In good company

As we look at the world of business today—including our clients and their industries—we like what we see.

Even better, we like what they see.

We are certainly encouraged by IBM's recent performance in a tough economy and by our future growth prospects. But what gives us even more hope for the future is the way companies, leaders and institutions of all kinds are coming to share in a highly promising consensus about the direction—and the very nature—of business.

About the potential of technology for integration, not just automation. About the power of innovation that combines invention and insight. About the links among openness, standards and trust.

Sometimes, consensus is driven by reaction and fear. But at other times, it's fueled by hope. This is one of those times. Which is very good news, both for IBM and for a new era of global business growth.

So, while it's certainly nice to be a company that's doing well… it's even nicer to be doing so in such *good company*.

SAMUEL J. PALMISANO
Chairman, President and Chief Executive Officer

Dear IBM Investor,

Last year, I told you that we were repositioning IBM for leadership, in all the ways that a business can lead. I described how IBM defines leadership, along with our plans to achieve it. And I said that I believed the results of this repositioning would roll out in meaningful ways in the years and decades to come.

TWELVE MONTHS LATER, it's clear that the future we envisioned is arriving, and more rapidly than we expected. This is in part because of the hopeful signs we're seeing of economic recovery, with the promise of renewed business investment in information technology. It's partly because of the rapid adoption of our on demand strategy by clients, partners and the overall IT industry. But it's also something more—something specific to this company and its people, and something longer lasting than a particular economic cycle.

IBM today is a very different enterprise than it was just a few years ago. Our business model has been quietly but substantially reshaped to capitalize on the most promising growth and profit opportunities in the market. Even more important for the long term, our operations and culture are being transformed as well. We are now focused with an intensity and unity I haven't seen since the heyday of the mainframe. As a result, we are poised to take IBM to the next level, and to redraw and extend the boundaries of the IT industry.

A very good year, for a very different company

IBM's 2003 is the kind of year on which it's gratifying to look back—both for our overall achievements and for the strong momentum with which we ended the year.

Our revenue from continuing operations, at $89.1 billion (a company record), increased by 10 percent. Earnings from continuing operations were $7.6 billion compared to $5.3 billion in 2002, which included $1.6 billion of after-tax charges for second and fourth quarter 2002 actions. We continued to gain market share across all our core businesses. IBM today is the market leader in servers, middleware, business transformation services and strategic outsourcing.

Highlights for the year included revenue growth in every server segment, a WebSphere middleware platform that grew 12 percent and gained market share, and 14 percent growth in strategic outsourcing. Our success with clients was evident in faster-than-market growth for five of IBM's six industry sectors. For example, in the public sector, which includes our relationships with governments and health care providers, we grew by 15 percent; in communications by 8 percent; in industrial by 14 percent; and in financial services by 13 percent.

We again generated excellent cash flows. After investing $5.1 billion in R&D, we had $12.7 billion in cash available for investment and distribution to shareholders. We invested $3.9 billion of that in net capital expenditures and $1.8 billion in acquisitions to

strengthen our portfolio. And we were able to return $5.4 billion to investors—$4.3 billion through share repurchase and $1.1 billion through dividends—ending the year in a strong cash position, with $7.6 billion, including marketable securities.

Overall, despite facing serious challenges, the IBM team executed with discipline. And indications for the year ahead are encouraging, including a strong demand pipeline (enlarged by more than $17 billion of services signings in the fourth quarter) and a growing number of alliances with business partners and software companies committed to leading with IBM's open, standards-based platforms.

All in all, a very good performance. But is it sustainable? Can we, in fact, improve upon it and keep growing for the foreseeable future? I believe so, and let me tell you why.

Recommitting to high value

For the past couple of decades, if you were to look at IBM's performance in any given year or over several years, what would you see? You'd see a very large global company in which some businesses are growing rapidly, some are flat and some are declining. Add it up, and it would average out to steady profitability—but perhaps uninspiring growth. For people with comparatively short memories, this might be the only IBM they'd ever known. And it would be legitimate to ask if the company is capable of more.

The answer is: We certainly are. In fact, over most of our nearly 100-year history, IBM was consistently a company that outperformed others in our markets and generated superior returns. And that was because we were singularly focused on leading, and most often creating and defining, the high-value spaces in our industry.

Of course, with a company of IBM's breadth and global presence, there are always ups and downs that result from economic cycles, product and technology transitions, and sometimes issues of execution. But it's also apparent that, somewhere along the line, we became more focused on defending our existing leadership position than on creating the next one. We weren't particularly bold or imaginative in getting into new markets or developing new businesses, products and services, even when our strategic analyses indicated that something new was coming. And, just as important, we hesitated to reinvent or get out of businesses that no longer represented high value for either

clients or shareholders. In a word, we lost sight of IBM's mission, of what had always set us apart.

Well, we've regained our focus now. IBM is an innovator—in every dimension of that word. We know that IBM and IBMers are at their best when they create value that our clients cannot get from anyone else. That means we will provide leading-edge technology, services, expertise and intellectual capital, and will integrate these capabilities for each client to provide them with competitive advantage.

We commit to that. We commit to innovating to deliver client success. And that is something for which clients are willing to pay a premium.

This may seem like a truism, but it actually commits us to a very focused strategy, based on a choice between the two primary sources of growth and profit in IT today: the high-volume, undifferentiated product play; and the high-value, innovation and integration play, focused on the enterprise. It is this high-value space we have chosen to lead.

We believe this is the right choice for IBM and our investors. By focusing on this space, we believe we can, on a sustainable, long-term basis, generate superior returns compared to the overall IT industry, command leading share position in our selected businesses, outperform the average of the S&P 500 on return on invested capital, and produce strong cash flows.

In recent years, we've taken many steps to seize this position. Before I talk about those steps, I want to spend a minute on what constitutes "high value" for clients today, and what will do so for the foreseeable future. It's embodied in what we call the on demand enterprise. And that, in turn, is all about a new kind of integration.

The next wave of integration

After two decades of disaggregation, the IT industry is re-integrating. This is being driven simultaneously by a major shift in client demand, and a major shift in technology.

Companies have come to realize that if they're going to respond rapidly and effectively to today's volatile marketplace, they need to do more than Web-enable discrete systems, processes or business units. They need to pull together all of the systems they've already got and integrate them securely with their core business activities—horizontally, across not just their whole company but their entire value chain, from customers to suppliers. This is an on demand enterprise.
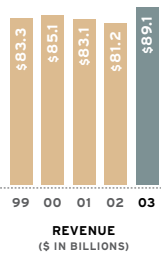
Focus on High Value

IBM Global Services generated $55 billion in services signings in 2003, including seven contracts over $1 billion and an additional 56 contracts in excess of $100 million each.

IBM Systems Group revenue increased 11 percent to $14 billion in 2003. It outpaced competitors with double-digit growth in strategic UNIX, blade and Intel-based servers, and storage systems products.
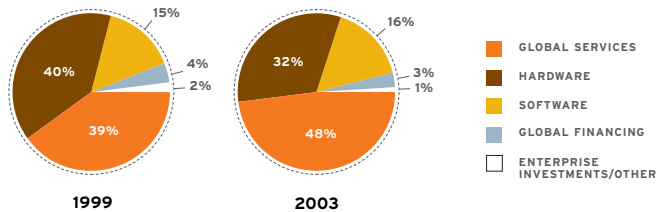
In 2003, IBM earned 3,415 U.S. patents, breaking the record for patents received in a single year and eclipsing the nearest company by more than 1,400 patents. During the past eleven years, the U.S. Patent Office has issued IBM more than 25,000 patents—nearly triple the total of any U.S. IT competitor during this time.

