



# features

## Trends



Main Picture: Umesh Chavan; Illustrations: G

# The Road Ahead

## 10 companies that will shape the future of computing

**T**echnologies come and go and corporations are built or ruined at the drop of a standard, and market leadership stakes are raised with each MHz that microprocessors pick up in speed. Although it is difficult to identify those who will lead the charge to the future, we have picked the Top 10 companies, which we think will significantly affect your computing universe in the next decade.

“We’ve only begun to scratch the surface of what the microprocessor makes possible,” says Marc Andreessen, technology guru at Netscape. Computers are becoming smaller, shrinking into palmtop devices and cellular phones, as vast amounts of information becomes accessible at all times—instantly and wirelessly. People are now talking to their computers rather than typing, books can be read on flexible, palm-sized digital displays, and megabytes of data can be stored in devices smaller than a matchbox.

The next decade is likely to see us move much beyond wordprocessing-and-spreadsheets computing. Thomas Kurzweil, a pioneer in the fields of scanner technology, speech and optical-character recognition systems, and digital speech synthesis, in his controversial book, *The Age of Spiritual Machines*, envisions the 21st century as a time when there would not be a clear difference between human beings and machines. Brain scanners will be used

to 'download' our personalities, which would then drive the behavioural patterns of microprocessor-driven robots.

#### The chosen ones

Survival in the Internet era is going to be very different from survival in the Industrial one. The Industrial age economy was driven by the efficient production of things. In the Information age, economies will be driven by the creation and efficient management of informa-

tion, in a pervasively networked environment.

In trying to peek into tomorrow, we have tried to identify and track the 10 companies which will play a substantial role in building those new economies. All the companies mentioned here will help in transforming the old Industrial age economy into something different. And they will do this by the intelligent use of technology, innovation, and the adoption of global strategic vision.

## APPLIED MATERIALS

### SO YOUR COMPUTER HAS 'INTEL INSIDE', BUT WHAT MADE IT POSSIBLE?

Applied Materials is the largest manufacturer of wafer fabrication systems for the semiconductor industry. In plain speak, it means that while it does not actually manufacture computer chips, it makes the machines that do. The company is in a position of crucial importance, and we don't need to spell out why. Communications, computing and the Internet, the three most powerful factors affecting our lives, are computer driven, and in that context it is easy to see why Applied Materials is on this list.

For the last 30 years, Applied Materi-



als has provided core technologies that power the Information Age. In July 1998, with the announcement of its new copper technology, AM pushed chip development to yet higher planes. A computer chip can be roughly described as a group of transistors wired together with interconnects. In the past, aluminium was the preferred material of choice for interconnects, but as chips are developed with finer interconnects and more transistors, aluminium slows down and cannot conduct electricity to make the circuits move fast enough. Applied Materials swiftly came to the rescue with a new range of chip fabrication systems employing copper, and there has been no looking back since.

#### Applied Materials

*Semiconductor manufacturing equipment*

[www.appliedmaterials.com](http://www.appliedmaterials.com)

Santa Clara, California

**Sales:** \$3.42 Billion

**Income (after tax):** \$113.0 Million

**Strengths:** Fabrication technology employing copper

**The Future:** As long as there are silicon chips, Applied Materials will supply the technology to make them

and Asia-Pacific (China and Singapore) 5 percent.

So what does the future hold for Applied Materials? President Dan Maydan is sure that the future is bright—"We are making the tools that make the chips that make the components that are responsible for the digital revolution." Yes, things look good for AM. In 1998, the company invested a respectable \$643.9 million in research, development and engineering. The forever-increasing demand in computing power is also spurring chipmakers to move to larger sized wafers. The move requires scrap-



## With its new copper technology, AM pushed chip development to yet higher planes

With revenues of \$4 billion last year and profits of \$230.9 million, Applied Materials' 1998 worldwide sales demonstrate its global capability. North America sales comprised 38 percent of revenue; Japan 17 percent; Taiwan 20 percent; Europe 16 percent; South Korea 4 percent

ping all the existing chip-making machines and using new ones, which Applied will, of course, build.

