



# Presentation of the 19th List

Hans Werner Meuer, University of Mannheim

Erich Strohmaier, NERSC/LBNL

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International Supercomputer Conference ISC2002

Heidelberg, June 20-22, 2002

Opening Session, June 20, 11:00 - 13:00

# TOP500

- Listing of the 500 most powerful Computers in the World
- Yardstick:  $R_{\max}$  from Linpack

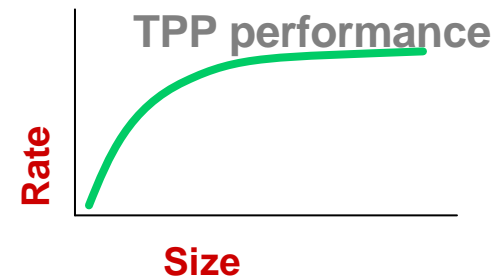
$$Ax=b, \text{ dense problem}$$

- Updated twice a year:

ISC'xy in Germany, June xy

SC'xy in USA, November xy

- All data available from [www.top500.org](http://www.top500.org)



# IPACS



( Integrated Performance Analysis of Computer Systems )

- ? BMBF project to develop more realistic benchmarks for distributed computer systems
- ? Project Partners: ITWM, Pallas, T-Systems, Universities of Mannheim and Rostock
- ? cooperation with LBNL/NERSC
- ? Some goals of IPACS:
  - Development & propagation of scalable, portable and realistic benchmarks
  - Prediction of performance of commercial codes
  - Mechanisms for the automatic installation and execution

More Information will be published at [www.ipacs-benchmark.org](http://www.ipacs-benchmark.org) very soon!

# TOP500 Status

- 1. List in June 1993
- 19. List on June 20, 2002, at ISC2002 in Heidelberg
- 20. List on Nov. 16, 2002 , at SC2002 in Baltimore
- 21. List on June 26, 2003, at ISC2003 in Heidelberg
- Accepted by users and manufacturers

TOP500



# TOP500 list - Data shown

- 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
- Customer Segment Academic, Research, Industry, Vendor, Class.
- # Processors Number of processors
- $R_{\max}$  Maxmimal LINPACK performance achieved
- $R_{\text{peak}}$  Theoretical peak performance
- $N_{\max}$  Problemsize for achieving  $R_{\max}$
- $N_{1/2}$  Problemsize for achieving half of  $R_{\max}$
- $N_{\text{world}}$  **Position within the TOP500 ranking**

# TOP10

Rank	Manufacturer	Computer	$R_{\max}$ [TF/s]	Installation Site	Country	Year	Area of Installation	# Proc
1	NEC	Earth-Simulator	35.86	Earth Simulator Center	Japan	2002	Research	5120
2	IBM	ASCI White SP Power3	7.23	Lawrence Livermore National Laboratory	USA	2000	Research	8192
3	HP	AlphaServer SC ES45 1 GHz	4.46	Pittsburgh Supercomputing Center	USA	2001	Academic	3016
4	HP	AlphaServer SC ES45 1 GHz	3.98	Commissariat a l'Energie Atomique (CEA)	France	2001	Research	2560
5	IBM	SP Power3 375 MHz	3.05	NERSC/LBNL	USA	2001	Research	3328
6	HP	AlphaServer SC ES45 1 GHz	2.92	Los Alamos National Laboratory	USA	2002	Research	2048
7	Intel	ASCI Red	2.38	Sandia National Laboratory	USA	1999	Research	9632
8	IBM	pSeries 690 1.3 GHz	2.31	Oak Ridge National Laboratory	USA	2002	Research	864
9	IBM	ASCI Blue Pacific SST, IBM SP 604e	2.14	Lawrence Livermore National Laboratory	USA	1999	Research	5808
10	IBM	pSeries 690 1.3 Ghz	2.00	IBM/US Army Reseach Lab (ARL)	USA	2002	Vendor	768

# TOP500 Certificate

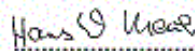
The Earth Simulator, manufactured by NEC at the  
Earth Simulator Center, Yokohama, Japan

is ranked

**No. 1**

among the worlds' TOP500 Supercomputers with  
**35.86 TFlop/s Linpack Performance**  
on the 19th TOP500 list published at the ISC2002 Conference in Heidelberg, Germany, June 20, 2002.