IBM Global Financing pre-tax income was $1.2 billion for 2003, representing a 24 percent year-to-year increase.

In 2003, revenue from IBM middleware increased 11 percent to $11 billion, primarily driven by continued strength in demand for WebSphere (12 percent growth), DB2 database (13 percent growth) and Tivoli (12 percent growth) middleware products.
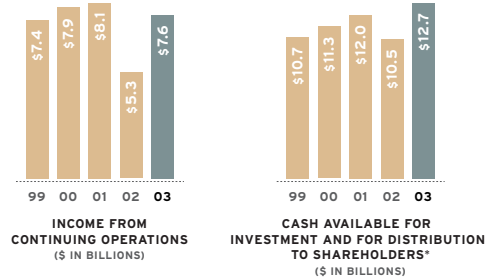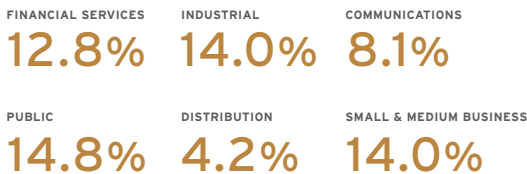
REVENUE
($ IN BILLIONS)

99	00	01	02	03
$83.3	$85.1	$83.1	$81.2	$89.1

TOTAL REVENUE BY BUSINESS SEGMENT

1999
- 40%
- 39%
- 15%
- 4%
- 2%

2003
- 32%
- 48%
- 16%
- 3%
- 1%

- 🟧 GLOBAL SERVICES
- ⬛ HARDWARE
- 🟨 SOFTWARE
- 🟦 GLOBAL FINANCING
- ⬜ ENTERPRISE INVESTMENTS/OTHER

INDUSTRY SECTOR GROWTH YEAR TO YEAR (2002-2003)

REVENUES IN ALL SIX OF IBM'S INDUSTRY SECTORS GREW FOR THE FULL YEAR, WITH THE FINANCIAL SERVICES SECTOR, INDUSTRIAL SECTOR AND PUBLIC SECTOR AMONG THE STRONGEST, AND WITH CONTINUED GOOD RESULTS IN THE SMALL AND MEDIUM BUSINESS SECTOR.

FINANCIAL SERVICES	INDUSTRIAL	COMMUNICATIONS
12.8%	14.0%	8.1%

PUBLIC	DISTRIBUTION	SMALL & MEDIUM BUSINESS
14.8%	4.2%	14.0%

INCOME FROM CONTINUING OPERATIONS
($ IN BILLIONS)

99	00	01	02	03
$7.4	$7.9	$8.1	$5.3	$7.6

CASH AVAILABLE FOR INVESTMENT AND FOR DISTRIBUTION TO SHAREHOLDERS*
($ IN BILLIONS)

99	00	01	02	03
$10.7	$11.3	$12.0	$10.5	$12.7

This represents management's view of cash available for investment and for distribution to shareholders. See the company's Management Discussion section on pages 64 and 65 for a reconciliation of these amounts to GAAP net cash from operating activities and basis for its presentation.

INCUBATED NEW BUSINESSES

- In just three years, Life Sciences has become a $1 billion business, more than doubling its revenue each year. It has grown from two employees in 2001 to more than 1,000 employees in 2003.

- IBM's Digital Media business grew 60 percent to $1.7 billion in revenue in 2003.

- Application Management Services grew 30 percent and contributed more than $1 billion in new revenue since the line of business was created two years ago.

- In 2003, Linux revenue grew over 50 percent to more than $2 billion, as the rate of related software and services combined nearly doubled year to year.

- IBM's Pervasive Computing business generated more than $2.4 billion in revenue in 2003, 36 percent growth mainly from services and software installations.

EMERGING GROWTH AREAS

- In China, India, Russia and Brazil, IBM generated revenue of $3 billion in 2003 and saw double-digit growth.

- IBM Business Consulting Services' Business Transformation Outsourcing (BTO) unit generated fourth-quarter 2003 signings of nearly $3 billion. Major contracts are in place with clients including BP, Procter & Gamble, Sprint, Raytheon Aircraft, Dresdner Bank of Germany, and United Technologies Corporation.

- With more than 2,000 clients, e-business Hosting Services revenue increased by more than 20 percent each of the past three years, topping $1 billion in revenue in 2003.

- IBM clients have more than $10 billion in dormant computing capacity installed, which can be turned on and paid for on demand. More than $500 million in capacity was turned on in 2003.

- In its first year, IBM's Engineering & Technology Services business designed products for Medtronic, New York Stock Exchange, Raytheon, Mayo Clinic and others, generating more than $160 million in revenue in 2003.

SUPPLY CHAIN IMPROVEMENTS

- By the end of 2003, the work of transforming and integrating the supply chain resulted in the lowest inventory levels for IBM in more than 20 years.

- IBM's supply chain transformation efforts have reduced the amount of time the sales force spends on activities like checking on order status, proposal generation and contracts by 20 percent.

- By speeding inventory turns and improving client collections and supplier payment terms, IBM's supply chain efforts generated more than $700 million in cash in 2003.

Financial Highlights

INTERNATIONAL BUSINESS MACHINES CORPORATION AND SUBSIDIARY COMPANIES

($ in millions except per share amounts)

FOR THE YEAR	2003	2002
Revenue	$89,131	$81,186
Income from continuing operations	7,613	5,334
Loss from discontinued operations	(30)	(1,755)
Net income	7,583	3,579
Earnings/(loss) per share of common stock:		
Assuming dilution:		
Continuing operations	4.34	3.07
Discontinued operations	(0.02)	(1.01)
Total	4.32	2.06
Basic:		
Continuing operations	4.42	3.13
Discontinued operations	(0.02)	(1.03)
Total	4.40	2.10
Net cash provided by operating activities from continuing operations	14,569	13,788
Investment in plant, rental machines and other property	4,393	4,753
Cash dividends paid on common stock	1,085	1,005
Per share of common stock	0.63	0.59

AT YEAR END		
Cash, cash equivalents and marketable securities	7,647	5,975
Total assets	104,457	96,484
Working capital	7,098	7,502*
Total debt	23,632	26,017
Stockholders' equity	27,864	22,782
Common shares outstanding (in millions)	1,695	1,722
Market capitalization	157,047	133,483
Stock price per common share	92.68	77.50
Number of employees in IBM/wholly owned subsidiaries	319,273	315,889

Reclassified to conform with 2003 presentation.

Becoming one is dauntingly hard to pull off. It requires both the end-to-end integration of the technology—which niche product vendors simply cannot do—and the integration of technology with business processes. This in turn requires deep business knowledge and industry expertise that few traditional technology companies have, and significant technical knowledge and research strengths that few consulting firms possess.

Integration is also an emerging force in core technology and computing architectures. To cite one example, advances in semiconductor devices have been largely propelled by increasing the clock speed of the microprocessor chip; this is like revving up the RPM of a car engine. But while advances in raw speed are continuing apace, they are no longer enough to increase chip and overall system performance. For one thing, chips have become so densely packed with transistors that they produce more heat than can be cost-effectively dissipated.

The solution is integration—putting multiple, often less-than-top-speed processors on the same chip, along with additional functions like fast memory and high-performance input/output. This is the approach IBM engineers have taken in developing our Blue Gene supercomputer. Integration of this sophistication is beyond the reach of most chip and systems companies. It requires expertise not just in semiconductors but in advanced systems architecture, custom logic design, operating systems and software tools. This is the kind of expertise that IBM has built up over decades, and it is not easily replicated. And that's why technology leaders like Sony, Cisco, Apple and QUALCOMM have partnered with IBM for advanced technology—and why last year Microsoft licensed IBM's microprocessor technology for use in its next-generation Xbox game console.

