1-64	Canon Japan /1993	Industry	64	**1838** 2560	9216 1536
185	KSR KSR1-64	Canon Japan /1993	Industry	64	**1838** 2560	9216 1536
186	KSR KSR1-64	Georgia Institute of Technology USA /1993	Research	64	**1838** 2560	9216 1536
187	KSR KSR1-64	Government UK /1992	Classified	64	**1838** 2560	9216 1536
188	KSR KSR1-64	Oak Ridge National Laboratory Oak Ridge USA /1991	Research	64	**1838** 2560	9216 1536
189	KSR KSR1-64	University of Colorado USA /1992	Academic	64	**1838** 2560	9216 1536
190	KSR KSR1-64	University of Massachusetts Amherst USA /1993	Academic	64	**1838** 2560	9216 1536
191	KSR KSR1-64	University of Michigan Michigan USA /1993	Academic	64	**1838** 2560	9216 1536
192	KSR KSR1-64	University of Washington Seattle USA /1993	Academic	64	**1838** 2560	9216 1536
193	Hitachi S-820/80	Hitachi Ltd. GPCD Japan /1988	Vendor	1	**1817** 3000	5000 .
194	Hitachi S-820/80	Hitachi Ltd. GPCD Japan /1988	Vendor	1	**1817** 3000	5000 .
195	Hitachi S-820/80	Hitachi Ltd. GPCD Japan /1989	Vendor	1	**1817** 3000	5000 .
196	Hitachi S-820/80	Hitachi Ltd. GPCD Japan /1989	Vendor	1	**1817** 3000	5000 .
197	Hitachi S-820/80	Hitachi Ltd. GPCD Japan /1990	Vendor	1	**1817** 3000	5000 .
198	Hitachi S-820/80	Hitachi Ltd. SSD Japan /1989	Vendor	1	**1817** 3000	5000 .
199	Hitachi S-820/80	Hokkaido University Sapporo Japan /1989	Academic	1	**1817** 3000	5000 .
200	Hitachi S-820/80	Institute of Molecular Science Japan /1988	Research	1	**1817** 3000	5000 .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
201	Hitachi S-820/80	Nat. Lab. for High Energy Physics Japan /1988	Research	1	**1817** 3000	5000 .
202	Hitachi S-820/80	Nihon University Japan /1993	Academic	1	**1817** 3000	5000 .
203	Hitachi S-820/80	Senshu University Japan / .	Academic	1	**1817** 3000	5000 .
204	Cray Research Y-MP M98	Cray Research Eagan USA / .	Vendor	8	**1733** 2667	. .
205	Cray Research Y-MP C94A/2128	Instituto National de Meteorologia (INM) Spain /1993	Research Weather	2	**1703** 1905	. .
206	Cray Research Y-MP C92A/2128	Mitsubishi Motors Company Kawasaki Japan /1993	Industry Automotive	2	**1703** 1905	. .
207	Fujitsu VP2400/20	Computer Technology Integrated (CTI) Japan /1991	Industry	1	**1688** 2000	. .
208	Hitachi S-3600/180	Hitachi Ltd. GPCD Japan /1993	Vendor	1	**1672** 2000	1000 .
209	Hitachi S-3600/180	Hitachi Ltd. GPCD Japan /1993	Vendor	1	**1672** 2000	1000 .
210	Cray Research Y-MP8/664	Cray Research Eagan USA / .	Vendor	6	**1651** 2000	. .
211	Cray Research Y-MP8I/6128	NASA/Marshall Space Flight Center USA /1993	Research Aerospace	6	**1651** 2000	. .
212	Cray Research Y-MP8/664	Nissan Motor Kanagawa Japan /1990	Academic	6	**1651** 2000	. .
213	Cray Research Y-MP8I/632	Taiwan Central Weather Bureau Taiwan /1992	Research Weather	6	**1651** 2000	. .
214	Cray Research Y-MP8/632	Toyota Motor Company Japan /1991	Industry Automotive	6	**1651** 2000	. .
215	MasPar MP-2216	Lockheed Missiles and Space Company USA /1993	Industry Aerospace	16384	**1600** 2400	11264 1920
216	MasPar MP-2216	National Cancer Institute USA /1993	Research Chemistry	16384	**1600** 2400	11264 1920
217	dec DECmpp SX 200	University of Bergen Bergen Norway / .	Academic	16384	**1600** 2400	11264 1920
218	Intel XP/A4	Caltech Pasadena USA /1993	Academic	56	**1500** 4200	6000 .
219	Intel XP/A4	Hiroshima University Japan /1993	Academic	56	**1500** 4200	6000 .
220	Intel XP/A4E	IRISA Rennes France /1993	Research Aerospace	56	**1500** 4200	6000 .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
221	Intel XP/A4	Rice University USA /1993	Academic	56	**1500** 4200	6000 .
222	Intel XP/A4	Sandia National Labs Livermore USA /1993	Research Energy	56	**1500** 4200	6000 .