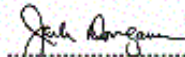
Congratulations from The TOP500 Editors



Hans Meuer  
University of Mannheim



Erich Strohmaier  
NEC/SC/Beihoku Lab



Jack Dongarra  
University of Tennessee

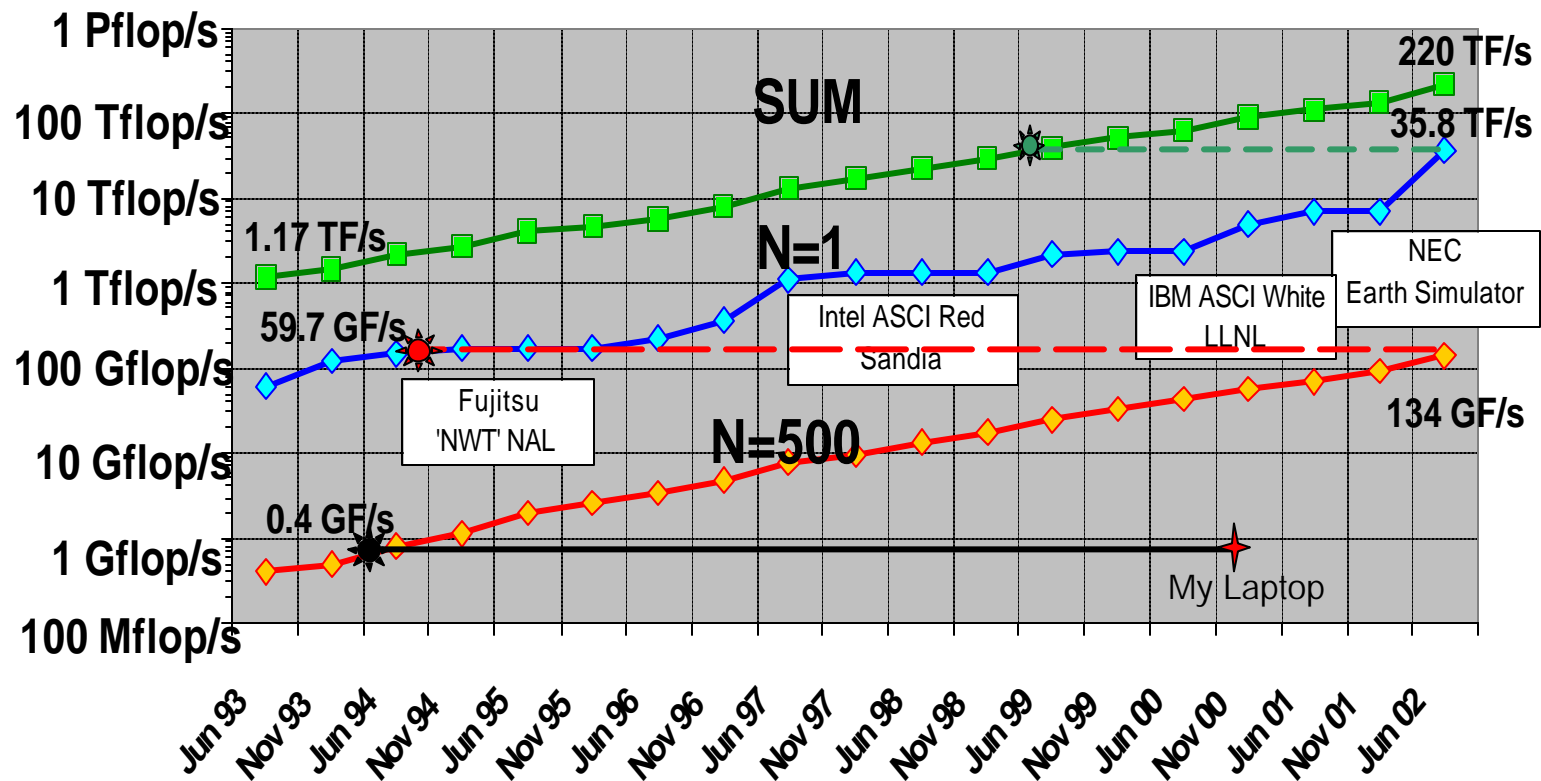


Horst Simon  
NEC/SC/Beihoku Lab

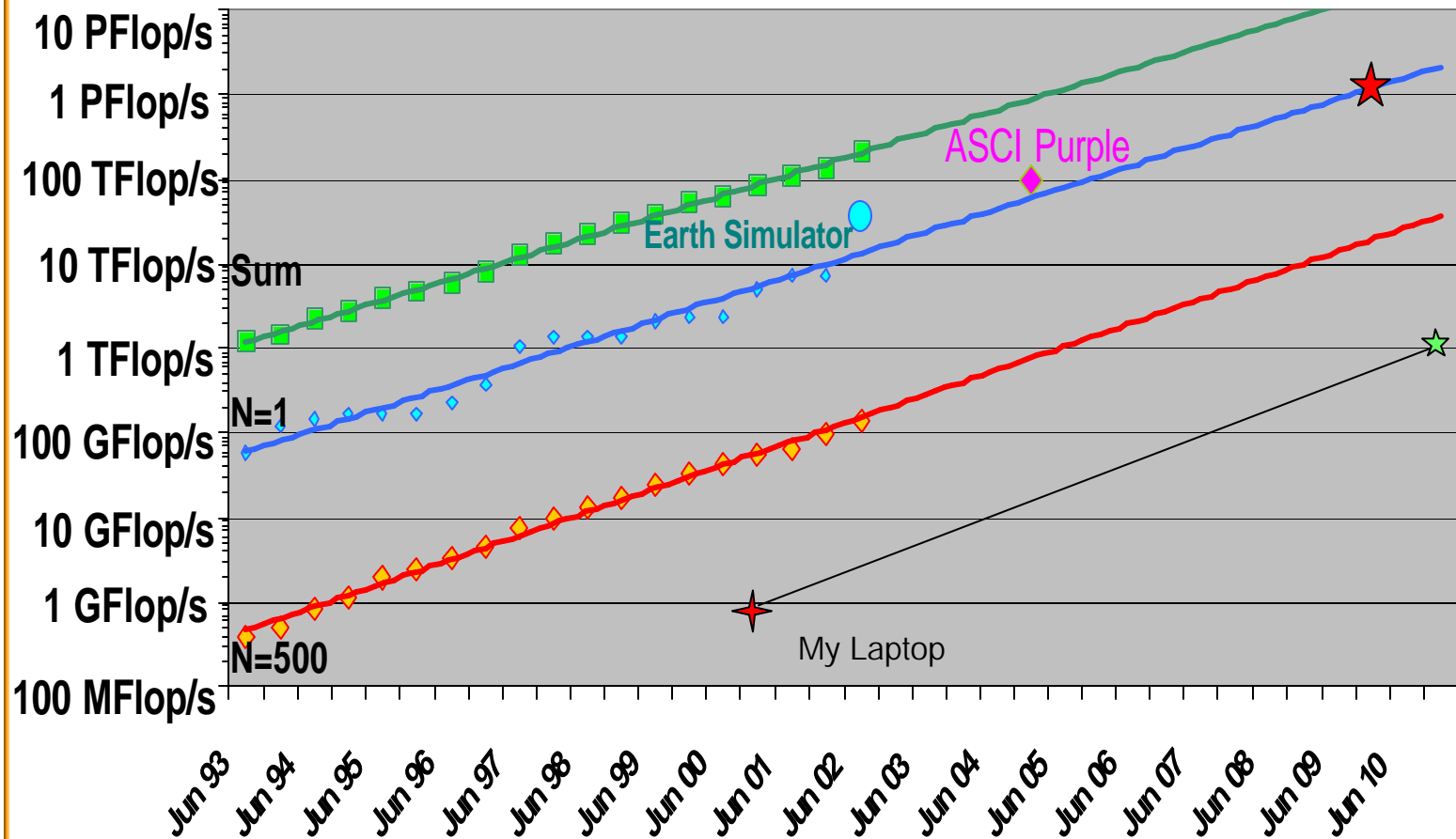
**TOP500**



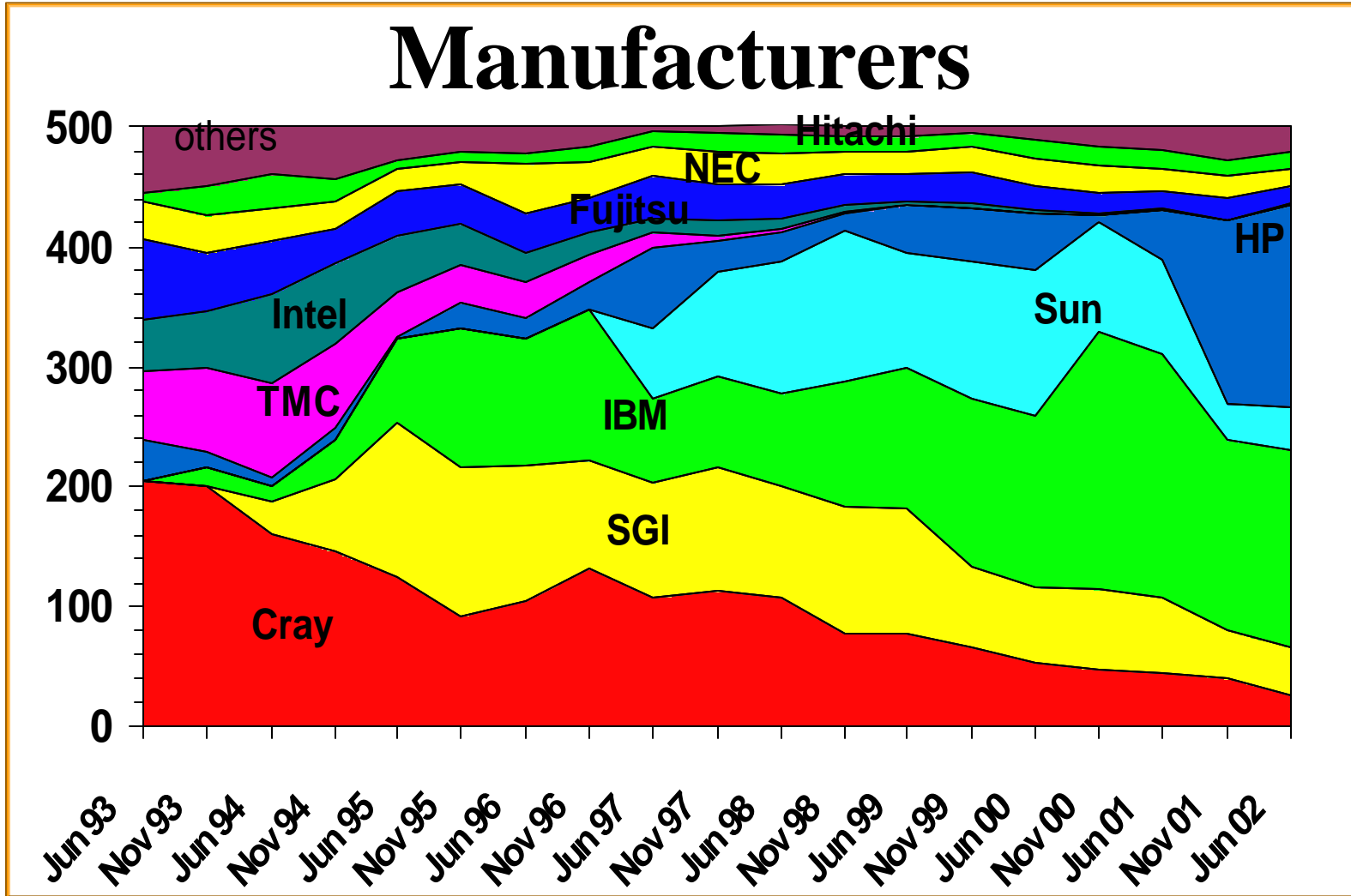