Bulking up in on demand

Many IT companies will struggle with this world that is dawning—with the need to choose between open and proprietary, between serving consumers and enterprises, between redistributing other people's intellectual capital and innovating. This is not about making pronouncements or promises. A company cannot be all things to every client, every partner and every investor.

For our part, we've decided. The two parallel trajectories of integration—in client demand and in what the technology requires—play directly to IBM's historic strengths. However, even with everything IBM brought to this table, we needed more. That's why we've made acquisitions such as PricewaterhouseCoopers Consulting (PwCC), Rational software and 19 other companies in the past two years. And it's why we reset our priorities in R&D to develop more technologies and services specifically for client needs in the on demand era.

On demand integration is also why we've placed a huge bet on standards, from the Internet protocols and Linux to grid computing and Web services. Without open technical interfaces and agreed-upon standards, even integration within a single enterprise would remain a gargantuan task. And forget about integration with the other companies, business processes, applications, pervasive computing devices, laws, regulations, customs and cultures that make up the ever-more-global marketplace of the 21st century. An IT company's position on open standards—not just its rhetoric, but its actions—is a clear indicator of whether it faces forward or backward, is serving the needs of clients or protecting its market position.

In addition to the opportunities I've described, our move into on demand has opened up some very large businesses beyond the frontiers of the traditional IT industry—opportunities that remain out of reach for most of our competitors.

One promising example is Business Transformation Outsourcing (BTO), which was not even part of the industry lexicon 18 months ago. In BTO engagements, IBM becomes responsible for transforming—and actually providing—a client's business process in areas such as human resources, procurement, customer care, and finance and administration. Thanks to the acquisition of PwCC and the formation of IBM Business Consulting Services, we generated nearly $3 billion in BTO signings during the fourth quarter of 2003 alone. To give a rough idea of the potential here, the current size of businesses' outsourced spending on sales, marketing, logistics, finance, HR and all other administrative processes is about $1 trillion a year. Of that, there is an opportunity in excess of $100 billion in the BTO areas we are pursuing. We are committed to extend our leadership position in BTO in 2004.

Remaking IBM

To some people, it may seem bold to have made all these moves during the worst market ever seen in the IT industry. But I don't believe it was particularly risky, because it was driven by client demand and the realities of the technology. What's really important for you to understand is that our commitment to leadership in the high-value spaces and in innovation isn't a mission statement. It's a business model. And it commits us to continual reinvention of IBM itself.

Over the past several years, we've taken aggressive steps to remix our business so that we are positioned for long-term leadership and new opportunities in the high-value enterprise space, however that changes. We have, since 1997:

• exited or reduced our presence in such areas as application software, hard-disk drives, networking hardware, low-end printers and retail PCs—which we estimate have declined from 31 percent to 25 percent of IT industry revenue;

• entered or increased our presence in distributed middleware, non-hardware maintenance services, Intel-based servers and mobile PCs—which have grown from 40 percent of industry revenue to 46 percent, and are expected to continue outperforming the overall IT market;

• increased our revenue in business and technology consulting services, infrastructure services and infrastructure software—which generate superior long-term revenue growth, profit, cash and return on invested capital—from 48 percent to 64 percent of our total, with expectations of increasing that going forward;

• grown aggressively in emerging markets; in China, India, Russia and Brazil we generated revenue of $3 billion last year and saw double-digit growth;

• upped our rate of new account growth, giving us a total of 730,000 large, medium and small enterprise clients—with IBM's small-and-medium business segment alone growing 14 percent to outperform the market in 2003, adding $2.4 billion in revenue; and

• incubated successful new high-growth businesses such as life sciences, digital media, application management services, e-business hosting services, Linux and pervasive computing—each of which has already

become a $1 billion-plus revenue stream. In the areas we're targeting within life sciences and digital media alone, third-party analysts see more than $60 billion of market opportunity by 2006.

While we do all this, we're continuing relentlessly to improve execution. By becoming an on demand business ourselves, we've made big strides in product cycle time, new product introduction, sales productivity and simplification of our processes. Our inventories are at their lowest level in more than 20 years, and our continuing progress in integrating our supply chain took $7 billion of cost out of the business in 2003, surpassing what we achieved in 2002.

Business value, and a company's values

As I mentioned last year, we've been spending a great deal of time thinking, debating and determining the fundamentals of this company. It has been important to do so. When IBMers have been crystal clear and united about our strategies and purpose, it's amazing what we've been able to create and accomplish. When we've been uncertain, conflicted or hesitant, we've squandered opportunities and even made blunders that would have sunk smaller companies.

It may not surprise you, then, that last year we examined IBM's core values for the first time since the company's founding. In this time of great change, we needed to affirm IBM's reason for being, what sets the company apart and what should drive our actions as individual IBMers.

Importantly, we needed to find a way to engage everyone in the company and get them to speak up on these important issues. Given the realities of a smart, global, independent-minded, 21st-century workforce like ours, I don't believe something as vital and personal as values could be dictated from the top.

So, for 72 hours last summer, we invited all 319,000 IBMers around the world to engage in an open "values jam" on our global intranet. IBMers by the tens of thousands weighed in. They were thoughtful and passionate about the company they want to be a part of. They were also brutally honest. Some of what they wrote was painful to read, because they pointed out all the bureaucratic and dysfunctional things that get in the way of serving clients, working as a team or implementing new ideas. But we were resolute in keeping the dialog free-flowing and candid. And I don't

think what resulted—broad, enthusiastic, grass-roots consensus—could have been obtained in any other way.

In the end, IBMers determined that our actions will be driven by these values:

- Dedication to every client's success
- Innovation that matters, for our company and for the world
- Trust and personal responsibility in all relationships

I must tell you, this process has been very meaningful to me. We are getting back in touch with what IBM has always been about—and always will be about—in a very concrete way. And I feel that I've been handed something every CEO craves: a mandate, for exactly the right kinds of transformation, from an entire workforce.

Where will this lead? It is a work in progress, and many of the implications remain to be discovered. What I can tell you is that we are rolling up our sleeves to bring IBM's values to life in our policies, procedures and daily operations.

I've already touched on a number of things relating to clients and innovation, but our values of trust and personal responsibility are being managed just as seriously—from changes in how we measure and reward performance, to how we equip and support IBMers' community volunteerism.

Our values underpin our relationships with investors, as well. In late February, the board of directors approved sweeping changes in executive compensation. They include innovative programs that ensure investors first receive meaningful returns—a 10 percent increase in the stock price—before IBM's top 300 executives can realize a penny of profit from their stock option grants. Putting that into perspective, IBM's market value would have to increase by $17 billion before executives saw any benefit from this year's option awards. In addition, these executives will be able to acquire market-priced stock options only if they first invest their own money in IBM stock. We believe these programs are unprecedented, certainly in our industry and perhaps in business.

Clearly, leading by values is very different from some kinds of leadership demonstrated in the past by business. It is empowering, and I think that's much healthier. Rather than burden our people with excessive controls, we are trusting them to make decisions and to act based on values—values they themselves shaped.
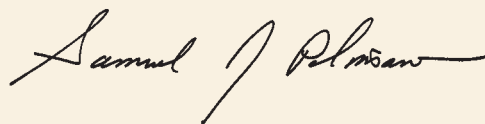
To me, it's also just common sense. In today's world, where everyone is so interconnected and interdependent, it is simply essential that we work for each other's success. If we're going to solve the biggest, thorniest and most widespread problems in business and society, we have to innovate in ways that truly matter. And we have to do all this by taking personal responsibility for all of our relationships—with clients, colleagues, partners, investors and the public at large. This is IBM's mission as an enterprise, and a goal toward which we hope to work with many others, in our industry and beyond.