223	Intel XP/A4E	Technische Universitaet Graz Graz Austria /1993	Academic	56	**1500** 4200	6000 .
224	Intel XP/A4	University of Indiana USA /1993	Academic	56	**1500** 4200	6000 .
225	Intel XP/A4	University of Melbourne Australia /1993	Academic	56	**1500** 4200	6000 .
226	Intel XP/A4	University of South Carolina USA /1992	Academic	56	**1500** 4200	6000 .
227	Intel XP/A4	University of Trondheim Norway /1992	Academic	56	**1500** 4200	6000 .
228	IBM ES 9000-900	CERN Geneva Switzerland/ .	Research	6	**1457** 2664	. .
229	IBM ES 9000-900	Cornell Theory Center Ithaca USA / .	Academic	6	**1457** 2664	. .
230	IBM ES 9000-900	UCLA Los Angeles USA / .	Academic	6	**1457** 2664	. .
231	Cray Research CRAY-2s/4-128	DKRZ Hamburg Germany /1988	Research Weather	4	**1406** 1952	. .
232	Cray Research CRAY-2s/4-128	Lawrence Livermore National Laboratory NERSC USA /1988	Research Energy	4	**1406** 1952	. .
233	Cray Research CRAY-2s/4-128	NASA/Langley Research Center Hampton USA /1989	Research	4	**1406** 1952	. .
234	Cray Research CRAY-2s/4-128	NCSA Urbana-Champaign USA /1988	Academic	4	**1406** 1952	. .
235	Cray Research CRAY-2/4-256	Air Force/Phillips Lab USA /1987	Research Aerospace	4	**1406** 1951	. .
236	Cray Research CRAY-2/4-512	Arabian American Oil Company USA /1992	Industry Geophysics	4	**1406** 1951	. .
237	Cray Research CRAY-2/4-256	Commissariat a l'Energie Atomique Grenoble France /1989	Research Energy	4	**1406** 1951	. .
238	Cray Research CRAY-2/4-128	Cray Research Eagan USA / .	Vendor	4	**1406** 1951	. .
239	Cray Research CRAY-2/4-256	Defense Research Agency Farnborough UK /1990	Classified	4	**1406** 1951	. .
240	Cray Research CRAY-2/4-256	Direction de la Meteorologie Nationale Toulouse France /1989	Research Weather	4	**1406** 1951	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
241	Cray Research CRAY-2/4-256	Ecole Polytechnique Federale de Lausanne Lausanne Switzerland/1990	Academic	4	**1406** 1951	. .
242	Cray Research CRAY-2/4-512	Minnesota Supercomputer Center USA /1988	Academic	4	**1406** 1951	. .
243	Cray Research CRAY-2/4-256	NT T Japan /1987	Industry Electronics	4	**1406** 1951	. .
244	Cray Research CRAY-2/4-512	US Air Force/National Test Facility USA /1990	Classified	4	**1406** 1951	. .
245	Cray Research CRAY-2/4-256	Universitaet Stuttgart Stuttgart Germany /1986	Research	4	**1406** 1951	. .
246	Intel iPSC/860	Caltech Pasadena USA /1990	Academic	64	**1400** 2560	9000 3500
247	Intel iPSC/860	Daresbury Laboratory Warrington UK / .	Research	64	**1400** 2560	9000 3500
248	Intel iPSC/860	McDonnell Douglas USA /1991	Industry Aerospace	64	**1400** 2560	9000 3500
249	Intel iPSC/860	SERC USA /1990	Research	64	**1400** 2560	9000 3500
250	Intel iPSC/860	Sandia National Labs Albuquerque USA /1991	Research	64	**1400** 2560	9000 3500
251	Intel iPSC/860	Superconducting Supercollider Lab USA /1990	Research	64	**1400** 2560	9000 3500
252	Intel iPSC/860	UCSD/San Diego Supercomputer Center San Diego USA /1990	Academic	64	**1400** 2560	9000 3500
253	Intel iPSC/860	Westinghouse Electric USA /1992	Industry Energy	64	**1400** 2560	9000 3500
254	KSR KSR1-48	North Carolina Supercomputer Center USA /1992	Academic	48	**1350** 1920	. .
255	Thinking Machines CM-2/16k	ATR Japan /1990		512	**1300** 3500	. .
256	Thinking Machines CM-2/16k	Australian National University Canberra Australia / .	Academic	512	**1300** 3500	. .
257	Thinking Machines CM-2/16k	GMD Birlinghoven Germany /1990	Research	512	**1300** 3500	. .
258	Thinking Machines CM-2/16k	ICFD Japan /1991	Research	512	**1300** 3500	. .
259	Meiko CS/i860/64	University of Edinburgh Edinburgh UK /1990	Academic	64	**1300** 2500	8500 3500
260	NEC SX-3/11	Sanyo Electric Moriguchi City Japan /1991	Industry Electronics	1	**1300** 1370	2816 192