As long as people use computers, and as long as manufacturers are interested in making and selling chips, there will be Applied Materials to contend with.

## XEROX PARC

THE EASIEST WAY TO PREDICT THE FUTURE IS TO INVENT IT

**X**erox PARC Laboratories have never manufactured a single product, and have not earned a single penny in profit in the three decades of its existence. Yet, in all likelihood, it will be one of the companies to play a substantial role in the future of computing. While all the companies mentioned in this article will have a far-reaching influence on the evolution of computing, it is Xerox PARC which might bring about a paradigm shift that will revolutionise computing.

A large reason for our optimism in PARC's future lies in its past. Xerox PARC was, perhaps, single-handedly responsible for the creation of the Personal Computer—a fact not known to most. From the dirty, abandoned building at the edge of Stanford University campus, which is home to the Xerox PARC Labs, was spawned the world's first PC, the Windows-style desktop interface which we all use today; the first laser printer, and much of the existing Internet technology. What really made this possible was a diverse collection of eccentric and extraordinary young inventors, driven by what came to known as PARC's hallmark

**Xerox PARC**  
*Research*  
[www.parc.xerox.com](http://www.parc.xerox.com)  
 Palo Alto, California  
**Sales:** N/A

**Current strengths:** One of the best bridges existing between computer academia and industry

**The Future:** It gave us the PC. One can only wait for the next leap of innovation



**From the edge of Stanford University campus was spawned the world's first PC, the Windows-style desktop interface, the first laser printer, and much of existing Internet technology**

phrase: "The easiest way to predict the future is to invent it". Their vision, as the then Director Douglas Englebart put it, was to "augment the human intellect". Thirty years down the line the objective remains the same.

If you hear John Seely Brown talking about the future, you would not imagine that he is the VP of Xerox and present director of Xerox PARC. In 1992 he wrote: "In the past, our emphasis has been on the individual, and most of our tools were aimed at enhancing the effectiveness of

the individual mind. In the future, the action will be in leveraging the organisational mind." The computing future, according to Brown, lies in understanding what happens to people's minds and

to organisations after PCs and networks are installed. One of the futuristic projects of PARC is the concept and development of the Ubicom (Ubiquitous Computing). It means you won't have to sit down at a desk and stare at a screen to use your computer. It means computers—or access to computers—will be buzzing everywhere, practically invisible, integrated seamlessly into your life. Their eyes and ears ever-seeing and hearing; their unabridged libraries always open for browsing. As Mark Weiser, a scientist working with Xerox PARC, stresses, the computer will recede into the background, and the most important side of the human-computer interaction will have a better chance to emerge.

Xerox PARC pays attention to small details. It noticed the fact that we use the 'Find Files or Folders' option quite often, and interpreted that the conventional file management systems have scope for improvement. As Don Norman of Apple explains, "The desktop worked very well on the old 128K Mac with no hard disk. You could scatter everything around and still see it on the screen. But today we have

thousands of items—more than can possibly fit on the screen".

In response, Xerox PARC is already working on a project aimed at improving the current Desktop and file organisation system.

Whatever the future might hold, and regardless of whether its innovations survive the arduous journey from research labs to the marketplace, one thing you can be sure of—wherever there is a fight to improve technologies, Xerox PARC is going to be right in the thick of things.

## IBM

### IN THE ERA OF THE INTERNET, SERVICES, NOT PRODUCTS, ARE DRIVING THE 'NEW' IBM

**T**ill the early 90s, this Armonk, New York-based Company was thought of as a monolithic old dinosaur, stumbling along on its last legs. It just shows how wrong people can be.

Among computer manufacturers, no quarter is given, and none asked for, and yet, against all odds, IBM (International Business Machines) not only redeemed its lost prestige, but also established itself as the one of the biggest, baddest cats around. Sure, it failed to extend its PC dominance in the 1980s—its OS/2 operating system was a major failure—and statisticians will undoubtedly point out that IBM lost a colossal \$ 1 billion, as recently as 1994. Yes, but all that was in the past.