Playing offense

Put it all together—a more focused business model, an industry shift that plays to our strengths, bets that are paying off in the near term, and a workforce that is united and impatient to become the great company we all aspire to be—and I feel good about IBM and our prospects.

Without the prod of fear or of a "burning platform," we've begun a substantial transformation of our company. For the first time in a very long time—probably since my early days with IBM 30 years ago—I'm seeing a company ready to focus more on opportunities than on threats, more intent on setting the agenda than on reacting to the moves of others. Our deep-seated optimism—a fundamental belief that IBMers have always possessed in progress, science and the improvability of the human condition—is reasserting itself. IBMers are ready to reclaim a position of leadership—in our industry and in the larger world of business.

Which is a very exciting place to be. For me and my colleagues, it's just terrific to be part of an energized IBM company that is once again ready to play some offense.

SAMUEL J. PALMISANO
Chairman, President and Chief Executive Officer

In the
company
of leaders

IF YOU WANT TO UNDERSTAND the changes shaping global business in the 21ST century, take a look into the corner office.

We're seeing the rise of a new generation of CEOs, who share a common point of view about how value is created today, how to exploit technology for tangible benefit, how to build different kinds of business relationships—and why those relationships, spanning all their company's constituencies, are vital to its success.

You'll also, more and more, find a leader who is actively driving the integration of business and technology and changing the way the organization operates—becoming what we at IBM call an on demand business.

For IBM, this shared point of view shapes everything we do— from our work with clients to the way we innovate. We have a new understanding of the potential for business in the world today. And we didn't just think it up on our own.

"If you can't differentiate yourself in this world, you get commoditized instantaneously. So we are constantly driving for more innovation, more differentiation and more technology. When I rally people inside GE, I say, 'Growth is out there to be had, but it's going to be uneven. Unless you are willing to make investments in the future, to take steps and stands, this is not a tide that's going to raise every boat. There are going to be clear winners and losers.'"

Jeffrey R. Immelt
CHAIRMAN AND CEO, GE

Tracing its origin to Thomas Edison's 1878 electric light company, GE has grown to become the world's most valuable company, with a market capitalization of more than $132 billion and 315,000 employees.

Jorma Ollila

CHAIRMAN AND CEO, NOKIA

"Nokia sees a future where the mobile phone industry can help companies mobilize their business processes, so they can be more competitive, innovative and flexible, and where users will enjoy the true benefits of enterprise mobility—connection to the people who matter, and to the data and processes that matter. Building this future requires strong industry cooperation and relies on an open business ecosystem to implement it successfully."

Nokia is the world leader in mobile communications, driving the growth and sustainability of the broader mobility industry. Nokia is dedicated to enhancing people's lives and productivity by providing easy-to-use and secure products like mobile phones, and solutions for imaging, games, media, mobile network operators and businesses.

Meg Whitman

PRESIDENT AND CEO, EBAY

"eBay is an on demand business.
Our industry is incredibly dynamic,
and we have to be the fastest moving,
most flexible, most single-focused:
a very simple company, actually.
We have 89 million customers
who expect us to be up 24 by 7, and
their needs are constantly changing."

AT IBM'S BUSINESS LEADERSHIP FORUM, NOV. 12, 2003

With 971 million listings in 2003, representing
$24 billion in gross merchandise sales, eBay defines
the category of online marketplace. Along with nearly
95 million confirmed registered users, eBay hosts
more than 150,000 stores online and provides
services such as its payment solution, PayPal.

Michael L. Eskew

CHAIRMAN AND CEO, UPS

"On demand and synchronized commerce are about treating every customer—and for us, every package— as if it were the only one we have. With 13 million packages a day going to and from 9 million customers, that's a tall order. Bringing synchronized solutions to our customers will allow the small to act big, the big to act small, and everyone to act global."

Founded in 1907, UPS has grown into a $30 billion corporation, and is a leading global provider of specialized transportation and logistics services. UPS operates in more than 200 countries and territories worldwide. Its innovative digital content management solution has streamlined and automated its workflow and approval routing processes.
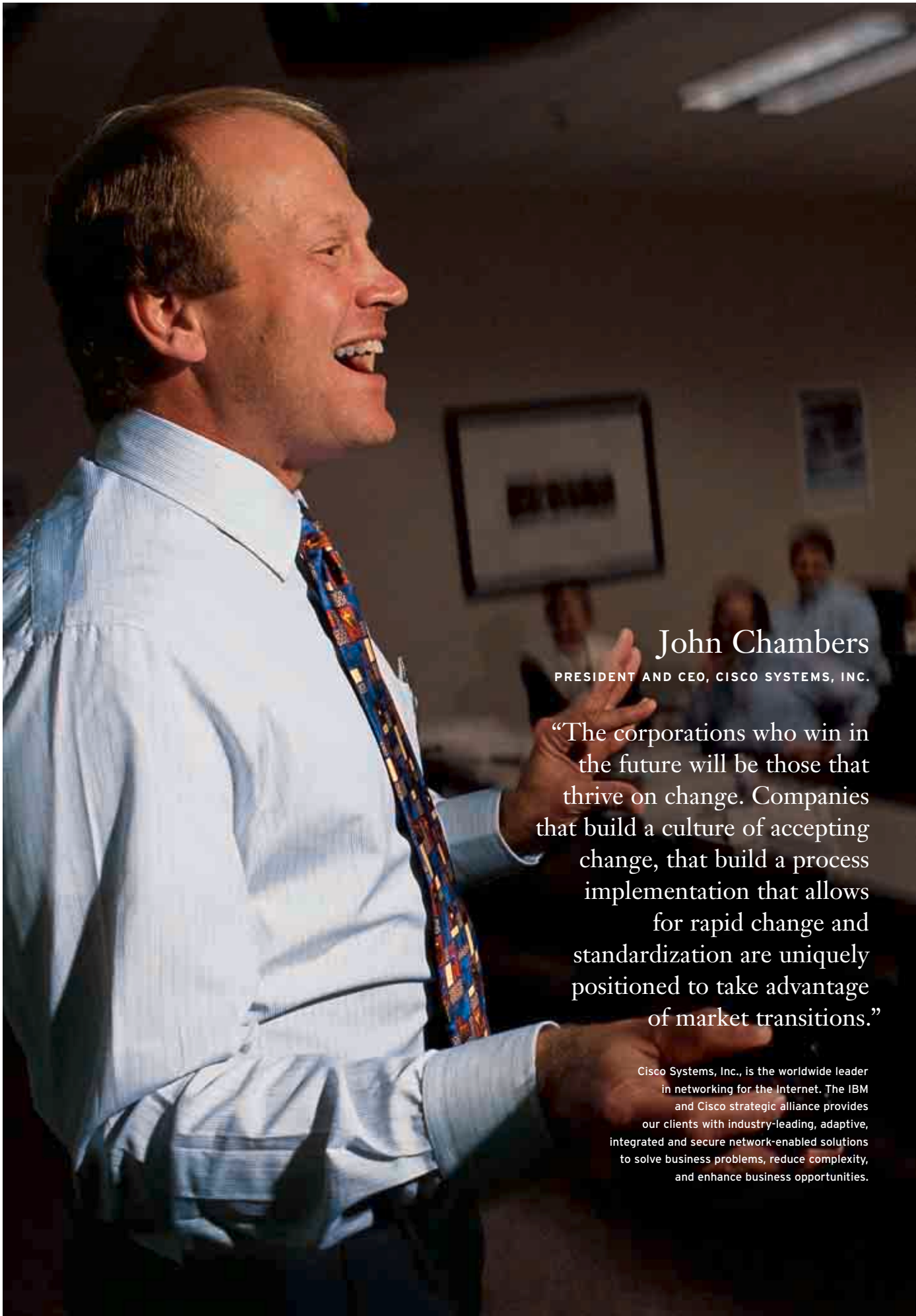
John Chambers
PRESIDENT AND CEO, CISCO SYSTEMS, INC.