# TOP500 - Performance



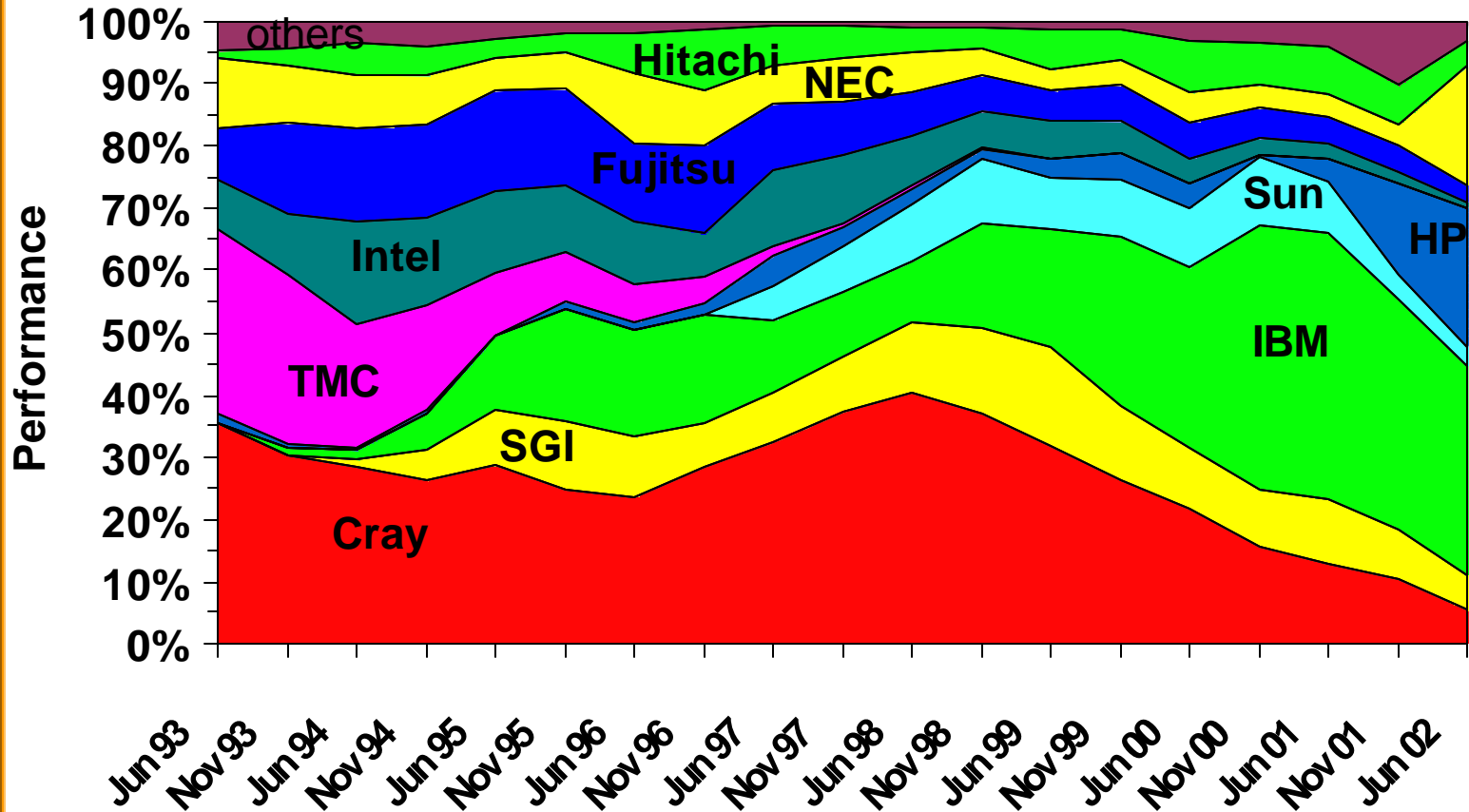
# Performance Extrapolation



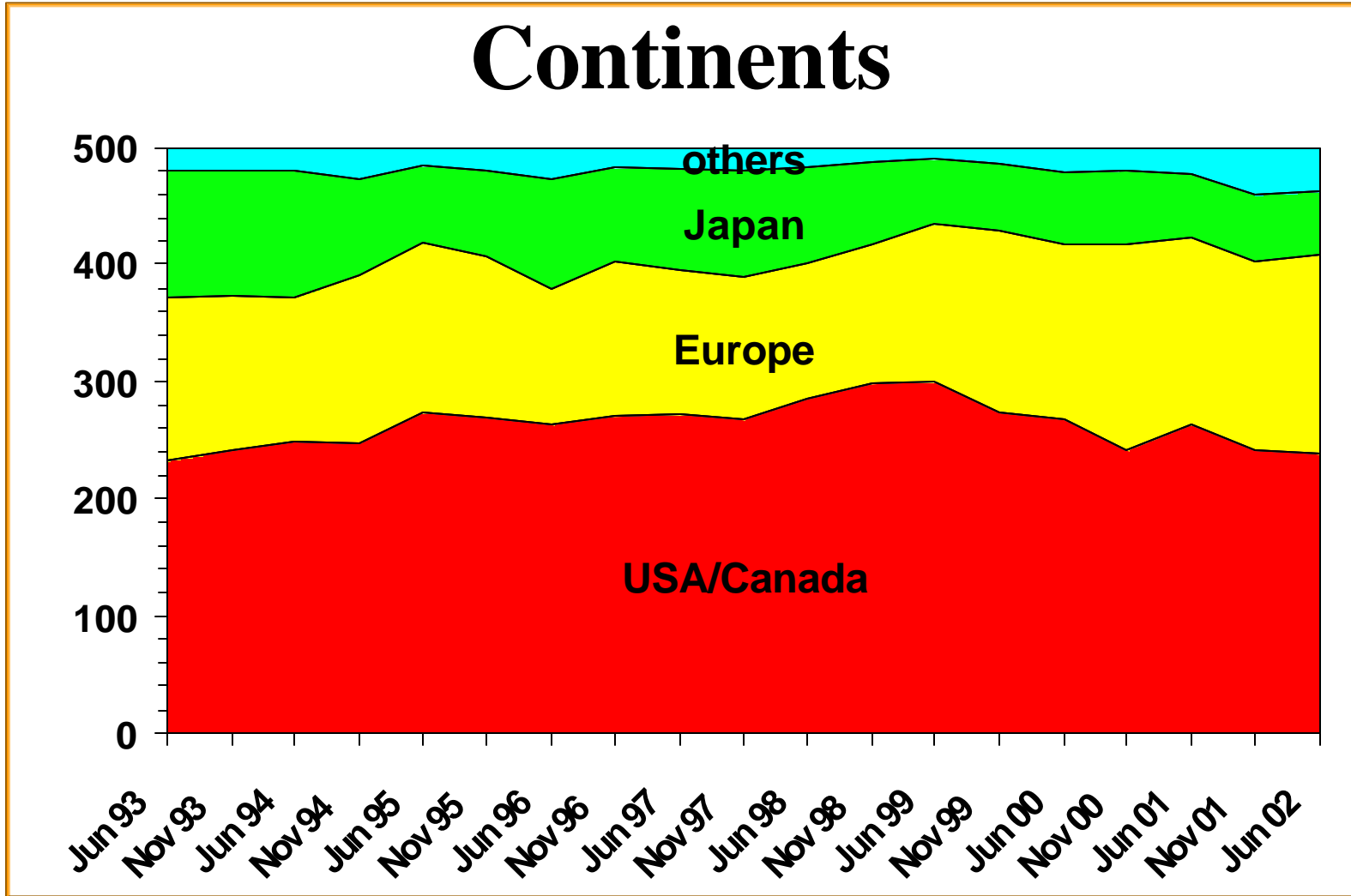
# Manufacturers



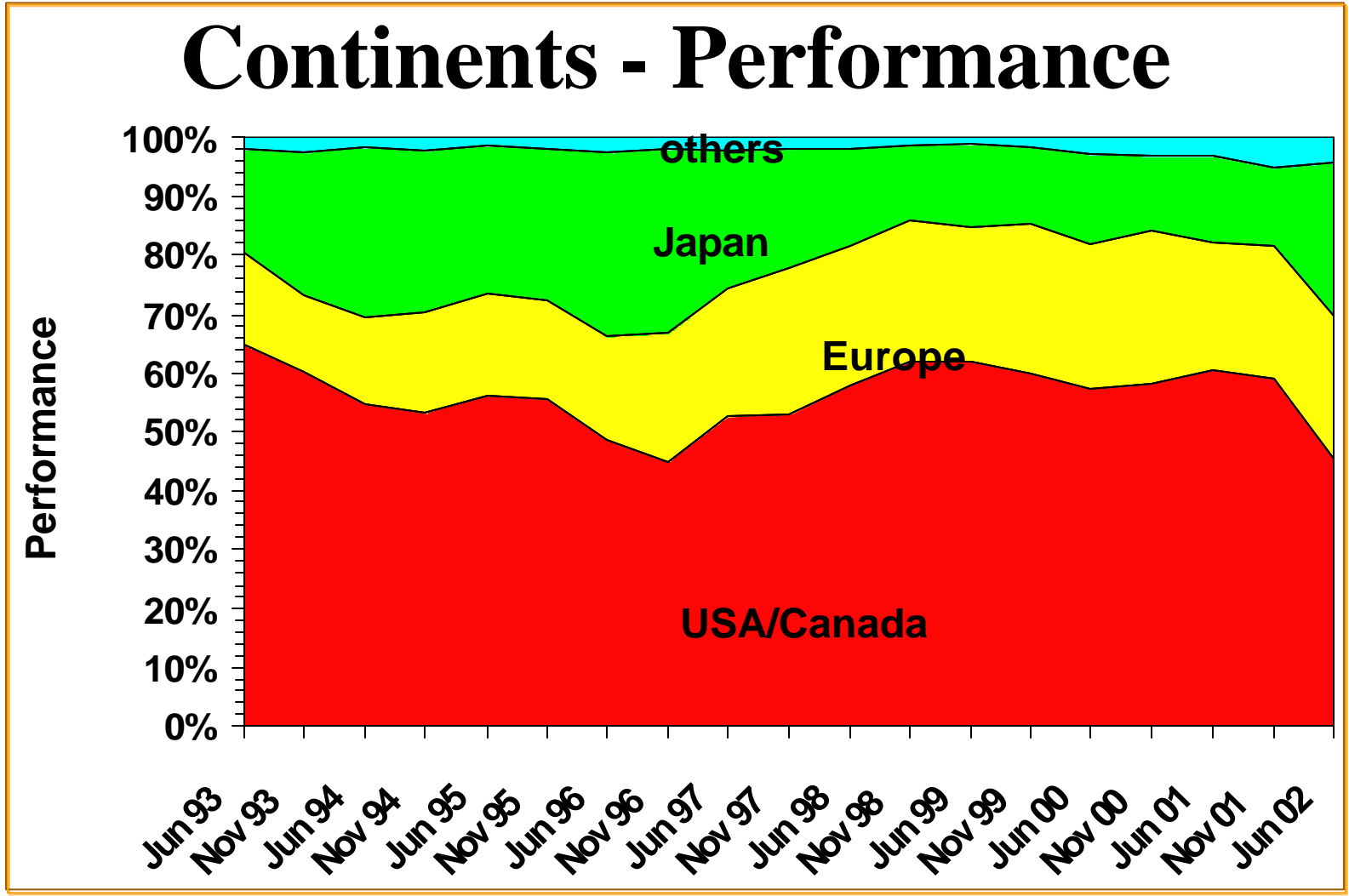
# Manufacturers



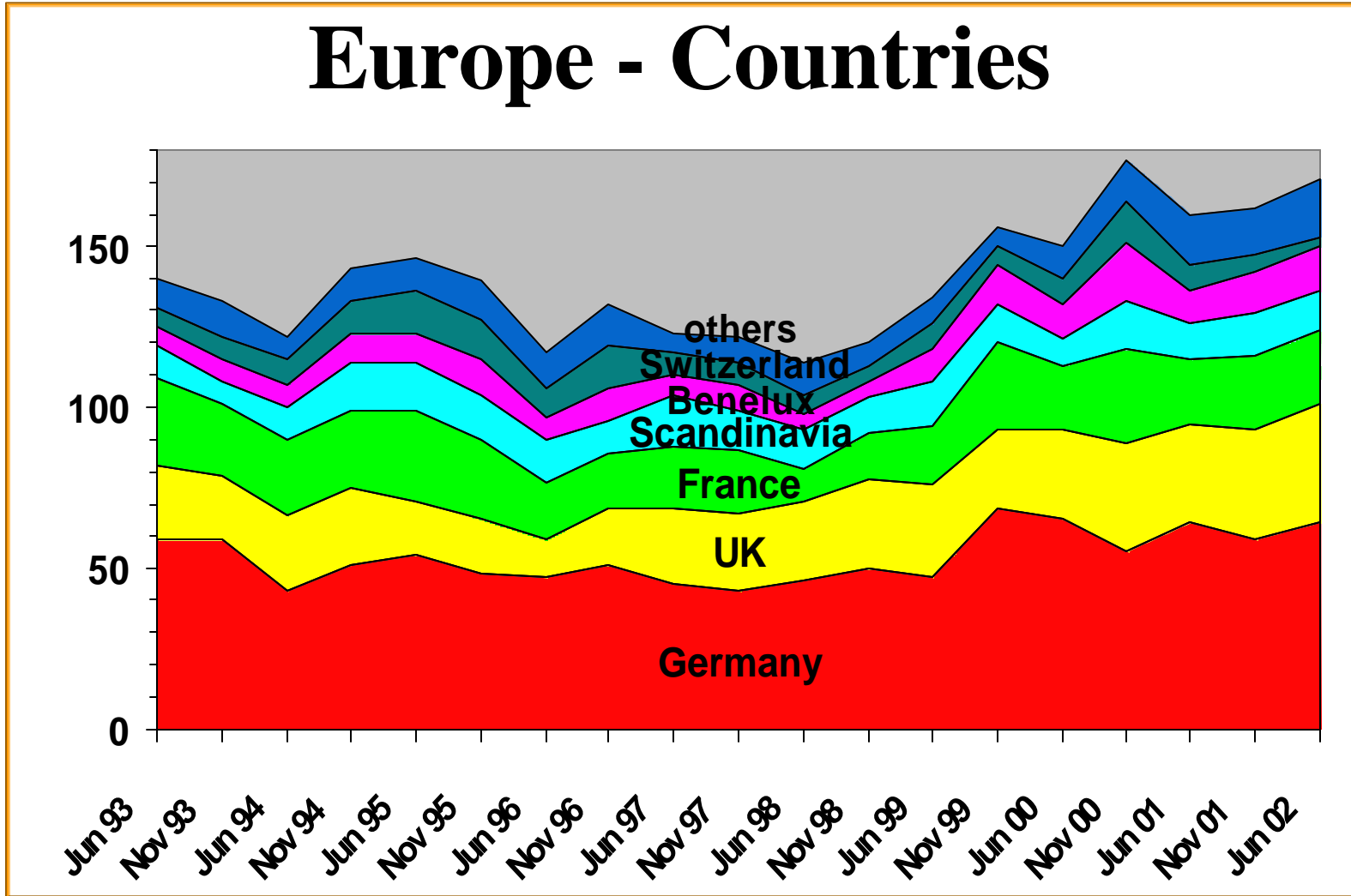
# Continents



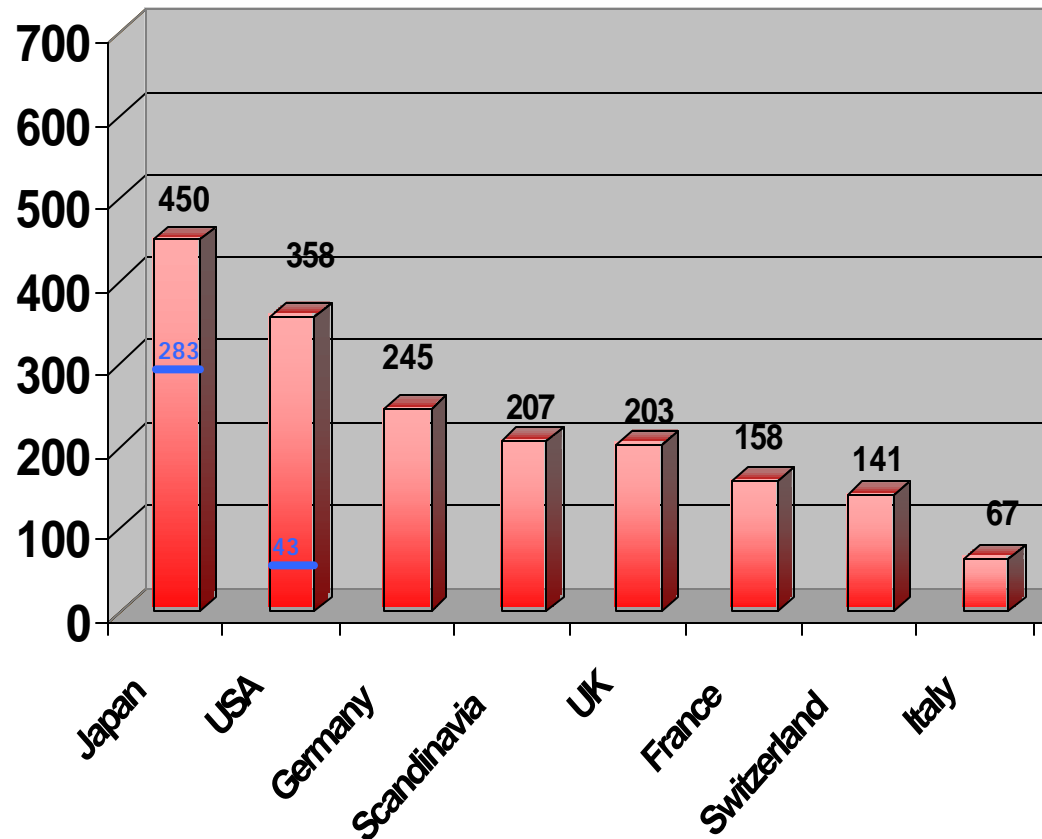
# Continents - Performance



# Europe - Countries

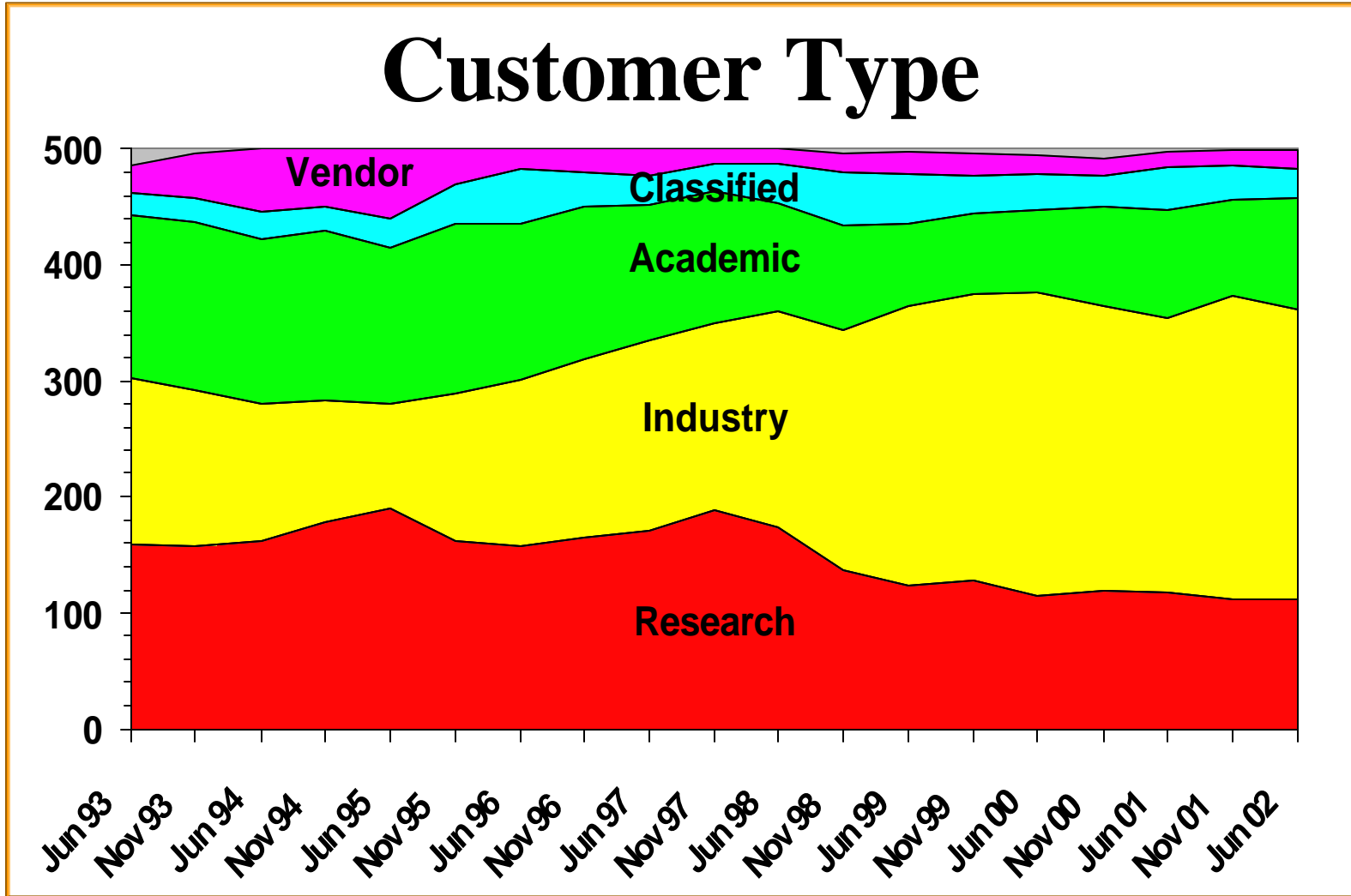