Take a good, hard look at some facts and figures. IBM's sales revenue for 1998 was \$82 billion, and though the PC division lost \$992 million in 1998, the company did earn \$23 billion on IT services like planning and installation of computer systems, providing of networking services, and management of Lotus Notes installations. The total pre-tax profit was \$9.7 billion out of which 39 percent (\$3.8 billion) was from service-related activities. Which is probably just the way

#### IBM

*Computer hardware and software*  
[www.ibm.com](http://www.ibm.com)

Armonk, New York

**Sales:** \$84.4 Billion

**Income (after tax):** \$6.76 Billion

**Current strengths:** Experience and knowledge base

**The Future:** E-Business, mainframe computers and computing, IT services



## IBM wants computing to be 'pervasive', through extensive deployment of embedded systems

last six years trying to get customers to think of IBM as a solutions provider, is finally succeeding in drawing the company out from its traditional 'mainframes and hardware' mould. The Gartner Group research firm predicts that in another five years, IBM's services value chain will represent up to 46 percent of IBM's revenues. In retrospect, it is also a vindication of Gerstner's decision to reverse John Aker's (IBM's Chairman and CEO till 1993)

decision to break IBM into a network of smaller, independent companies. IBM is big, and better for it.

The Blue Behemoth has seen what the future holds, and is making its moves accordingly. All the right ones, as it turns out. Take IBM's large-scale move into e-business for example. Over the last two years, IBM has reportedly spent several hundreds of millions of dollars in promoting its competence in conducting electronic commerce.

Caught unawares by the Internet blitzkrieg, business managers the world over have resorted to getting outside expertise to deal with the vagaries of conducting business on the Net. And IBM, with more than 10,000 e-business customers, is right.

IBM, whose Deep Blue computer defeated world chess champ Gary Kasparov in a face-off in 1996, wants computing in the next decade to be 'pervasive', through extensive deployment of embedded systems, and 'deep', through the use of supercomputers and highly advanced software. To further this vision, IBM recently established its 'Deep Computing Institute'—a \$29 million-effort to help

researchers use massive computing power in solving complicated problems. William Pulleyblank, Director of Mathematical Sciences at IBM Research, says

"Deep computing combines the best of business and scientific computing techniques to find the [required] value buried [in large amounts of data] and apply that information to solve real-world problems".

IBM seems deeply committed to solving computing problems, and through its innovations, will continue to influence our computing universe well into the next decade. We are sure Kasparov would agree...



Lou Gerstner, IBM's CEO, would have wanted it to be.

When you are big, working the Net economy can be complex. There are Enterprise level applications to be managed, constant connectivity to be maintained, and products to be sold over conventional as well as electronic networks. Complexity drives services, and it is only fitting that in the era of the Internet, services, not products, are driving the 'new' IBM. Gerstner, who has spent the

# SUN MICROSYSTEMS

## THEY ARE THE DOT IN .COM

**E**stablished in 1982, the enigmatic and innovative Sun Microsystems is on a roll right now. Sun has, over the past decade, built powerful, reliable Unix-based workstations, which have served as the mainstay of mission-critical computing networks around the world.

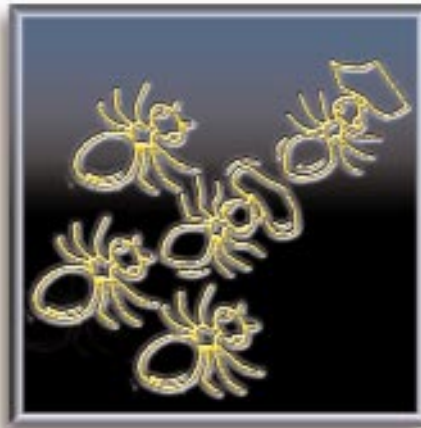
Last year, Sun grossed a healthy \$9.8 billion, spent a respectable \$1.3 billion on research (mostly pertaining to the Internet), and ended up earning a net profit of \$763 million. Though Sun has traditionally always made money by selling its much-acclaimed SPARC (Scalable Processor Architecture) workstations and all its multiple variants, that is not the reason it is here in this list.