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N_{world}	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
261	NEC SX-3/11	Tokai University Tokai Japan /1992	Academic	1	**1300** 1370	2816 192
262	NEC SX-3/11	Universitaet Koeln Koeln Germany /1990	Academic	1	**1300** 1370	2816 192
263	Thinking Machines CM-200/8k	Uni-C Copenhagen Denmark /1992	Academic	256	**1200** 2500	10752 4096
264	Cray Research Y-MP8/4128	BMW AG Muenchen Germany /1992	Industry Automotive	4	**1159** 1333	. .
265	Cray Research Y-MP8E/4128	Boeing Seattle USA / .	Industry Aerospace	4	**1159** 1333	. .
266	Cray Research Y-MP8/464	CINECA Bologna Italy /1992	Academic	4	**1159** 1333	. .
267	Cray Research Y-MP8I/464	Chrysler Motors Company USA /1992	Industry Automotive	4	**1159** 1333	. .
268	Cray Research Y-MP4E/464	Citroen Peugeot Velizy France /1992	Industry Automotive	4	**1159** 1333	. .
269	Cray Research Y-MP4E/464	Compagnie Generale de Geophysique (CGG) Fletham UK /1993	Industry Geophysics	4	**1159** 1333	. .
270	Cray Research Y-MP4/432	Compagnie Generale de Geophysique (CGG) Massy France /1992	Industry Geophysics	4	**1159** 1333	. .
271	Cray Research Y-MP4/464	Cray Research Eagan USA / .	Vendor	4	**1159** 1333	. .
272	Cray Research Y-MP4/464	Cray Research Eagan USA / .	Vendor	4	**1159** 1333	. .
273	Cray Research Y-MP8/432	Defense Research Agency Ford Halstead UK /1990	Research	4	**1159** 1333	. .
274	Cray Research Y-MP4/432	Deutscher Wetterdienst Offenbach Germany /1990	Research Weather	4	**1159** 1333	. .
275	Cray Research Y-MP8/464	EXXON USA /1992	Industry Geophysics	4	**1159** 1333	. .
276	Cray Research Y-MP4/464	Eidgenoessische Technische Hochschule Zuerich Switzerland/1992	Academic	4	**1159** 1333	. .
277	Cray Research Y-MP8/4128	Electricite de France Clamart France /1990	Industry Energy	4	**1159** 1333	. .
278	Cray Research Y-MP4/432	Florida State University Tallahassee USA /1990	Academic	4	**1159** 1333	. .
279	Cray Research Y-MP4E/464	Hyundai Korea /1993	Industry Automotive	4	**1159** 1333	. .
280	Cray Research Y-MP4E/464	Lockheed Aeronautical Systems Company USA /1992	Industry Aerospace	4	**1159** 1333	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
281	Cray Research Y-MP8I/4128	Lockheed Aeronautical Systems Company USA /1993	Industry Aerospace	4	**1159** 1333	. .
282	Cray Research Y-MP4E/464	MPI Garching Germany /1991	Research	4	**1159** 1333	. .
283	Cray Research Y-MP4E/464	Matsushita Electric Osaka Japan /1992	Academic	4	**1159** 1333	. .
284	Cray Research Y-MP8I/4128	Merck Co USA /1993	Industry Chemistry	4	**1159** 1333	. .
285	Cray Research Y-MP4/464	Mitsubishi Motors Company Okazaki Japan /1992	Industry Automotive	4	**1159** 1333	. .
286	Cray Research Y-MP4/464	NCSA Urbana-Champaign USA /1990	Academic	4	**1159** 1333	. .
287	Cray Research Y-MP8/464	North Carolina Supercomputer Center USA /1991	Academic	4	**1159** 1333	. .
288	Cray Research Y-MP8/4128	ONERA Chatillon France /1991	Research Aerospace	4	**1159** 1333	. .
289	Cray Research Y-MP4/464	SARA (Stichting Academisch Rekencentrum) Amsterdam Netherlands/1990	Academic	4	**1159** 1333	. .
290	Cray Research Y-MP4E/464	Samsung Korea /1991	Industry Electronics	4	**1159** 1333	. .
291	Cray Research Y-MP8/4128	Toshiba Kanagawa Japan /1990	Academic	4	**1159** 1333	. .
292	Cray Research Y-MP4/432	Universidad Nacional Autonoma de Mexico Mexico /1991	Academic	4	**1159** 1333	. .
293	Cray Research Y-MP4E/464	Universitaet Kaiserslautern Kiel Germany /1993	Academic	4	**1159** 1333	. .
294	Cray Research Y-MP4/464	University of Trondheim Norway /1992	Academic	4	**1159** 1333	. .
295	Cray Research Y-MP8/464	VW (Volkswagen AG) Wolfsburg Germany /1993	Industry Automotive	4	**1159** 1333	. .
296	Cray Research Y-MP M94/4256	KFA Juelich Germany /1993	Research	4	**1114** 1333	. .
297	Cray Research Y-MP M98/41024	University of Alaska Fairbanks USA /1992	Academic	4	**1114** 1333	. .
298	Fujitsu VPX220/10	GECO-PRAKLA Houston USA /1993	Industry Geophysics	1	**1048** 1250	. .
299	Fujitsu VPX220/10	Keio Daigaku University Japan /1992	Academic	1	**1048** 1250	. .
300	Siemens-Nixdorf S200/10	Schering Germany /1991	Industry Chemistry	1	**1048** 1250	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
301	Siemens-Nixdorf S200/20	Siemens Muenchen Germany /1991	Industry Electronics	1	**1048** 1250	. .
302	Thinking Machines CM-5/16	Goverment USA /1993	Classified	16	**980** 2048	6528 3008
303	Thinking Machines CM-5/16	Kyushu University Kyushu Japan / .	Academic	16	**980** 2048	6528 3008
304	Thinking Machines CM-5/16	LOREN Taiwan /1993		16	**980** 2048	6528 3008
305	Thinking Machines CM-5/16	NCSA USA /1993	Academic	16	**980** 2048	6528 3008
306	Thinking Machines CM-5/16	Pittsburgh Supercomputing Center Pittsburgh USA / .	Academic	16	**980** 2048	6528 3008
307	Thinking Machines CM-5/16	Thinking Machines USA /1993	Vendor	16	**980** 2048	6528 3008
308	Thinking Machines CM-5/16	West Virginia University USA / .	Academic	16	**980** 2048	6528 3008
309	Parsytec GCel 3/1024	Universitaet Koeln/DLR Koeln Germany /1992	Academic	1024	**971** 1540	15999 2073
310	Parsytec GCel 3/1024	Universitaet Paderborn Paderborn Germany /1992	Academic	1024	**971** 1540	15999 2073
311	Meiko CS/i860/42	Ensign Geophysics Weybridge UK /1987	Academic	42	**970** 1700	. .
312	nCube nCUBE2	Mitsubishi Electric Corporation Kanagawa Japan /1991	Industry Electronics	512	**958** 1200	15200 2240
313	nCube nCUBE2	Rockwell USA /1992	Industry Aerospace	512	**958** 1200	15200 2240
314	Hitachi S-820/60	Defence Agency Land Japan /1989	Classified	1	**905** 1500	5000 .
315	Hitachi S-820/60	Hitachi Ltd. Adv. Res. Lab Japan /1993	Vendor	1	**905** 1500	5000 .
316	Hitachi S-820/60	Hitachi Ltd. Cent. Res. Lab. Japan /1992	Vendor	1	**905** 1500	5000 .
317	Hitachi S-820/60	Hitachi Ltd. SICD Japan /1991	Vendor	1	**905** 1500	5000 .
318	Hitachi S-820/60	Hitachi Ltd. SICD Japan /1991	Vendor	1	**905** 1500	5000 .
319	Hitachi S-820/60	Hitachi Ltd. STRD Japan /1991	Vendor	1	**905** 1500	5000 .
320	Hitachi S-820/60	Kajima Corporation Japan /1990	Industry Construction	1	**905** 1500	5000 .