# Kflops per Inhabitant

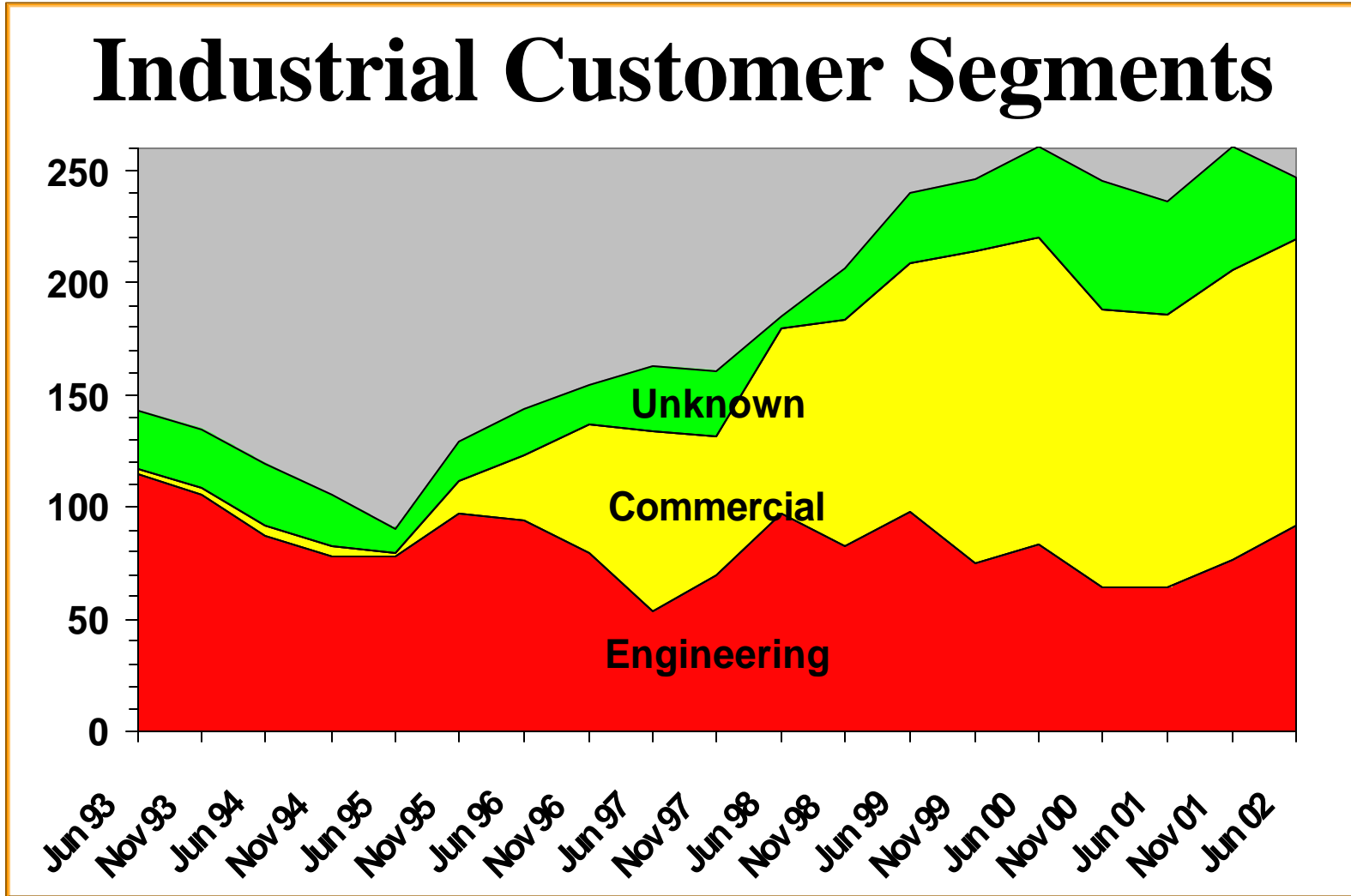




# Customer Type



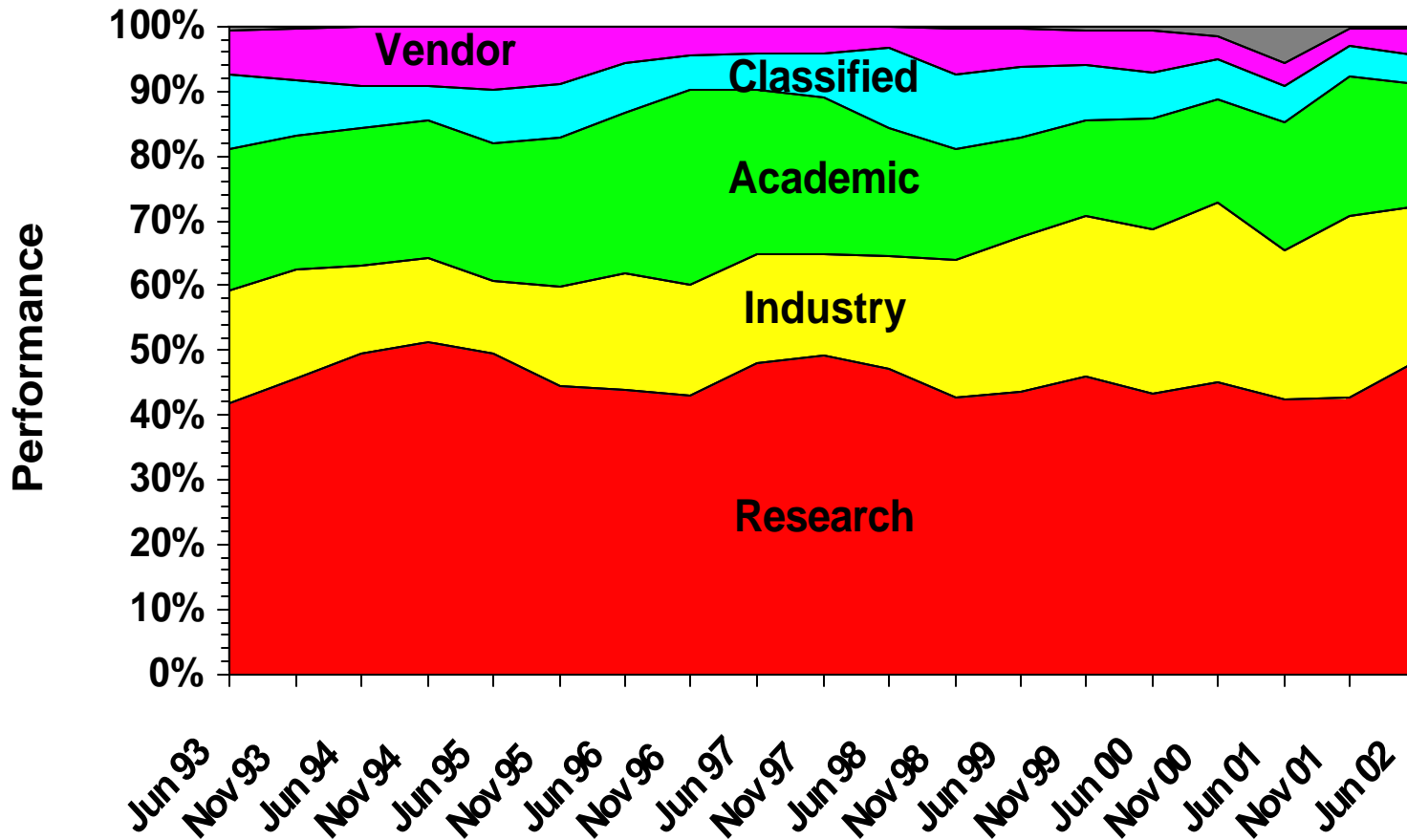
# Industrial Customer Segments



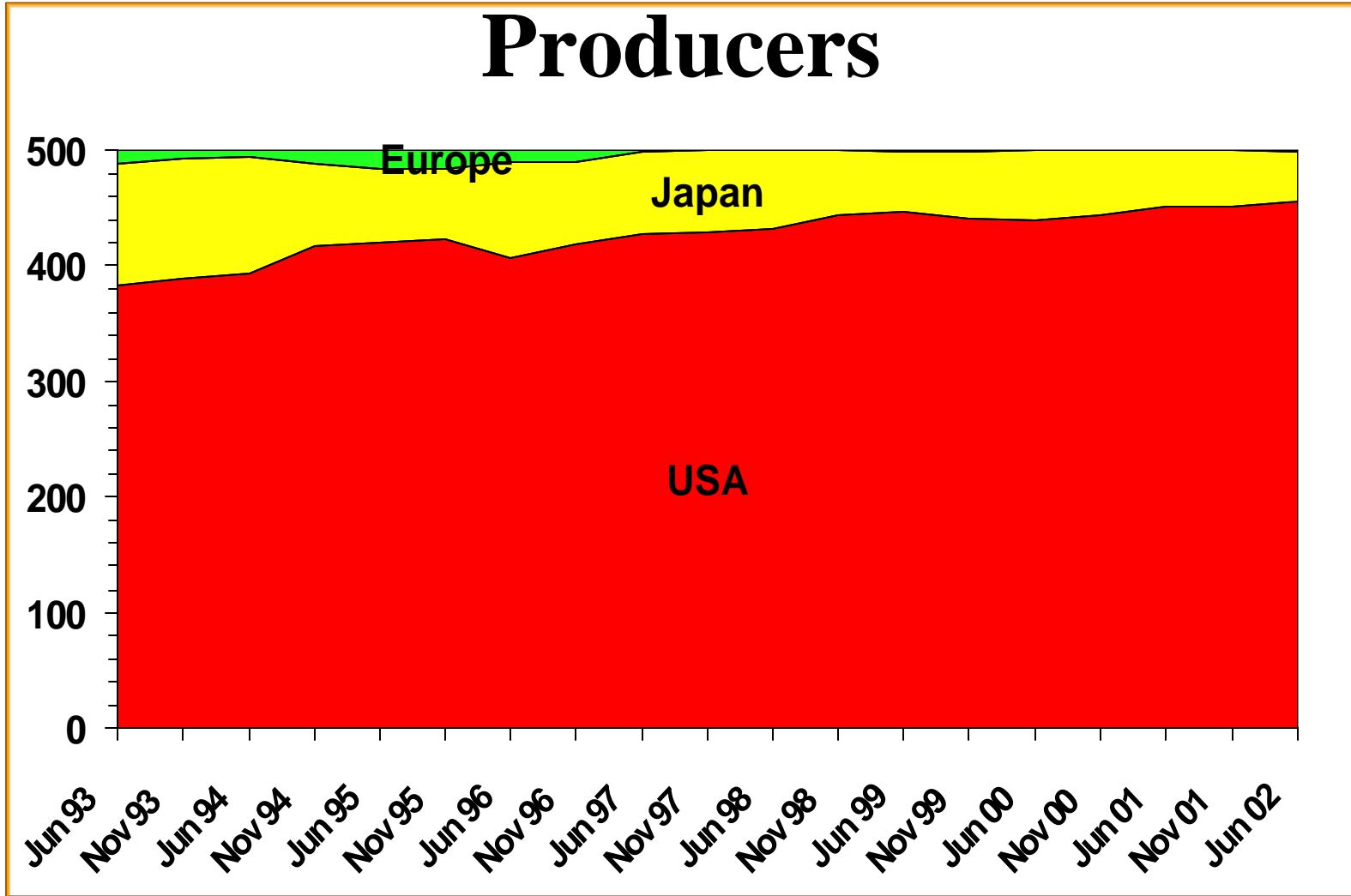
# Excerpt from TOP500

Rank	Manufacturer	Computer	Rmax [GF/s]	Installation Site	Country	Area	# Proc
	...	...	...	...	...		...
40	IBM	SP Power3	795	Charles Schwab	USA	Finance	768
66	IBM	SP Power3	594	Sprint PCS	USA	Telecom	320
67	IBM	SP Power4	555	EDS General Motors	USA	Automotive	224
73	IBM	SP Power3	546	State Farm	USA	Database	520
125	IBM	Netfinity P3 Ethernet Cluster	366	WesternGeco	UK	Geophysics	1280
127	Hewlett-Packard	SuperDome HyperPlex	361	Centrica Plc	UK	Energy	196
...	...	...	...	...	...		...