That reason has got more to do with Sun's five-year-old programming language Java, which is platform independent ('write-once, run-anywhere' as Sun puts it), and now, Jini. While Java was instrumental in bringing the razzle-dazzle of multimedia to the Web, Jini, a mere 48 KB of Java-based code, will allow all kinds of digital appliances (Digital cameras, PDAs, TV sets, Digital audio-video recorders and players and so on) to com-



municate with each other. In cognisance of its capabilities, Sony, Philips, and Xerox are already working on bringing out Jini-enabled products by the end of this year.

**Sun Microsystems**  
*Computer hardware and software*  
**www.sun.com**  
 Palo Alto, California  
**Sales:** \$11.1 Billion  
**Income (after tax):** \$909.2 Million  
**Current strengths:** SPARC workstations, Java, Jini  
**The Future:** "The Network is the computer"



## Ideas, more than anything else, seem to be their strength, and with co-founder Bill Joy at the helm, there is going to be no dearth of new ideas at Sun

Ideas, more than anything else, seem to be Sun's strength, and with co-founder Bill Joy at the helm, there is going to be no dearth of new ideas. Joy, who designed the most crucial circuits on

Sun's SPARC processors, masterminded the development of Java and developed Jini, is Sun's powerhouse 'thinktank'. He holds the opinion that by letting employees remain free to pursue creative tangents, companies can continue to have a wild side, which they can draw on in times of competitive stress. The SunLabs, established in 1990, are also an effort at keeping that 'wild spirit' alive. Employing about a hundred people, the SunLabs work at playing around with new ideas, developing new technologies, and trying out untested computing theories. This is Sun's way of ensuring that the maverick spirit personified by Bill Joy remains at work.

Sun's unconventional technologies also form the basis for Sun's CEO, Scott McNealy's vision of a world that runs on pervasively networked 'intelligent' devices. McNealy, who once took a dig at Bill Gates by asking, "in a world without fences, who needs Gates?" has no particular affection for Microsoft, and echoes Sun's corporate sentiments when he says that Microsoft's client-server model of computing is soon going to be obsolete.

Of course, not everyone buys this argument, but Sun anticipates and understands this initial resistance. As Bill Joy says, "Explaining the new way of doing computers and networks is difficult. It's like expecting people in a feudal society to know what it would be like to live in a capitalistic society. It's just too hard to imagine until you're in it".

Well, hard it might be, but our Internet-driven world is beginning to evaluate the merits of having small, intelligent devices that take away the drudgery and complexity

of routine computing tasks from us, and let the network handle it instead.

Ultimately, Sun's credo, "the network is the computer," just might come true after all.

# CISCO

## CISCO'S PRODUCTS POWER ABOUT 80 PERCENT OF THE INTERNET BACKBONE

**C**isco might just be one of the most important companies no one has heard of. Established in 1984, by the husband-and-wife team of Leonard Bosack and Sandy Lerner, Cisco has grown to be a giant in the last 15 years. But it is almost ironical that despite sales of \$8.5 billion last year, and profits of \$1.4 billion, Cisco is something of an unknown entity for most PC users, who have no idea of what the company does.

A pioneer in Internetworking, Cisco dominates the field of data networking equipment and its products power about 80 percent of the Internet backbone. Cisco's routers are its mainstay (a router is a device which helps a computer on one network to send digital data to a computer on another network, by figuring out the location of the destination device, and actually delivering the data). Without this equipment there would be no network, and the Internet would remain a pipe dream. Of course, end-users do not often get to see the routers and hubs which are so very crucial to the functioning of the Internet, and hundreds of thousands of

**Cisco**  
Networking equipment  
[www.cisco.com](http://www.cisco.com)  
San Jose, California  
**Sales:** \$11.0 Billion  
**Income (after tax):** \$1.36 Billion  
**Current strengths:** Cisco products power 80% of the Internet backbone  
**The Future:** Any change in networking architecture will require Cisco's participation



**With Internet traffic doubling every four months, the demand for Cisco products is on an upswing like never before**

corporate intranets and extranets, which explains Cisco's relative anonymity. Since 1995, when current CEO John Chambers took over, Cisco's share prices have increased by nearly 800 percent, and the company has a market value of over \$100 billion, just nine years after going public. Not only that, Cisco's overall revenues have increased by more than a hundred times in the last nine years!