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N_{world}	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
321	Hitachi S-820/60	Suzuki Motor Japan /1989	Industry Automotive	1	**905** 1500	5000 .
322	Hitachi S-820/60	Yamaichi Information Systems Japan /1989	Research Economics	1	**905** 1500	5000 .
323	KSR KSR1-32	GWDG Goettingen Germany /1992	Academic	32	**893** 1280	6144 896
324	KSR KSR1-32	INRIA - Sophia Antipolis Rennes France /1992	Research	32	**893** 1280	6144 896
325	KSR KSR1-32	Leibniz Rechenzentrum Muenchen Germany /1993	Academic	32	**893** 1280	6144 896
326	KSR KSR1-32	Siemens Nixdorf Muenchen Germany /1993	Vendor	32	**893** 1280	6144 896
327	KSR KSR1-32	Universitaet Mannheim Mannheim Germany /1992	Academic	32	**893** 1280	6144 896
328	KSR KSR1-32	University of Houston USA /1992	Academic	32	**893** 1280	6144 896
329	KSR KSR1-32	University of Manchester Manchester UK /1992	Academic	32	**893** 1280	6144 896
330	KSR KSR1-32	University of Toronto Toronto Canada /1993	Academic	32	**893** 1280	6144 896
331	NEC SX-2	Aoyama Gakuin University Japan /1988	Academic	1	**885** 1333	. .
332	NEC SX-2	Institute Laser Eng Osaka Univ. Osaka Japan /1985	Academic	1	**885** 1333	. .
333	NEC SX-2	Institute of Computational Fluid Dynamics Japan /1987	Research	1	**885** 1333	. .
334	NEC SX-2A	Mazda Motor Corporation Yokohama Japan /1989	Industry Automotive	1	**885** 1333	. .
335	NEC SX-2	NEC Fuchu Plant Japan /1987	Vendor	1	**885** 1333	. .
336	NEC SX-2	NEC Scientific Information (NSIS) Japan /1985	Research	1	**885** 1333	. .
337	NEC SX-2	Sumitomo Metal Industries Japan /1988	Industry	1	**885** 1333	. .
338	NEC SX-2	Tohoku University Tohoku Japan /1988	Academic	1	**885** 1333	. .
339	Cray Research Y-MP4/332	Arco Oil and Gas Company USA /1992	Industry Geophysics	3	**881** 999	. .
340	Cray Research Y-MP4E/364	British Aerospace PLC Farnborough UK /1991	Industry Aerospace	3	**881** 999	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
341	Cray Research Y-MP4E/332	Bureau of Meterology Melbourne Australia /1993	Research Weather	3	**881** 999	. .
342	Cray Research Y-MP4E/364	DKRZ Hamburg Germany /1991	Research Weather	3	**881** 999	. .
343	Cray Research Y-MP4/332	Du Pont De Nemours Company USA /1990	Industry Chemistry	3	**881** 999	. .
344	Cray Research Y-MP8/364	Honda Research and Development Company Tokyo Japan /1990	Industry Automotive	3	**881** 999	. .
345	Cray Research Y-MP4/364	Mitsubishi Electric Corporation Kanagawa Japan /1991	Industry Electronics	3	**881** 999	. .
346	Cray Research Y-MP4E/364	Mobil / Technical Center Tulsa USA /1993	Industry Geophysics	3	**881** 999	. .
347	Cray Research Y-MP4E/364	Renault Rueil-Malmaison France /1992	Industry Automotive	3	**881** 999	. .
348	Cray Research Y-MP4/332	Shell USA USA /1992	Industry Geophysics	3	**881** 999	. .
349	Cray Research Y-MP4/364	debis Stuttgart Germany /1991	Industry Automotive	3	**881** 999	. .
350	Cray Research Y-MP M98/31024	General Motors/Research Environment Staff USA /1993	Industry Automotive	3	**855** 999	. .
351	Hitachi S-3600/160	Hitachi Zosen Corp. Japan /1992	Vendor	1	**851** 1000	1000 .
352	Hitachi S-3600/160	Toyo Tire Rubber Japan /1993	Industry	1	**851** 1000	1000 .
353	Fujitsu VP2200/10	ANSTO Australia /1991	Academic	1	**842** 1000	. .
354	Fujitsu VP2200/10	Australian National University Canberra Australia /1991	Academic	1	**842** 1000	. .
355	Fujitsu VP2200/10	Kawasaki Heavy Industry Japan /1990	Industry Heavy Ind.	1	**842** 1000	. .
356	Fujitsu VP2200/10	Kawasaki Steel Japan /1991	Industry Heavy Ind.	1	**842** 1000	. .
357	Fujitsu VP2200/10	Meiji University Japan /1990	Academic	1	**842** 1000	. .
358	Fujitsu VP2200/10	Nikko Securities Japan /1991	Industry finance	1	**842** 1000	. .
359	Fujitsu VP2200/10	Nippon Steel Japan /1992	Industry Heavy Ind.	1	**842** 1000	. .
360	Fujitsu VP2200/10	Sharp Japan /1990	Industry Electronics	1	**842** 1000	. .