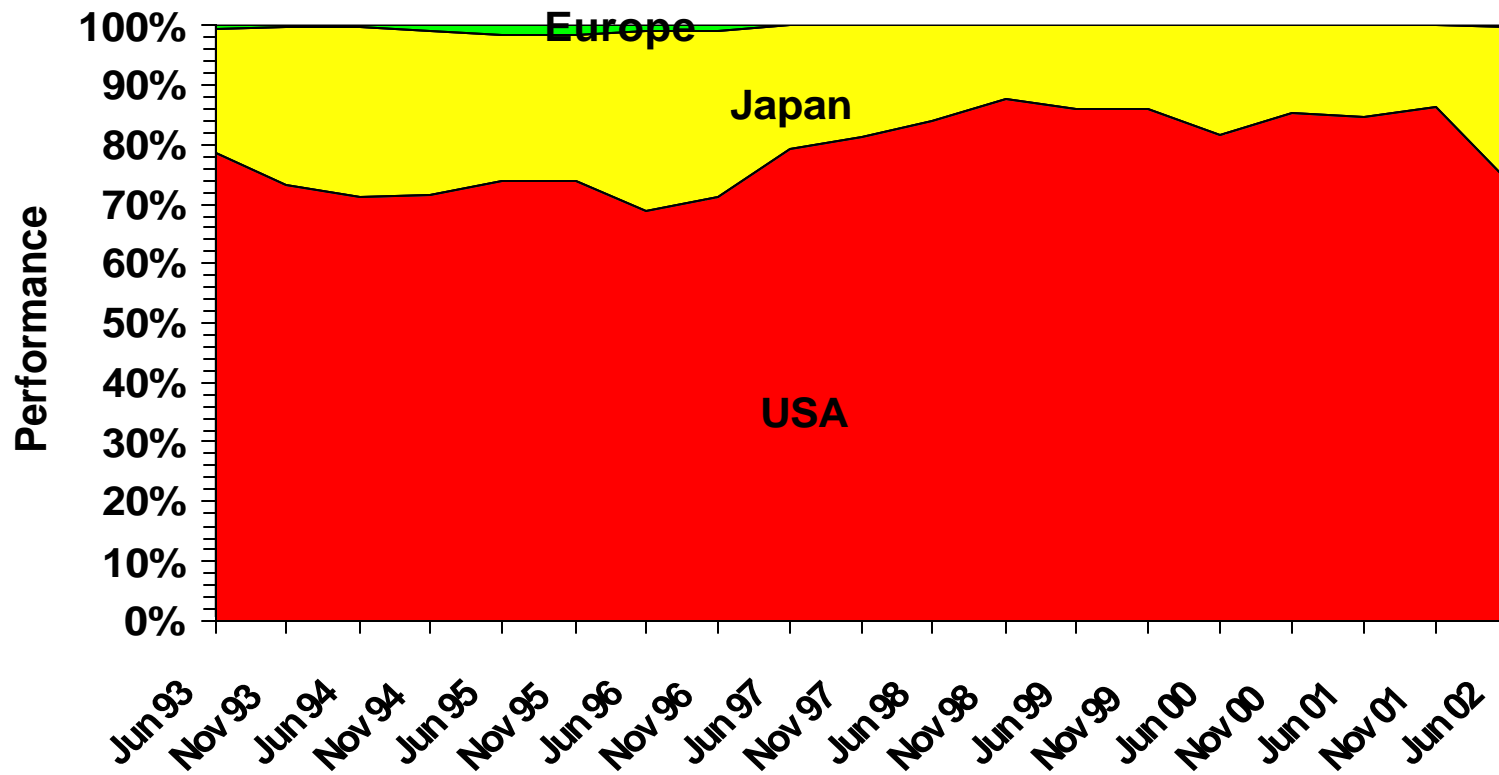
# Customer Types - Performance



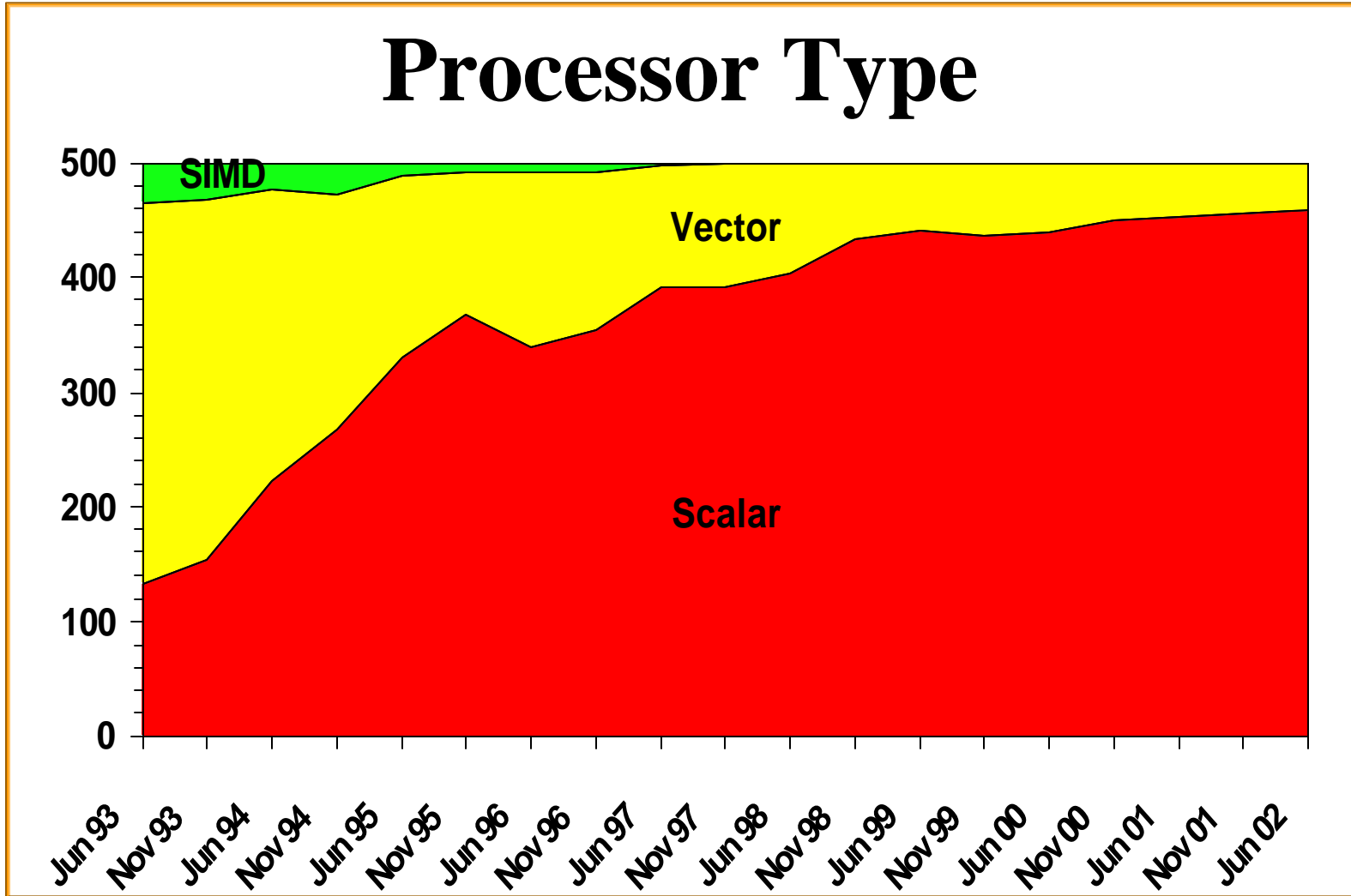
# Producers



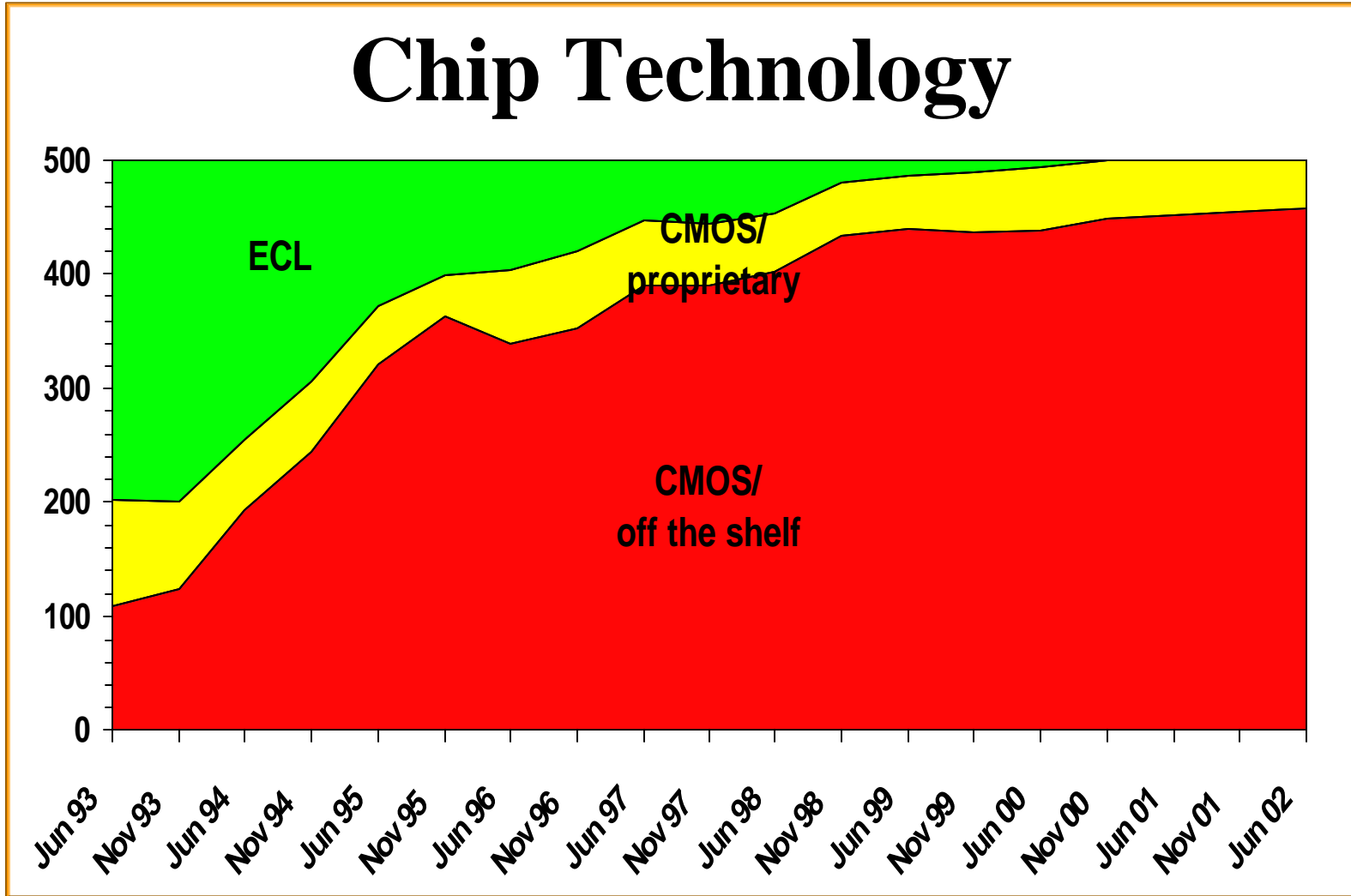
# Producers - Performance



# Processor Type

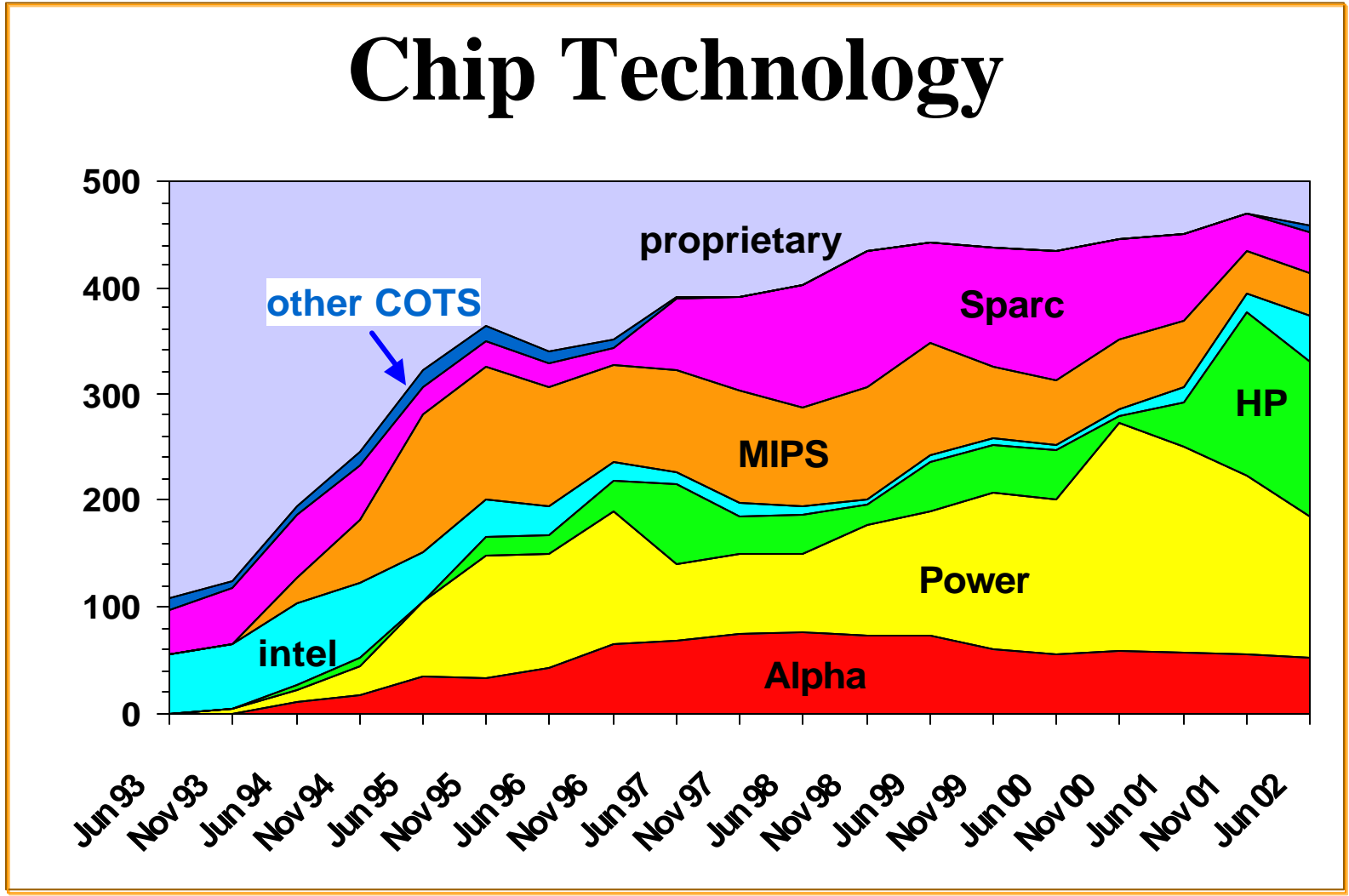


# Chip Technology

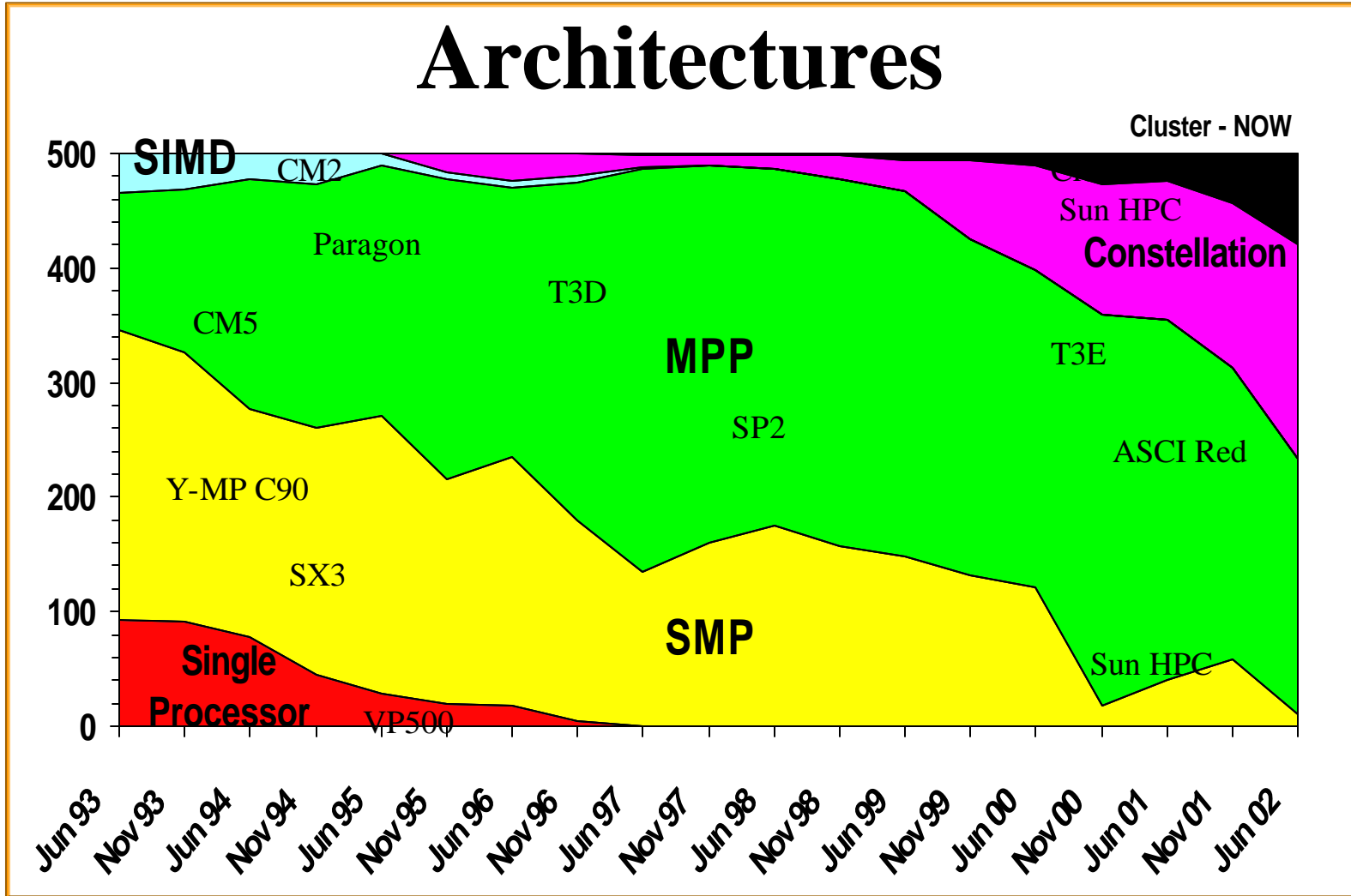




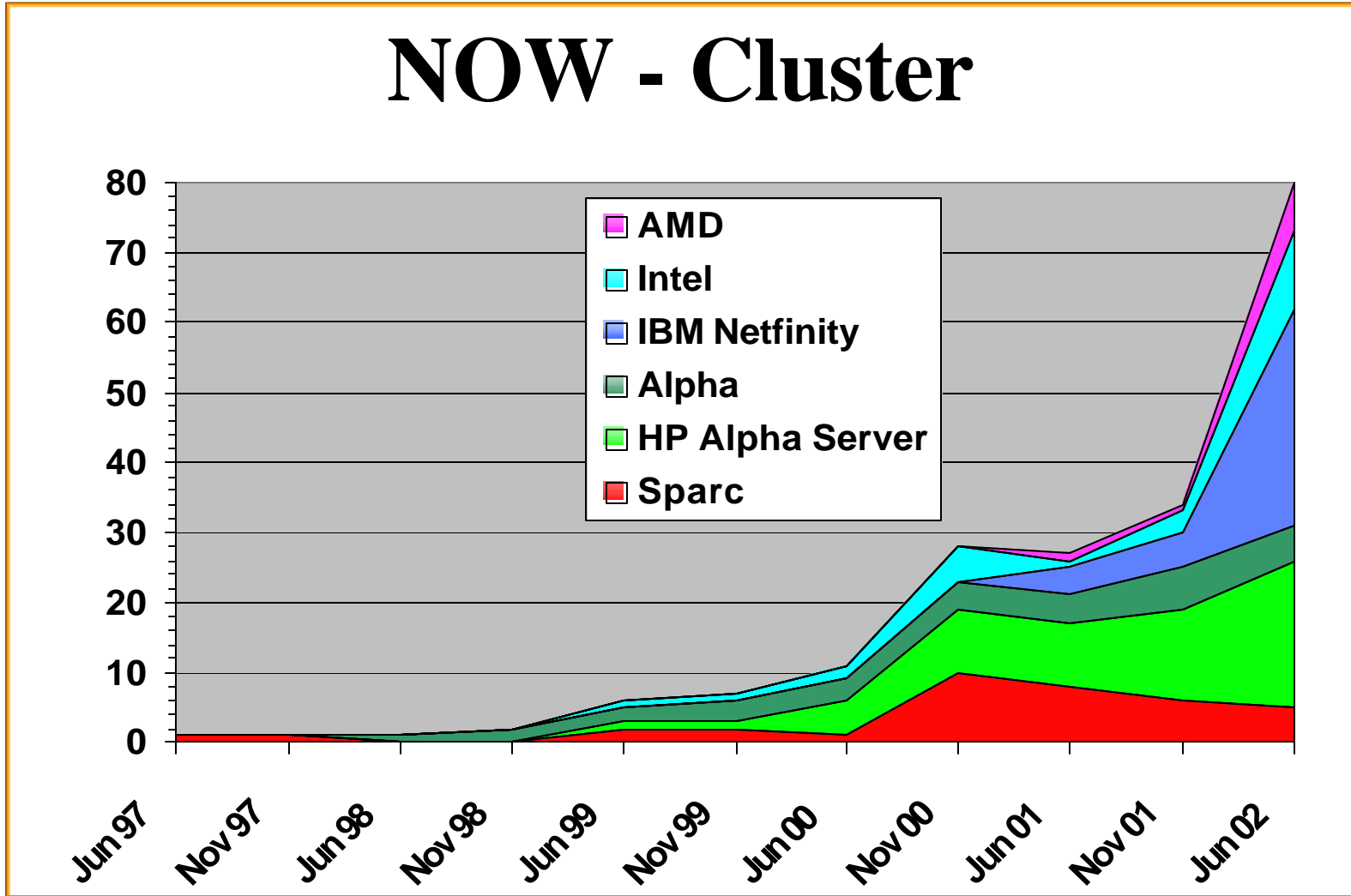
# Chip Technology



# Architectures



# NOW - Cluster



**TOP500 Supercomputer Sites - Netscape**  
 File Edit View Go Communicator Help  
 Location: http://www.top500.org/

Home About Current List Archive Database In Focus Contact

**TOP500 Supercomputer Sites**

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. The TOP500 list has been updated twice a year since June 1993. Here you can get information about all published lists.

Presented by:  
 • University of Mannheim  
 • University of Tennessee

Submit your site now!

June 19-22, 2002  
 Heidelberg

Search for:  Go

**Feature: 19th List and ISC2002 in Heidelberg**

- ISC2002 Highlights
  - ISC2002 Keynote Address by Monika Henzinger, Director of Research, Google Inc. : "**Indexing the Web- a Challenge for Supercomputing**"
  - Presentation of the **19th TOP500 Supercomputer List** by Hans Meuer, Uni Mannheim/ Jack Dongarra, UTK, and Erich Strohmaier, NERSC
  - **Grid Computing:** Status in Europe and in USA / Numerical Libraries and the Grid by Wolfgang Gentsch, Sun Microsystems / Ian Foster, University of Chicago, Domenico Laforenza, CNUCE, and Jack Dongarra, UTK
  - Panel Discussion Innovative "**HPC - Applications: Challenge for Software?**" Moderator: Wolfgang Nagel, TU Dresden
  - The most powerful "**Supercomputer Centers in Europe and the World**" by Christian Bischof, RWTH Aachen, Dona Crawford, LLNL, Alexander Reinefeld, ZIB Berlin, Keiji Tani, Earth Simulator Center, Tokyo
- An Interview with Monika Henzinger
- An Interview with Jack Dongarra
- Relaunch of ISC2002 conference web site