With Internet traffic doubling every four months, the demand for Cisco products is on an upswing like never before. Users want more bandwidth, more routers, more powerful servers and bigger

hard drives, and they want to download more and yet more data. It is an endless cycle, but CEO Chambers is not satisfied. Says he, "I want Cisco to be a dynasty. I think it can be a company that changes the world." To further this ambition, Cisco has also been trying to license what it calls its IOS (Internetwork Operating System), which controls all its routers and

switches. Alcatel, Ericsson, Northern Telecom, HP, Compaq, and even Microsoft and Intel have seen it fit to license the IOS, which says something about its industry-wide acceptance.

Chambers, who says that "In high tech, if you don't stay ahead of trends, they'll destroy everything you work for," is also getting ready to play with the big boys in the telecom equipment arena. As data traffic is mushrooming, phone companies are building new networks that are capable of carrying all information—including voice and video—through one single cable. This of course means that Cisco is in for a dogfight with the likes of Nortel, Lucent and Siemens, all of whom are much bigger than Cisco itself.

But Chambers is confident that his company can pull it off—he really believes in Cisco's ability to win. Chambers also wants people to think of Cisco as a communications company, rather than a router company. In August last year, the company spent about \$60 million on an advertising campaign which ran in the US and in Europe, and underlined the fact that Cisco is the company which makes the Internet work.

If running the Internet was not enough, the king of routers wants to do more. Like many other companies, it has dreams of pervasively networked households in the future, with 'intelligent' devices that can communicate among themselves. Yes, Cisco believes in the 'fridge talks to microwave talks to TV talks to VCR' scenario, and if it comes true, guess who is going to link all those devices itching to talk to each other?

Once, Bill Gates, commenting on Cisco's obsession for brand-name recognition, is supposed to have asked, "Really, who knows the name of their plumber?" But in a world where phone and Cable TV networks might someday be routed through the all-powerful Internet, all of us might be finding out the name of our plumber, the hard way.



# ORACLE

## THE INTERNET IS GOD, AND LARRY ELLISON IS A BELIEVER

**B**ob Finnocchio, CEO of Informix, one of Oracle's main competitors, once called the Internet "a gift from heaven to the database business, because as more and more people and companies get connected, everyone will need bigger, better, and faster databases." True, and considering the fact that it is Oracle, and not Informix, that has truly realised the potential in Internet databases, ironical!

Oracle, the world's second-largest software company, lays claim to fame with its database software. Around the world, Oracle databases are used to store information on finances, inventories, legal correspondence, transaction records, personnel details, and any other type of information crucial to businesses. The company has kept its products cross-platform compatible, and Oracle 8i works on IBM mainframes and Unix servers as well as Windows NT servers. With more than a hundred thousand customers (the list includes most Fortune 500 companies) in more than a hundred countries, 61 percent of the database market chose Oracle last year and sales amounted to \$7.1 billion, and profits, \$813 million.

The story is just beginning, though.



For Oracle, the Internet is God, and Larry Ellison, co-founder and CEO, a believer. Ellison, who likes to pilot his very own fighter jet (an Italian Marchetti), wear Armani suits and drive around in a silver Mercedes, is fond of saying that "The Internet changes everything—and I really mean everything." This is driving him

### Oracle

*Database software and programming*  
[www.oracle.com](http://www.oracle.com)

Redwood City, California

**Sales:** \$8.3 Billion

**Income (after tax):** \$ 1.17 Billion

**Current strengths:** This second-largest software company is the leader in database programming

**The Future:** A tighter integration of database and Web technologies



## Oracle has kept its products cross-platform compatible, and Oracle 8i works on IBM mainframes as well as Unix and Windows NT servers

to engineer Oracle into the ultimate e-corporation, which thinks different from its competitors. Depending upon which way the Internet phenomenon swings, this could be a formula for success on a massive scale, or failure of equally

great magnitude.