"The corporations who win in the future will be those that thrive on change. Companies that build a culture of accepting change, that build a process implementation that allows for rapid change and standardization are uniquely positioned to take advantage of market transitions."

Cisco Systems, Inc., is the worldwide leader in networking for the Internet. The IBM and Cisco strategic alliance provides our clients with industry-leading, adaptive, integrated and secure network-enabled solutions to solve business problems, reduce complexity, and enhance business opportunities.

W. James McNerney, Jr.

CHAIRMAN AND CEO, 3M COMPANY

"The best and most sustainable innovation occurs where creativity and customer needs intersect. Good ideas don't just leap out of laboratories—they are called out by the clear voice of the customer and need to be reinforced with the right resources."

With operations in 60 countries and clients in more than 200, 3M is one of the United States' largest global manufacturers and a diversified technology company that has become an icon of innovation. Its creativity spans many markets—from display and graphics to electronics and communications, health care, safety, security and protection services, transportation and beyond.

Sir John Bond

HSBC GROUP CHAIRMAN

"HSBC has to be flexible to succeed. Companies today have to reinvent themselves constantly. You have to preserve the best of what's gone before, jettison what's no longer relevant and build the new. And you have to maintain your essential character while doing it."

HSBC is the world's second largest banking and financial services organization. Its international network, linked by innovative advanced technology, includes more than 9,500 offices in 79 countries and territories in Europe, the Asia-Pacific region, the Americas, the Middle East and Africa—and serves more than 110 million customers.
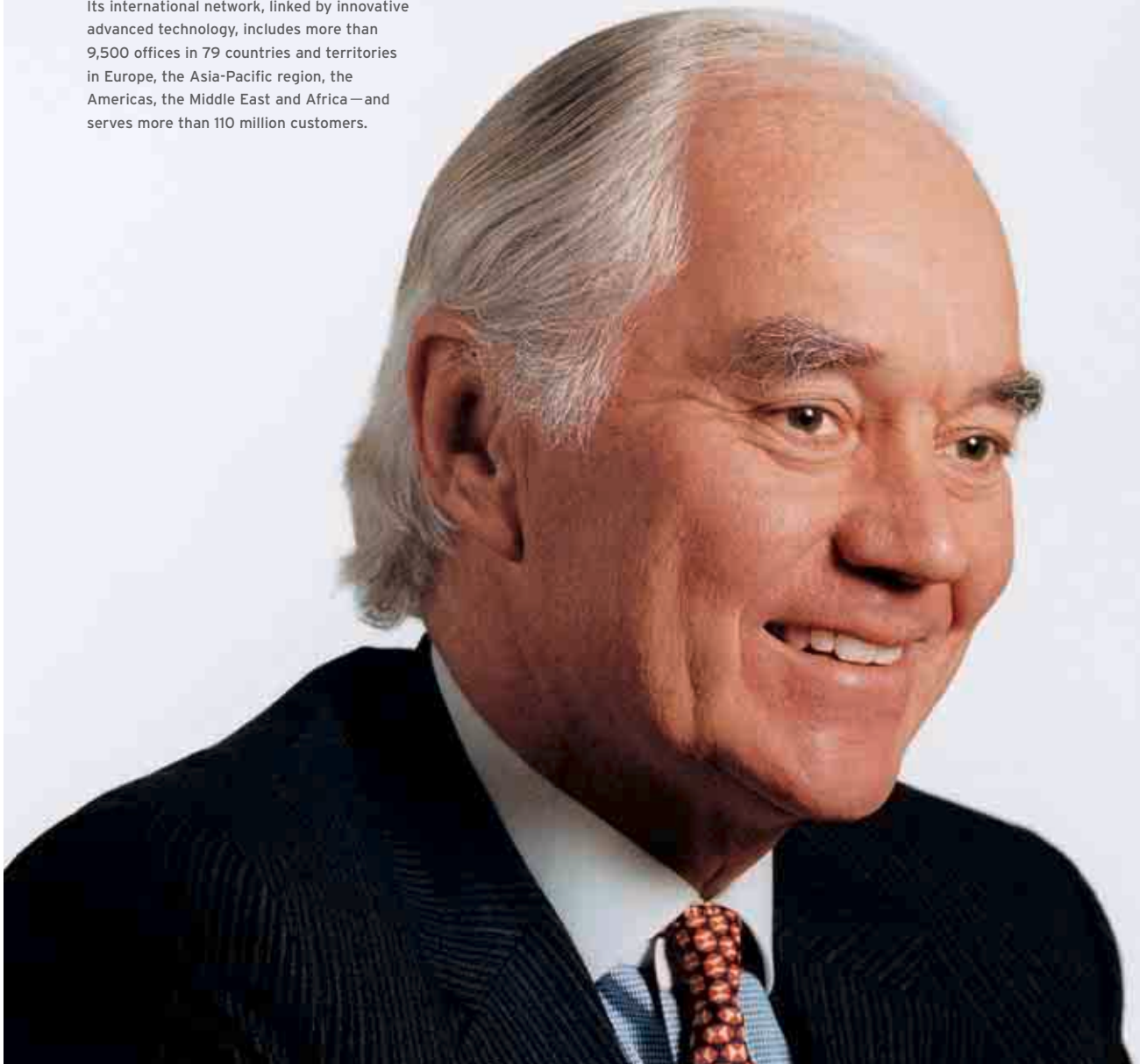
In the company *of* innovators

INNOVATION IS NOT JUST "INVENTION." It's what results when technical invention meets business insight. And it crosses fields of study, as well as industries.

What results? New business models. New ways to envision and build the physical environment. New ways of integrating knowledge and technology to enhance health and extend life. New ways to serve clients. New forms of creative expression.

This is how IBM pursues innovation—and this is the kind of innovation we pursue—every day, in our clients' workplaces, and in our own. Together, we apply intelligence, reason and science to make not just a product or a profit, but a difference. Because, while invention can be a solitary activity, innovation is always a collaboration.

Finnair
HIGHER MATH

WHAT ARE AN AIRLINE'S ASSETS, and how do they generate revenue? There are the fleet and routes, of course—but there is also a vast and continually growing store of data about travel and purchase histories. The problem is, this asset has been essentially unused. But what if that data could be analyzed and integrated with marketing programs and processes to predict buying patterns and sales appeal? Customer relationship management would then become customer equity management. And that would be a whole new way to run an airline.

That's how Finnair's long-term relationship with IBM took a new turn this past year, with the deployment of mathematical modeling and optimization algorithms designed by researchers from IBM's Zurich Research Lab. Processing frequent-flier data has a potential impact of reducing marketing costs by 20 percent while improving marketing response rates by as much as 10 percent. And that means big money—in increased revenues and in savings.

Still only a prototype, IBM's Customer Equity Management solution already has an 80 percent accuracy rate for predicting the eventual value a customer represents. By forecasting a frequent flier's future travel decisions, it's also helped improve the airline's customer satisfaction rate by 10 percent. And all from pulling numbers out of Finnair.

"With the many ills the airline industry faces today,
and in a highly logistical business, managing processes
by applying technology more widely
and more innovatively is a necessity."