- The **19th TOP500 List** will be introduced at the International Supercomputing Conference 2001 (ISC2002) in Heidelberg, Germany (June 19-22, 2002).

**New Directions in Cluster Technologies**  
 September 18-19  
 Plymouth, Massachusetts USA  
 Sponsored by:  
 Intel, AMD, Myricom  
**Microway**

**FUJITSU COMPUTERS SIEMENS**

**server pSeries 690**  
**IBM**

**Western Scientific**  
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 Cluster Computing Solutions

HPC Manufacturers NYSE Stock Quotes		
Symbol	Price	%
IBM	74.65	-1.11
HPQ	17.96	-2.16
CRAY	4.14	-1.43

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Welcome to Clusters @ TOP500 ! Wed Jun 12

**Sections**

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- [Benchmarks](#) (2/0)
- [Beowulf](#) (2/0)
- [Editorials](#) (1/0)
- [Extreme Linux](#) (1/0)
- [General News](#) (25/0)
- [Hardware](#) (1/0)
- [Linux](#) (2/0)
- [Press Releases](#) (8/1)
- [Software](#) (23/0)

**User Functions**

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**MOSIX 1.6.0**

Wednesday, June 05 2002 @ 11:11 PM CDT  
Contributed By: [Amnon](#)

**MOSIX** is a software that allows any size Linux cluster of Pentium/AMD workstations and servers to work like a single system. To run in a MOSIX cluster, there is no need to modify or to link applications with any library, or even to assign processes to different nodes, MOSIX does it automatically - just fork and forget, like in an SMP.

MOSIX 1.6.0 for Linux 2.4.18 was released.

[Post a comment](#)

**SEQUENOM Uses Linux NetworX Cluster to Provide Online Supercomputing Power for Genetic Research**

Tuesday, May 07 2002 @ 04:50 PM CDT  
Contributed By: [Andrea Laycock](#)

**SALT LAKE CITY, May 7, 2002**—Linux NetworX announced today that the first genomics ASP (application service provider) is powered by a Linux NetworX cluster supercomputer to provide users with online genetic research access. SEQUENOM, Inc. (Nasdaq: SQNM), a discovery genetics company, is providing the ASP, known as RealSNP.com(TM), to include its database of millions of gene sequences to offer the most comprehensive online genomics research tool available today.

[read more](#) (468 words) [2 comments](#)  