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Top500 Supercomputers - Worldwide

$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
361	Fujitsu VP2200/10	Sony Japan /1990	Industry	1	**842** 1000	. .
362	Fujitsu VP2200/20	Toyota Motor Company Japan /1991	Industry Automotive	1	**842** 1000	. .
363	Siemens-Nixdorf S200/10 (4ns)	Universitaet Frankfurt Frankfurt Germany /1991	Academic	1	**842** 1000	. .
364	Meiko CS/i860/32	DRA Malvern Weybridge UK /1990	Research	32	**825** 1300	7000 3000
365	Cray Research X-MP/416	AMK Bonn Germany /1990	Classified	4	**822** 940	. .
366	Cray Research X-MP EA/432	BP Exploration Inc./U.S. USA /1990	Industry Geophysics	4	**822** 940	. .
367	Cray Research X-MP/48	Battelle Software Seattle USA / .	Industry Energy	4	**822** 940	. .
368	Cray Research X-MP/4	Chevron La Habra USA / .	Industry Geophysics	4	**822** 940	. .
369	Cray Research X-MP/416	Compagnie Generale de Geophysique (CGG) Massy France /1992	Industry Geophysics	4	**822** 940	. .
370	Cray Research X-MP/416	Cray Research Eagan USA / .	Vendor	4	**822** 940	. .
371	Cray Research X-MP EA/464	Finish State Computer Centre Espoo Finland /1990	Academic	4	**822** 940	. .
372	Cray Research X-MP/416	Lawrence Livermore National Laboratory Livermore USA /1987	Research	4	**822** 940	. .
373	Cray Research X-MP EA/464	Lockheed Missiles and Space Company USA /1990	Industry Aerospace	4	**822** 940	. .
374	Cray Research X-MP EA/464	Lockheed Missiles and Space Company USA /1990	Industry Aerospace	4	**822** 940	. .
375	Cray Research X-MP EA/464	MIT Cambridge USA / .	Research	4	**822** 940	. .
376	Cray Research X-MP/416	Michelin Clermont-Ferrand France /1992	Industry Automotive	4	**822** 940	. .
377	Cray Research X-MP EA/464	Minnesota Supercomputer Center USA /1992	Academic	4	**822** 940	. .
378	Cray Research X-MP/416	NASA/Marshall Space Flight Center USA /1988	Research Aerospace	4	**822** 940	. .
379	Cray Research X-MP/416	Swedish National Supercomputer Centre Linkoping Sweden /1991	Academic	4	**822** 940	. .
380	Convex C3880	CONVEX Dallas USA /1992	Vendor	8	**795** 960	. .