**EERO AHOLA, SENIOR VICE PRESIDENT, CORPORATE BUSINESS
DEVELOPMENT AND STRATEGY, FINNAIR**

01.

OTHER DESTINATIONS

Finnair now uses IBM's Customer Equity Management system to understand its best customers much more deeply, and to tailor marketing programs to them—even aligning company strategy around their needs. And future applications could be broader still—helping make decisions about fleet deployment, the allocation of new routes, and contingency plans for some of the most serious challenges facing airlines today.

02.

GETTING UPGRADED

Finnair's relationship with IBM began decades ago, in the mainframe era. Since 2002, IBM has run the airline's data center operations, as well. But with Customer Equity Management, IBM and Finnair are taking a whole new trip together. "They've gone from being a supplier to being our data center to being a partner," says Eero Ahola. "It's a totally different relationship."

Frank Gehry

THINKING OUTSIDE THE BOX

"This technology provides a way for me to get closer to the craft. It felt like I'd been speaking a foreign language, and now, all of a sudden, the craftsman understands me. In this case, the computer is not dehumanizing; it's an interpreter." FRANK GEHRY, ARCHITECT

WALT DISNEY CONCERT HALL, LOS ANGELES

REPLACING BOXY BUILDINGS with bold, reflective, curvilinear designs takes courage and vision—especially when dealing with large-scale public works.

Master architect Frank Gehry is so excited about the potential of software to free architects from the constraints of paper, pencil and two-dimensional design programs that he recently created Gehry Technologies. This IBM-certified business partner sells the concept and the software itself to other architects and designers to help them unleash their own creativity.

Gehry was inspired by his experience designing Los Angeles' Walt Disney Concert Hall. Collaborative virtual product design software originally developed by IBM and Dassault Systèmes for the aerospace and automotive industries allowed craftspeople to understand Gehry's novel, three-dimensional designs precisely. With the technology, IBM Product Lifecycle Management Solutions, they knew how much material the design required and how the complex components would come together.

That helped in both creative and pragmatic ways. Removing uncertainties reduced costs as much as one-third, which proved critical in overcoming a raft of obstacles—from an economic down-turn to a major earthquake—standing in the high-profile project's way.

The result: One of the most acoustically sophisticated concert halls in the world, an instant global architectural landmark and the centerpiece of a $1.2 billion redevelopment project in L.A.'s downtown Bunker Hill district.

01.

FIRST COMES CREATIVITY…

A crumpled napkin. The movement of water around the bow of a boat. Who knows what will spark the creative mind? But the more unusual the design, the greater the risks. Can it be built? What will it cost? Will it perform as intended? Innovators like Frank Gehry have embraced new tools to tame this uncertainty principle—and to let their creativity take flight.

02.

…FOLLOWED BY SAVINGS…

Complex, free-form surfaces excite designers and delight the eye. CATIA (computer-aided three-dimensional interactive application) software makes even the most complex and unconventional designs readily understandable and gives craftspeople the tools they need to fabricate and assemble components efficiently.

03.

…AND THEN THE APPLAUSE

The Los Angeles Philharmonic Orchestra performed the first concert in its new home on October 23, 2003. Music critics marveled at the concert hall's acoustics. Architecture critics praised the "exquisite craftsmanship" of the "stunning organic sculpture." One critic pronounced it a "rhapsody in steel." Yet another was confident that, "over time, it will be to Los Angeles what the Eiffel Tower is to Paris."

IN 2003, INDEPENDENT SOFTWARE VENDORS WITH WHOM IBM HAS A STRATEGIC ALLIANCE INFLUENCED MORE THAN $10 BILLION OF IBM SERVICES, HARDWARE AND SOFTWARE REVENUE, *more than double the amount* INFLUENCED IN 2001.

MORE THAN 90,000 BUSINESS PARTNERS WORLDWIDE (CONSULTANTS, INTEGRATORS, SOFTWARE VENDORS, VALUE-ADDED RESELLERS AND DISTRIBUTORS) GENERATED *more than* 1/3 OF IBM'S REVENUE IN 2003.

FLIP A SWITCH, and thousands of people and buildings instantly appear. Flip it off, and they go away. On. Off. On. Off. Sounds like a cartoon, doesn't it?

For Threshold Digital Research Lab, a digital production company that's really in the business of intellectual property management, it is a cartoon... or a full-length film, a television show, or a Web site. It's whatever high-end graphic, animation and special effects power they need right at that moment. On. Off.

They have all the IT muscle they need to challenge far larger competitors without breaking the bank, because this groundbreaking studio pays only for the computing capacity as it's needed—an especially attractive pricing model for an entertainment company, which faces surges in demand ("opening next week, everywhere") and periods of lower-intensity use ("coming next fall to a theater near you"). Think of it as supercomputing on demand: IBM hosts the computing in New York, and Threshold animators and artists in California apply their super-creative talents to make the most of it.

Threshold's upcoming full-length animated feature, *Foodfight!,* will include 138 speaking characters, more than 6,000 "extras" and 174 sets with nearly 5,000 buildings—all digital, and all ready for an early call at the flip of a switch, anytime they're needed. So despite the complexity of the project, Threshold has been able to use IBM's Deep Computing Capacity On Demand Center to shorten its production cycle to 18 months—less than a third of the time it takes to produce most animated films.

01.

THE VIRTUAL STUDIO

Major film studios used to need up to 500 acres of sets, props, costumes and characters. Today, Threshold's "virtual backlot" is making a feature with more of all of these than the largest epics of the past—in a studio of less than 10,000 square feet. And when filming "wraps," Threshold doesn't have to destroy the sets and send its character actors packing. They remain intact and accessible for modification and future use by other Threshold artists.

02.

ON TIME AND ON BUDGET

Even popular films often lose money simply because they cost too much to make. Threshold's on demand e-studio avoids the large permanent overhead some of its competitors must support. And it uses human capital just as efficiently. Threshold's core group of animators can tap the talents of remotely based colleagues using industry-standard IBM workstations. Chairman and CEO Larry Kasanoff believes his on demand business model can cut costs as much as 40 percent.

SOME CUSTOMERS TAP INTO IBM'S DEEP COMPUTING CAPACITY ON DEMAND CENTER, WHILE OTHERS HAVE CAPACITY ON DEMAND SITTING IN THEIR IBM MACHINES, WAITING TO BE TURNED ON. IN FACT, MORE THAN $500 MILLION *of that capacity on demand was turned on in 2003, with another* $10 BILLION STILL IN THE MARKETPLACE.

Threshold Digital Research Lab
READY FOR ITS CLOSE-UP

"IBM on demand technology is allowing us to compete against people who may have more resources than we do, in the following very simple way: It allows us to make our entertainment better, faster and cheaper. The On Demand Center takes away the words, 'I can't,' and makes you say, 'Hey, I can do anything I can think up.'"

LARRY KASANOFF, CHAIRMAN AND CEO, THRESHOLD ENTERTAINMENT

GILFAM
REAL-TIME REAL ESTATE

"We have to set a legal framework in order
to provide a land register available to everybody,
yet we have to satisfy specific conditions,
such as insuring privacy and safeguarding against misuse."

**JEAN-LUC VALLENS, JUDGE, PRESIDENT OF THE PUBLIC
GROUP FOR THE COMPUTERIZATION OF THE LAND REGISTER OF
ALSACE AND MOSELLE (GILFAM)**

OVER THE LAST FIVE YEARS, IBM'S BUSINESS WITH GOVERNMENTS WORLDWIDE HAS MORE THAN DOUBLED—GROWING AT A RATE IN 2003 *more than* FIVE TIMES THE INDUSTRY AVERAGE IN EUROPE, THE MIDDLE EAST AND AFRICA COMBINED, *and more than seven times the industry average* IN THE AMERICAS.