Most Recent Comment: 05/26 04:30PM

**MOSIXVIEW 1.1**

Friday, March 01 2002 @ 10:38 AM CST  
Contributed By: [mosixview](#)

MOSIXVIEW 1.1 is out.

There are several smaller changes and enhancements in the new version of Mosixview which also supports OpenMosix now. Read more about the changes and

**Clusters@TOP500**

For more information about this Site, please read [here](#).

**Cluster Database:** Be sure to check the cluster database. If you are affiliated with one of the sites and think that some cluster data is incorrect, please [let us know](#).

**Guest Editorial**

Dr. Thomas Sterling: *"It is quite possible that by the middle of this decade clusters in their myriad forms will be the dominant high-end computing architecture."*

**Top 10 Clusters (Rpeak)**

- [HELICS](#)
- [Locus Supercluster](#)
- [RHIC Computing Facility](#)
- [Biopendium](#)
- [Genesis Machine](#)
- [Platinum](#)
- [CBRC Magi system](#)
- [RWC SCore Cluster III](#)
- [Biopendium II](#)

# TOP500 Team

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[www.top500.org](http://www.top500.org) and [clusters.top500.org](http://clusters.top500.org)

# Excerpt from TOP500

Rank	Manufacturer	Computer	Rmax [GF/s]	Installation Site	Country	# Proc
...	...	...	...	...	...	...
30	Self-made	Cplant/Ross	707	Sandia National Lab	USA	1369
34	IBM	Titan Cluster Itanium 800 MHz	594	NCSA	USA	320
39	NEC	Magi Cluster PIII 933 MHz	654	CBRC – Tsukuba Advanced Computing Center	Japan	1024
40	Self-made	SCoreIII PIII 933 MHz	618	Real World Computing, Tsukuba	Japan	1024
41	IBM	Netfinity Cluster PIII 1 GHz	594	NCSA	USA	1024
320	Dell	PowerEdge Cluster Windows2000	121	Cornell Theory Center	USA	252
...	...	...	...	...	...	...