Ellison thinks that "With Internet computing, you can really get the big picture," and has decided that henceforth, it should be possible to view as well as manipulate all of Oracle's enterprise applications via a Web browser, running off either a PC, or an independent Internet device. Traditionally, enterprise apps run off a server on corporate intranets, and desktop software is required to manipulate data on the client side.

Keeping the desktop software synchronised with the server can become complex and expensive. No big fan of Microsoft's client-server model of computing, Ellison reckons it makes sense to engineer software applications which allow running even the most complex of business processes off a browser, and accordingly, Oracle has stopped all further development on software apps based on the client-server model.

Of course, its not going to be a cakewalk for Oracle. SQL Server7, Microsoft's contender against Oracle 8i, offers about the same functionality at less than half the price of Oracle's product. Also, a large percentage of its customers are running Oracle apps on NT, and Oracle has to ensure that its software works well on NT machines, failing which customers might well opt for SQL.

With the Internet becoming the focal point of all computing, it makes sense, in retrospect, for Oracle to place its bets on the convergence of the database and the Web browser. FastForward from Oracle can, in fact, Web-enable all of a company's strategic business functions in less than a month.

Ellison says, "With the Internet, computer and network services will finally begin to look like the electricity utility, the telephone utility, or the water utility systems, and database technology will be the very centre." We agree.



## WIND RIVER SYSTEMS

### NANOTECHNOLOGY WILL EVENTUALLY TAKE US WAY BEYOND MICROPROCESSORS

**D**oug Englebart of Xerox PARC, who created the mouse, and developed the concepts of hyperlinks, e-mail and videoconferencing, said "If you look at the whole array of digital technology, the microprocessor is just a part of that. Nanotechnology will eventually take us way beyond microprocessors." Englebart might as well have been speaking on behalf of Wind River Systems, a relatively small company, established in 1981, and based in Alameda, California.

Most of us don't even think of computer operating systems when we use devices like digital cameras, ATM machines, Global Positioning Systems, hi-end programmable Video equipment and even microwave ovens. But even these devices do have job-specific 'computers', with tiny yet very efficient operating systems. Called 'embedded systems', these are the computers we interact with daily without even realising it. VxWorks, the most widely used RTOS (Real Time Operating System) across various industries, was introduced by Wind River Systems way back in 1987.

With revenues of \$129.4 million this

#### Wind River Systems

*Operating systems and embedded objects*

[www.wrs.com](http://www.wrs.com)

Alameda, California

**Sales:** \$156.6 Million

**Income (after tax):** \$26.1 Million

**Current strengths:** WRS makes the software that runs 'smart' machines

**The Future:** To many, the future lies in the networking of microprocessor-embedded objects



**WRS products have been used by major manufacturers to incorporate Internet capability into their cellular phones, PDAs, cable modems and network printers**

been adapted by its customers to run everything from automobile fuel-injection systems to PDAs.

Tornado II, launched in May this year, was the latest in RTOS development tools from Wind River Systems. It provides a quick-start project creation wizard, which allows it to be easily configured for the specific task at hand. Tornado II analyses user applications and automatically scales the accompanying VxWorks RTOS for optimum operating efficiency by including only application-specific features. Says Jerry Fiddler, Co-Founder and CEO of WRS "The smart phone and network computer have grabbed the attention of the media as the new frontier of the Internet."

WRS is right there on the frontier. Its Embedded Internet Product Suite has been used by some of the major manufacturers to incorporate Internet capability into their cellular phones, PDAs, cable modems, network printers and, of course, network computers. Fiddler continues, saying "Wind River was the first vendor to bring Internet Protocols (TCP/IP) to the embedded market, and the Tornado for Embedded Internet Product Suite is an extension of this expertise—a turnkey solution for any embedded developer."