IN THE UNITED STATES, IBM HARDWARE, SOFTWARE AND SERVICES CAN BE FOUND IN *more than* 90 PERCENT *of federal agencies.*

IN THE ALSACE AND MOSELLE jurisdictions of eastern France, what worked to ensure the rights of property owners has worked against the needs of modern business development.

Local law in the region keeps things very local. Only original documents can be used for all land title transactions. Also, the documents may not leave their regions. And their authenticity has to be guaranteed—signed—by the local judge. The rules are in some ways unique, due in part to the inheritance of regulations and customs from periods of French and German sovereignty.

The problem was, owners and mortgage bankers could barely conduct business away from the local courthouse. So GILFAM, the government bureau that oversees the computerization of the land registry for this part of France, worked with IBM to create a novel system for on demand security and the authenticity of digitized titles and deeds. The result is useful not just for land registries, but for many other regulatory agencies requiring official approvals and notarizations.

Using smartcards, biometric identification tools and time stamps, judges will be able to sign registry documents in digital fashion, making them available online for buyers, builders and lenders as well. The GILFAM registry and process have thus been virtualized—one of the keys to making the business of government on demand.

O1.

THE MORE THINGS NEED TO STAY THE SAME…

Land title archives for the three government jurisdictions that make up GILFAM—Moselle and the Upper and Lower Rhine divisions of Alsace—go back 300 years and have at different times been written in French, German and Gothic German. An elementary but necessary step was turning all these deeds— 2.5 million sheets of paper in 40,000 registers held in 46 registry offices—into digital documents.

As a result of the system created by IBM, the transfer of real estate titles will now combine the assurance of a secure system with robust user authentication, to maintain the registry's integrity, as required by law. Something a judge has (such as a hardware token), plus something the judge knows (a personal password), and something the judge "is" (a biometric pattern like a fingerprint) will produce something everyone can use and trust.

O2.

…THE MORE THINGS NEED TO CHANGE

The project for a computerized land registry *(livre foncier informatisé)* is a good example of the integration of technology and law in effective e-government. New processes and supporting technology were created by the IBM team to support the GILFAM mission, but new laws had to be passed by the French government to support the validity of digital signatures and the authenticity of an e-business registry office.

This model can apply to governments everywhere as they transform themselves to become on demand. In the United States, for example, the Food and Drug Administration has issued regulations that permit the use of electronic records and digital signatures in place of paper and handwriting once the outlined requirements are met. The end result for these agencies is greater flexibility and efficiency, as well as easier access for citizens and corporations.

IN ACADEMIC CIRCLES, it's widely known as the "traveling salesman problem": Take a finite number of points and the cost of travel between each pair of them. Then find the most cost-effective way to visit all the points and return the traveling salesman to where he started. But for a leading limousine company serving thousands of traveling salespeople and other professionals every day, it was a complex business problem, as well.

When BostonCoach initially asked IBM to install a global-positioning system, so that its dispatchers could find optimal routes, it inspired us to see the fleet itself as an organic system. In the process, we rethought how a limo company (with thousands of customers, rides and routes on any given day) could become an on demand business, with continual response and analysis of data in the search for maximum efficiency.

With the solution developed by IBM, the drivers' assignments are still made by fleet controllers—real people with years of experience. But the system now uses an algorithm developed by IBM researchers to solve the problem of scheduling. By considering positioning data, business "rules" and even driver pay rates and FAA schedules, the Fleet Optimization System maps the location of drivers and customers and suggests to dispatchers the best matchups.

As a result, while other travel companies have experienced declines in revenue and customer loyalty, BostonCoach is on target to achieve a 20 percent increase in productivity and a 10 percent increase in sales.

01.

NOW SERVING ATLANTA

Despite the name, BostonCoach has operations in nine major cities, with affiliates in more than 450 other cities globally and with as many as 1,000 to 1,400 rides per day in its largest markets. Normally, establishing service in a new city would require BostonCoach to create a new dispatch center operating 24 hours a day, 7 days a week, right at startup. With the efficiencies of the Fleet Optimization System, in 2003 the company entered an entirely new market—in Atlanta—by relying completely on its existing dispatch centers.

02.

BETTER SERVICE WITH BETTER SCHEDULES

BostonCoach leads in the van, limousine and sedan service industry for on-time pickup, but leadership used to come at a cost. Before the system created by IBM's On Demand Innovation Services, dispatchers would often turn down last-minute reservations—or send two cars to meet a single customer—rather than risk brand-damaging disappointment. Now, fleet controllers can accept more business and use cars more efficiently, with a system that optimizes schedules for three different time scales: daily, every 15 minutes and even several times per minute.

BostonCoach

YOUR RIDE IS HERE

"The real differentiation is in the quality of service that you deliver. More likely than not, technology initiatives will become a commodity down the road, so you really want to be first to market—to get in first and hook customers." RUSS COOKE, PRESIDENT, BOSTONCOACH

Mayo Clinic

REFINING THE ART OF HEALING

"Wouldn't it be marvelous if I knew not just the
exact location of the patient's cancer but its gene characteristics,
and the outcomes with the last 500 patients at Mayo
with cancer in that identical location and with those
identical genetic characteristics?" **DR. HUGH SMITH, MAYO CLINIC**

IN THREE YEARS, *Life Sciences has become a* $1 BILLION *business* FOR IBM, *more than doubling revenue* EACH YEAR SINCE ITS FORMATION IN 2000. NEW CLIENTS INCLUDE 25 OF THE TOP PHARMACEUTICAL AND BIOTECHNOLOGY COMPANIES.

IN THE AREA OF MEDICAL DEVICES AND DIAGNOSTICS, *more than 60 leading analytical instrument and tools companies* NOW BASE THEIR OFFERINGS ON IBM TECHNOLOGY, INCLUDING IBM MIDDLEWARE, SERVER PLATFORMS AND SERVICES.

FOR A MEDICAL CENTER, loss means something far more serious than it does for almost any other business.

And the prospect of loss becomes maddening if there's any possibility information for treatment and cure might already exist—but be hidden inside archived case files, or in trends across millions of records, requiring lengthy, expensive studies to uncover. If only doctors could tap data from consenting patients with similar epidemiological or genetic makeup, much faster, more effective, individualized therapy would be possible.

Now, with IBM's help, the world-famous Mayo Clinic is increasing exponentially the ability to sift through their warehouse of patient data—and helping doctors make sense of it. As a result, medicine can become less about the science of trial-and-error and more about the art of healing.

It was Mayo Clinic that originally pioneered the idea of collaborative medicine—the joint application of the greatest medical minds to treat an illness and cure a disease. And now they've expanded that collaborative approach into the realm of patient histories. Through IBM's on demand solution, trends and correlatives become identifiable—speeding the course of discovery and enhancing patient care.

01.

2,400 HEADS ARE BETTER THAN ONE

The new system will provide Mayo Clinic's 2,400 physicians with differing levels of on demand access to medical data to support diagnoses and treatment decisions based on information collected from millions of informed, consenting patients. To ensure patient privacy and confidentiality are maintained, physicians conducting research will access only general information ("a 38-year-old female with a family history of heart disease"), while the treating doctor accesses the records of her specific patient—no matter where those records originated or physically reside.

02.

FROM MONTHS TO MINUTES

The Mayo Clinic Life Sciences System can perform complex, cross-patient correlations across patient demographics, diagnostics and laboratory results— for all of the 4.4 million patient histories in their vast data warehouse. Medical searches by symptom, patient age, laboratory result, drugs prescribed and other factors—searches that once took months—are completed in a matter of minutes, giving physician investigators the information they need, where and how they need it, facilitating discovery and patient care improvement.