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N_{world}	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
381	Convex C3880	DKRZ Hamburg Germany /1993	Research Weather	8	**795** 960	. .
382	Convex C3880	Danish Meteorological Institute Copenhagen Denmark /1992	Research	8	**795** 960	. .
383	Convex C3880	Ford Dearborn USA /1992	Industry Automotive	8	**795** 960	. .
384	Convex C3880	NCSA Urbana-Champaign USA /1992	Academic	8	**795** 960	. .
385	Convex C3880	SICAN Hannover Germany /1993	Industry	8	**795** 960	. .
386	Convex C3880	UNOCAL USA /1992	Industry	8	**795** 960	. .
387	Siemens-Nixdorf VP400EX	KFK Karlsruhe Germany /1990	Research	1	**794** 1714	. .
388	Fujitsu VP-400E	NAL Japan /1987		1	**794** 1714	. .
389	NEC SX-3/1LR	Sumitomo Rubber Industries Japan /1992	Industry Chemistry	1	**780** 800	2304 112
390	MasPar MP-2208	Arizona State University USA /1993	Academic	8192	**766** 1200	9386 1374
391	Cray Research S-MP/MCP784	Canon USA / .	Industry	84	**742** 3360	. .
392	Cray Research S-MP/MCP784	Martin Marietta USA / .	Industry Defense	84	**742** 3360	. .
393	Cray Research S-MP/MCP784	Martin Marietta USA / .	Industry Defense	84	**742** 3360	. .
394	Cray Research S-MP/MCP784	Martin Marietta USA / .	Industry Defense	84	**742** 3360	. .
395	Cray Research S-MP/MCP784	Martin Marietta USA / .	Industry Defense	84	**742** 3360	. .
396	Cray Research S-MP/MCP784	Martin Marietta USA / .	Industry Defense	84	**742** 3360	. .
397	Cray Research S-MP/MCP784	Martin Marietta USA / .	Industry Defense	84	**742** 3360	. .
398	Cray Research CRAY-2s/2-128	Eli Lilly and Company USA /1990	Industry Chemistry	2	**741** 976	. .
399	Cray Research CRAY-2s/2-128	US Air Force/National Test Facility USA /1988	Classified	2	**741** 976	. .
400	Cray Research S-MP/MCP756	CNR-Napoli USA / .		56	**678** 2210	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
401	Cray Research S-MP/MCP256	Cray Research Eagan USA / .	Vendor	56	**678** 2210	. .
402	Cray Research S-MP/MCP756	Special Systems USA / .		56	**678** 2210	. .
403	Cray Research S-MP/MCP756	Special Systems USA / .		56	**678** 2210	. .
404	NEC SX-3/1L	Hino Motor Japan /1992	Industry Automotive	1	**670** 680	2048 128
405	NEC SX-3/1L	Kajima Construction Japan /1991	Industry	1	**670** 680	2048 128
406	NEC SX-3/1L	Komatsu MFG Japan /1991	Industry	1	**670** 680	2048 128
407	IBM 9076-001 SP1	Halliburton USA /1993	Academic	8	**664** 1000	10000 1662
408	IBM 9076-001 SP1	ITESM Mexico /1993	Academic	8	**664** 1000	10000 1662
409	IBM 9076-001 SP1	NCAR USA /1993	Research	8	**664** 1000	10000 1662
410	Thinking Machines CM-2/8k	Universitaet Wuppertal Wuppertal Germany /1990	Academic	256	**650** 1750	. .
411	Thinking Machines CM-2/8k	University of Parma Parma Italy / .	Academic	256	**650** 1750	. .
412	Intel iPSC/860	Fermi National Accelerator Laboratory Batavia USA / .	Research	32	**640** 1280	6000 2500
413	Intel iPSC/860	GSF Neuherberg Germany /1990	Research	32	**640** 1280	6000 2500
414	Intel iPSC/860	KFA Juelich Germany /1991	Research	32	**640** 1280	6000 2500
415	Intel iPSC/860	Universitaet Saarbruecken Saarbruecken Germany /1990	Academic	32	**640** 1280	6000 2500
416	Convex M3860/8	CIRA Capua Italy /1993		6	**615** 720	. .
417	Convex C3860	GRS (Gesellschaft fuer Reaktorsicherheit) Muenchen Germany /1993	Research	6	**615** 720	. .
418	Convex C3860	Josef Stefan Institut Ljubljana Slovenia /1993	Research	6	**615** 720	. .
419	Convex C3860	MIT Cambridge USA /1993	Research	6	**615** 720	. .
420	Convex C3860	Universitaet Tuebingen Tuebingen Germany /1992	Academic	6	**615** 720	. .

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Top500 Supercomputers - Worldwide