Though it would be an exaggeration to call it the post-PC era, the Internet is pushing the development of job-specific, Web-enabled devices, which, with implementations of Artificial Intelligence, are 'smarter' than PCs. Some day, these devices may form the basis of a pervasively networked computing environment, which would be easy to live with, and operate at 100 percent reliability levels. Unlike personal computers, such devices will respond instantly, and hopefully, never, ever 'crash'.

In such an environment, Wind River Systems might well be the company that will lead the way towards embedded real-time deliverance.



year, Wind River Systems is one of the largest providers of software development tools for real-time embedded applications used in Internet devices, telecommunications equipment, medical imaging systems, defence equipment and the aerospace industry. Wind River's RTOS has

# EMC CORPORATION

## THE 600-POUND GORILLA OF ENTERPRISE STORAGE SYSTEMS

**M**errill Lynch & Co analyst Steven P Milunovich predicted that EMC is going to be “the next technology franchise along with Microsoft, Intel and Cisco.” High praise, indeed. So what’s so special about EMC?

EMC is not exactly a household name for most of us, but it is the 600-pound gorilla of enterprise storage systems. In general, demand for storage capacity is accelerating dramatically as enterprises generate more and more data, and capacity-consuming multimedia like audio and video become mainstream components of that data. A recent *Business Week* story quoted EMC CEO Michael Ruetters as saying, “A lot of customers have been talking about their plans to double their storage requirements this year.” Thanks to customers’ never-ending needs for increased data storage capacity, EMC has averaged over 50 percent annual growth in sales and earnings for the past five years. Sales have soared from \$127 million in 1988 to nearly \$4 billion last year. EMC dominates this market which

### EMC Corporation

*Data storage solutions*

[www.emc.com](http://www.emc.com)

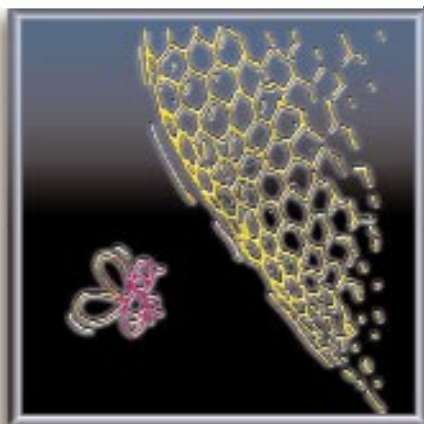
Palo Alto, California

**Sales:** \$4.27 Billion

**Income (after tax):** \$867.9 Million

**Current strengths:** The undisputed king of enterprise data management

**The Future:** More data mining, more networking, more EMC



extensive data networking and the Internet, work environments are getting increasingly decentralised. The harnessing of the collective information of the distributed organisation (clients, suppliers, partners and employees) is becoming critical in a world where creative and innovative use of information and knowledge can provide a competitive advantage. This is where EMC enters the scene with a creative mix of hardware, software and service solutions to store and manage information.

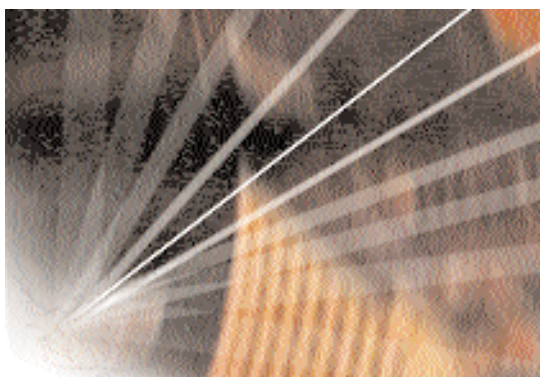
One telling characteristic of EMC’s corporate focus is that they don’t just call it storage technology, they call it storage and retrieval technology, and value-added features from EMC systems and software include faster processing, sophisticated data protection, non-disruptive backup, data recovery, and workload compression.

But for all its present success, EMC is a corporation for the next millennium. Analysts are already predicting earnings growth of 35 percent this year, and a long-term rate of around 27 percent.