$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
421	Cray Research Y-MP4/264	AEA Technology Harwell UK /1993	Research Energy	2	**604** 666	. .
422	Cray Research Y-MP4E/264	AGIP Milano Italy /1993	Industry Geophysics	2	**604** 666	. .
423	Cray Research Y-MP2E/232	Agency for Defense Development Korea /1992	Classified	2	**604** 666	. .
424	Cray Research Y-MP8/2128	Air Force/Eglin Air Force Base USA /1990	Classified	2	**604** 666	. .
425	Cray Research Y-MP2E/232	Apple Computer Inc. USA /1991	Industry Electronics	2	**604** 666	. .
426	Cray Research Y-MP2E/264	Audi AG Ingolstadt Germany /1992	Industry Automotive	2	**604** 666	. .
427	Cray Research Y-MP2E/232	Bundesanstalt fuer Wasserbau Hamburg Germany /1992	Research Geophysics	2	**604** 666	. .
428	Cray Research Y-MP2E/232	CONOCO Inc. USA /1991	Industry Geophysics	2	**604** 666	. .
429	Cray Research Y-MP4E/264	CSIRO (Commonwealth Scientific) Carlton Australia / .	Research	2	**604** 666	. .
430	Cray Research Y-MP4E/232	Canon Sales Tokyo Japan /1992	Industry	2	**604** 666	. .
431	Cray Research Y-MP2E/232	Centro de Supercomputacion de Catalunya Barcelona Spain /1992	Academic	2	**604** 666	. .
432	Cray Research Y-MP2/232	Cray Research Eagan USA / .	Vendor	2	**604** 666	. .
433	Cray Research Y-MP8/21024	Cray Research Eagan USA / .	Vendor	2	**604** 666	. .
434	Cray Research Y-MP2/232	DLR Oberpfaffenhofen Germany /1990	Research	2	**604** 666	. .
435	Cray Research Y-MP2E/232	Daihatsu Motor Company Japan /1992	Industry Automotive	2	**604** 666	. .
436	Cray Research Y-MP2E/264	Disaster Prevention Research Japan /1992	Research	2	**604** 666	. .
437	Cray Research Y-MP2E/232	EDS/ Adam Opel AG Ruesselsheim Germany /1992	Industry auot	2	**604** 666	. .
438	Cray Research Y-MP2E/232	ELF Aquitaine Pau France /1992	Industry Geophysics	2	**604** 666	. .
439	Cray Research Y-MP4E/264	Ecole Polytechnique Federale de Lausanne Lausanne Switzerland/1992	Academic	2	**604** 666	. .
440	Cray Research Y-MP4/264	Electricite de France Clamart France /1992	Industry Energy	2	**604** 666	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
441	Cray Research Y-MP4/216	Fiat Torino Italy /1991	Industry Automotive	2	**604** 666	. .
442	Cray Research Y-MP2E/232	Grumman Aerospace Corporation USA /1991	Industry Aerospace	2	**604** 666	. .
443	Cray Research Y-MP2E/232	Institute Mediterraneen de Technologie Marseille France /1991	Academic	2	**604** 666	. .
444	Cray Research Y-MP2E/232	Isuzu Motor Tokyo Japan /1991	Industry Automotive	2	**604** 666	. .
445	Cray Research Y-MP2E/264	Kyoto University, Chemical Research Kyoto Japan /1992	Academic	2	**604** 666	. .
446	Cray Research Y-MP8/264	Los Alamos National Laboratory Los Alamos USA /1990	Research Energy	2	**604** 666	. .
447	Cray Research Y-MP2E/264	Marion Merrell Dow Inc USA /1992	Industry Chemistry	2	**604** 666	. .
448	Cray Research Y-MP2E/232	Mazda Motor Corporation Yokohama Japan /1991	Industry Automotive	2	**604** 666	. .
449	Cray Research Y-MP2E/216	Mazda Motor Corporation Yokohama Japan /1992	Industry Automotive	2	**604** 666	. .
450	Cray Research Y-MP2/216	NBS USA /1991	Research Weather	2	**604** 666	. .
451	Cray Research Y-MP2	National Center for Atmospheric Research Boulder USA / .	Research Weather	2	**604** 666	. .
452	Cray Research Y-MP2E/216	Navy POPS Supercomputing Facility Saint Louis USA / .	Research Weather	2	**604** 666	. .
453	Cray Research Y-MP8/232	Nippon Denso Japan /1991		2	**604** 666	. .
454	Cray Research Y-MP2E/232	Pennsylvania State University USA /1993	Academic	2	**604** 666	. .
455	Cray Research Y-MP2/232	Phillips Petroleum Company USA /1992	Industry Geophysics	2	**604** 666	. .
456	Cray Research Y-MP4/216	Rolls-Royce PLC UK /1990	Industry Aerospace	2	**604** 666	. .
457	Cray Research Y-MP2/264	Sandia National Labs Livermore USA / .	Research Energy	2	**604** 666	. .
458	Cray Research Y-MP2E/264	TEXACO USA /1991	Industry Geophysics	2	**604** 666	. .
459	Cray Research Y-MP2/216	Texas A M University USA /1993	Academic	2	**604** 666	. .
460	Cray Research Y-MP2E/264	The Scripps Research Institute USA /1992	Industry Chemistry	2	**604** 666	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
461	Cray Research Y-MP2E/232	UFRGS/Uni. Federal do Rio Grande do Sul Brazil /1992	Academic	2	**604** 666	. .
462	Cray Research Y-MP2E/232	US Navy/Fleet Numerical Oceanography Center Monterey USA /1992	Research Weather	2	**604** 666	. .
463	Cray Research Y-MP2E/264	Universitaet Stuttgart Stuttgart Germany /1993	Academic	2	**604** 666	. .
464	Cray Research Y-MP2/216	University of Nevada at Las Vegas USA /1990	Academic	2	**604** 666	. .
465	Cray Research Y-MP2/232	University of Rochester - Laboratory for Laser E. USA /1991	Academic	2	**604** 666	. .
466	Cray Research Y-MP2E/264	debis Muenchen Germany /1993	Industry	2	**604** 666	. .
467	Fujitsu AP1000/128	Australian National University Canberra Australia / .	Academic	128	**566** 710	12800 1100
468	Siemens-Nixdorf S100/10	GEOVOR Traben Trabach Germany /1991	Industry Weather	1	**556** 625	. .
469	Siemens-Nixdorf S100/10	Technische Universitaet Wien Wien Austria /1992	Academic	1	**556** 625	. .
470	Siemens-Nixdorf S100/10	Universitaet Hamburg Germany /1992	Academic	1	**556** 625	. .
471	KSR KSR1-20	AWI (Alfred Wegener Institut) Bremerhaven Germany /1993	Research	20	**550** 800	. .
472	Cray Research Y-MP M92/2256	AT T Bell Laboratories USA /1992	Industry Electronics	2	**550** 666	. .
473	Cray Research Y-MP M92/21024	Minnesota Supercomputer Center USA /1992	Academic	2	**550** 666	. .
474	IBM 3090-600J	Centro de Supercomputacion de Catalunya Barcelona Spain / .	Academic	6	**540** 828	. .
475	IBM 3090-600J	GSI Darmstadt Germany /1987	Academic	6	**540** 828	. .
476	IBM 3090-600J	TU Braunschweig Braunschweig Germany / .	Academic	6	**540** 828	. .
477	IBM 3090-600E	University of Leuven Belgium / .	Academic	6	**540** 828	. .
478	IBM 3090-600S	Utah Supercomputing Institute USA / .	Academic	6	**540** 828	. .
479	IBM ES 9000-720	DESY Hamburg Germany / .	Research	6	**540** 828	. .
480	IBM ES 9000-720	SARA/IC3A (Stichting Academisch Rekencentrum) Amsterdam Netherlands/1990	Academic	6	**540** 828	. .

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$\mathbf{N}_{\text{world}}$	Manufacturer Computer	Installation Site Location/Year	Field of Application	# Proc.	**Rmax** R_{peak} [Mflop/s]	N_{max} $N_{1/2}$
481	Convex C3850	NASA/Johnson Space Center Houston USA /1992	Research	5	**522** 600	. .
482	Cray Research S-MP/MCP728	CWI/Centrum voor Wiskunde en Informatica Amsterdam Netherlands/1992	Research	28	**508** 1120	. .
483	Parsytec GCel 3/512	Athens HPC Lab, Athen Greece /1993	Research	512	**485** 770	. .
484	Parsytec GCel 3/512	SARA (Stichting Academisch Rekencentrum) Amsterdam Netherlands/1993	Academic	512	**485** 770	. .
485	MasPar MP-1216	AT T USA /1991	Industry Electronics	16384	**473** 550	11264 1280
486	MasPar MP-1216	Bellcore USA /1990	Industry	16384	**473** 550	11264 1280
487	MasPar MP-1216	Chevron La Habra USA / .	Industry Geophysics	16384	**473** 550	11264 1280
488	MasPar MP-1216	Harvard University Cambridge USA / .	Academic	16384	**473** 550	11264 1280
489	MasPar MP-1216	Iowa State University USA /1990	Academic	16384	**473** 550	11264 1280
490	MasPar MP-1216	NASA/Goddard Space Flight Center Greenbelt USA /1990	Research Aerospace	16384	**473** 550	11264 1280
491	MasPar MP-1216	Purdue University West Laffayette USA /1991	Academic	16384	**473** 550	11264 1280
492	dec DECmpp SX 100	Thompson LER Rennes France / .	Industry Electronics	16384	**473** 550	11264 1280
493	MasPar MP-1216	Universitaet Karlsruhe Karlsruhe Germany /1990	Academic	16384	**473** 550	11264 1280
494	MasPar MP-1216	Universitaet Stuttgart Stuttgart Germany /1991	Academic	16384	**473** 550	11264 1280
495	Fujitsu VP-200E	MOE Nobeyama Observatory Japan /1989	Research	1	**472** 857	. .
496	Fujitsu VP-200E	MOE Space Science Research Japan /1987	Research	1	**472** 857	. .
497	Fujitsu VP-200E	Nat. Space Observatory Japan /1986	Research	1	**472** 857	. .
498	Fujitsu VP-200E	National Fusion Research Japan /1988	Research	1	**472** 857	. .
499	Siemens-Nixdorf VP200EX	Universitaet Bremen Germany /1991	Academic	1	**472** 857	. .
500	Siemens-Nixdorf VP200EX	Universitaet Dresden Dresden Germany /1991	Academic	1	**472** 857	. .

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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. A comprehensive report of more than 200 pages, based on the data of the TOP500 list, will be published. 1993 [4]

Table 2: Number of Systems Installed

TOP500 Statistics — Number of Systems Installed						
Manufacturer	Australia	Europe	Japan	USA	Others	Total
Convex		7		6		13
Cray Research	2	56	18	117	7	200
DEC		2				2
Fujitsu	3	2	26	3		34
Hitachi			25			25
IBM		7		8	1	16
Intel	1	11	2	33		47
KSR		8	2	16		26
MasPar		2		10		12
Meiko		3				3
nCube			1	2		3
NEC		4	24	2	1	31
Parsytec		4				4
SNI		14				14
TMC	4	13	8	44	1	70
Total	10	133	106	241	10	**500**

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

TOP500 Statistics — Installed R_{max} [Gflop/s]						
Manufacturer	Australia	Europe	Japan	USA	Others	Total
Convex		4.8		4.3		9.1
Cray Research	1.5	75.7	18.6	326.9	20.0	442.7
DEC		2.1				2.1
Fujitsu	2.3	4.2	176.7	5.3		188.5
Hitachi			40.2			40.2
IBM		4.7		14.5	0.7	19.9
Intel	1.5	17.0	3.5	121.5		143.5
KSR		7.8	3.7	33.7		45.2
MasPar		1.0		7.3		8.3
Meiko		3.1			0.4	3.5
nCube			1.0	2.9		3.9
NEC		17.1	90.5	25.0	2.9	135.5
Parsytec		2.9				2.9
SNI		23.7				23.7
TMC	8.9	30.3	18.8	341.5	1.0	400.5
Total	14.2	194.4	353.0	882.9	25.0	**1469.5**

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

TOP500 Statistics — Installed R_{peak} [Gflop/s]						
Manufacturer	Australia	Europe	Japan	USA	Others	Total
Convex		5.8		5.2		11.0
Cray Research	1.7	89.8	21.9	401.7	22.6	537.7
DEC		3.0				3.0
Fujitsu	2.7	5.0	302.4	6.3		316.4
Hitachi			84.5			84.5
IBM		7.6		36.2	1.0	44.8
Intel	4.2	35.9	7.5	282.9		331.5
KSR		11.0	5.1	59.5		75.6
MasPar		1.1		9.9		11.0
Meiko		5.5				5.5
nCube			1.2	3.6		4.8
NEC		18.8	102.8	27.5	3.2	152.3
Parsytec		4.6				4.6
SNI		31.3				31.3
TMC	19.9	67.1	41.8	745.4	2.0	876.2
Total	28.5	286.5	567.2	1579.2	28.8	**2490.2**

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