According to Ruetters “We envision corporations having ‘data sockets’ in every office, conference room, and hallway—just as there are phone jacks everywhere today.” Ruetters envisions these data sockets connected to central ESNs (Enterprise Storage Networks), which would allow companies to fish for data throughout the enterprise, with a very, very large net. Ruetters makes no bones about his determination to stay

ahead—“Our goal is to keep widening the gap between EM and our competitors, by quickly ascending new technology curves.”

Ultimately, you are going to run out of storage space. EMC will see you then.



was estimated at \$11 billion last year and is projected to hit \$35 billion by 2001.

The storage systems used by big businesses and institutions are much more than just giant disk drives. EMC’s Symmetrix, for example, allows companies to centralise storage for all their disparate computing systems—mainframes, Unix and Windows NT networked computers. Demand for this cross-platform functionality is driven by the proliferation of

## The harnessing of collective information is becoming critical in a world where creative and innovative use of information can provide a competitive advantage

networked computing, and increasing need to share and manage data across enterprises.

The last decade of this millennium has witnessed a revolution in the way corporations are conducting business. Due to

## INTEL

### UNLESS IT HAS 'INTEL INSIDE', IT ISN'T A PC. WELL, ALMOST

**B**ased in Santa Clara, California, Intel was founded in 1968 by Gordon Moore along with Robert Noyce, the co-inventor of the Integrated Circuit. Today, its chips power more than 80 percent of all PCs in the world. With market worth of more than \$200 billion, revenues of more than \$26 billion and profits of more than \$6.1 billion, Intel has become an unstoppable force. Applications developers routinely churn out software that demands more

#### INTEL

*Microprocessors*

[www.intel.com](http://www.intel.com)

Santa Clara, California

**Sales:** \$27.4 Billion

**Income (after tax):** \$6.79 Billion

**Current strengths:** "Unless it is Intel inside, it isn't a PC."

**The Future:** Intel will try to consolidate its position as a leader in making chips

makes it easy for Web sites to deliver video over the Net, and in setting standards for Internet telephony. Intel-owned CNET produces TV shows devoted to technology.

Intel plans to continue its relentless growth well into the next century. By 2011, Intel plans to sell hundreds of millions of chips every year, all of which will run at clock speeds of more than 10,000 MHz, and will pack in more than a billion transistors each. Asked if he envisions any



and more processing power, and Intel, with astronomical gross margins of about 60 percent, is happy to create new factories which churn out radical new chips with more features and processing power than ever before. In Andy Grove's vision of the future, we will all be watching TV on our PCs, playing games and browsing interactive 3D worlds on the Net, and using voice- and video-enabled communication devices to stay in touch with friends. In consonance with this vision, Intel has plans for being more than just a



chip manufacturer. The Intel Architecture Labs in Hillsboro, Oregon, have been involved in creating software, which

## Intel's chips power more than 80 percent of all PCs in the world

problems in achieving this, Craig Barrett says, "We are going down the road at 120 miles an hour. Somewhere, there's going to be a brick wall to cross, but it's better to run into the wall than to anticipate it and stop short."

No, don't bet against Intel.

## CORPORATION 'X'

### NO ONE HAS A PATENT ON SUCCESS

**P**rediction is a perilous exercise, and if you are trying to predict the future of IT corporations, you are a brave magazine indeed! And thus, we have Corporation X. Corporation X is our tribute to the ingenuity and perseverance of those who have given form to computing as we know it, and to those who will continue to shape computing for the generations to come. No one has a patent on success. Right now, the next Steve Jobs, Bill Gates or Linus Torvalds could be sitting in his backyard, mulling over some intriguing aspect of



computing. They could be engineering a new operating system, building a new GUI, developing new communication protocols, or figuring out how the next generation of processors are going to push speeds beyond what we could ever imagine.

The continual transformation of abstract thought into reality is what drives the mavericks of computing. They have proved it can be done.

Next time, it could be you.

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and ROMIT MITRA