03.

CHANGING HOW MEDICINE IS PRACTICED

As the understanding of genetics increases, the system will aggregate patient genomic information, as well as proteomic data and research information, from a variety of sources. This will help quicken the pace of clinical research, identify likely participants in clinical trials, help researchers understand illness on a molecular level, and allow physicians to treat patients and practice preventive medicine based on an individual's own physical makeup.

In the company *of* visionaries

THERE IS A GROWING—WE THINK UNSTOPPABLE— realization that neither technology nor business will for long be controlled by a small number of people or companies. Aside from the obvious economic advantages of an "open" approach, there is simply no other way to bring about the world we envision—the world we need.

The implications are far-reaching and broadly empowering. Opening access to other people and their information creates relationships that didn't exist before, which then become engines of creation themselves. Crossing barriers—between languages or even areas of expertise—opens up opportunities for the creation of new economic, business and societal value.

Connections arise between people and ideas, technologies and processes—and what started as a commitment or passion just a few years ago may end up as the leading position. And once you're there, it's good to find out that you're not alone.

by Martin Scorsese

FILMMAKER/CHAIR, THE FILM FOUNDATION

Film has undeniably changed the way
people view themselves. The ability to see
the world in motion, mechanically reproduced,
first in image and then married to sound,
is a monumental development in human history.
It's allowed us to see ourselves in ways
we never would have previously imagined.

Of course, a change of this magnitude affects culture and
society in complex, dramatic ways, some better than others.
But ultimately, cinema is about people—all cinema is about
who we are as human beings. And film has allowed us a glimpse
into other cultures like no other medium.

In the working-class Italian-American neighborhood where
I grew up, cinema was my introduction to other cultures.
Through film, I identified with people who looked and lived
differently from myself. Through this identification, superficial
differences disappeared, and I saw myself and the people I
knew in these films.

In today's world, it's important we recognize our interde-
pendency: we are not alone, and certainly not isolated.
Technologies as complex as the Internet, and as comparatively
simple as motion pictures, serve to unite the world and to
erase boundaries. Exposure to other cultures only enriches
our own. Film is a powerful tool for knowledge and for
understanding.

IBM, THE FILM FOUNDATION AND THE
UCLA FILM AND TELEVISION ARCHIVE WILL PRESERVE
AND ARCHIVE *more than* 27 MILLION FEET OF
HEARST METRONOME NEWS COLLECTION NEWSREEL FOOTAGE
DATING FROM 1913 TO THE 1960S, WHICH HISTORIANS,
SCHOLARS AND THE GENERAL PUBLIC *can access online.*

IBM ALSO SUPPORTS THE FILM FOUNDATION'S EDUCATIONAL
INITIATIVE, "THE STORY OF MOVIES"—AN INTERACTIVE,
INTERDISCIPLINARY CURRICULUM ENABLING EDUCATORS TO
teach students critical thinking ABOUT THE HISTORICAL
AND CULTURAL SIGNIFICANCE OF FILM.

TO ADVANCE LEARNING'S FRONTIER, WE NEED
TO CROSS DISCIPLINES

by Shirley Ann Jackson, Ph.D.
PRESIDENT, RENSSELAER POLYTECHNIC INSTITUTE

For decades, in both business and science,
the trend was specialization—knowing
more and more about increasingly
focused and narrower areas.
Today, the boundaries of specialization
are blurring.

Many of the most exciting frontiers of scientific research today—such as biotechnology, genomics, and nanotechnology—represent a convergence of disciplinary forces, creating new discoveries and often new science.

As these emerging scientific areas grow and expand, they increasingly overlap. And as they do so, they begin to inform each other, yielding even greater discoveries. Their function requires multidisciplinary and interdisciplinary approaches and the use of sophisticated computing tools.

That is what information technology represents—

a requisite support system for human thought and human creativity.

At this point, there are still more questions than answers about the full impact of information technology in transforming the university. Many of the questions will be answered, in time. What we know now is that we must be prepared for disruption, and that universities must devote sufficient resources and investment to getting ahead of the curve in this new era. Information technology cannot just be grafted onto existing plans. It must be an integral part of a new planning process.

IBM AND RENSSELAER POLYTECHNIC INSTITUTE,
America's oldest technological research university,
CREATED THE RENSSELAER CENTER FOR BROADBAND DATA TRANSPORT,
SCIENCE AND TECHNOLOGY. THE $33 MILLION RESEARCH CENTER
PROVIDES AN IT INFRASTRUCTURE
TO HANDLE ANY LEVEL OF INTERNET TRAFFIC,
DATA STORAGE, AND NEW SCIENTIFIC CHALLENGES THAT REQUIRE
IMMENSE COMPUTING POWER.

THE WORLD WIDE WEB MUST LIVE UP TO ITS NAME

by Harry P. Pachon, Ph.D.

PRESIDENT, TOMÁS RIVERA POLICY INSTITUTE, AND PROFESSOR OF PUBLIC POLICY, UNIVERSITY OF SOUTHERN CALIFORNIA

and Elsa E. Macias, Ph.D.

SENIOR RESEARCH ASSOCIATE, TOMÁS RIVERA POLICY INSTITUTE, UNIVERSITY OF SOUTHERN CALIFORNIA

Despite the increase of multilanguage material online, most Web content is still in English.

This leaves Spanish-dominant Web users—especially vulnerable low-income and underserved Latinos— with minimal access to vital material on the Web that can help them address health, education or life-skills issues. Given the large and growing number of first-generation Latinos in the United States, this need will continue to be important for years to come, affecting millions. The ¡TradúceloAhora! (TranslateNow!) grant program, pioneered by IBM in response to a report it commissioned on the Latino digital divide, provides a creative solution to the problem. IBM created, and is now donating, English-to-Spanish translation software and technology for nonprofit organizations across the United States, opening a world of information for Spanish-speakers and bilingual online users.

THE TOMÁS RIVERA POLICY INSTITUTE (TRPI) IS THE *premier Latino think tank*. IN 2003, IBM LAUNCHED A MULTIMILLION-DOLLAR ¡TradúceloAhora! AUTOMATIC TRANSLATION GRANT PROGRAM, WHICH HAS HELPED TRPI AND 30 OTHER NONPROFIT ORGANIZATIONS *address the digital divide* FOR LATINOS WITH IBM'S WEBSPHERE TRANSLATION SERVER.

DON'T THINK "COMPUTERS," THINK COMPUTING

by Xie Huanzhong

DIRECTOR-GENERAL, DEPARTMENT OF SCIENCE AND TECHNOLOGY,
MINISTRY OF EDUCATION, PEOPLE'S REPUBLIC OF CHINA

The China Grid will provide a wide range
of advantages over standard computer networks for
university students and researchers—and its uses
will go far beyond the academic world.

Innovation is the spirit and soul of China's economic development. And it is also key to our students' aspirations for personal development and for making a difference—for their country and for human civilization.

China is one of the first countries to implement a computing grid of this scale. It is a computing network, much more efficient than a network of computers. You simply can't compare traditional clustering and data storage capacity with those of a grid. For example, the China Grid will fully utilize the information and computing resources of our CERNET (China Education and Research Network), and will enable resource sharing, eliminate information islands and provide an effective and high-standard platform for computing at our universities.

This implementation of grid computing will help bring down costs and raise the bar for quality control. It will transform teaching and education in general by better utilizing online information and by providing a robust environment for scientific research. Students and researchers will use the China Grid for image processing, biological information science, hydrodynamics, e-campus activities and other computing-intensive projects.

But grid computing is also the future environment for applications ranging from e-business, telemedicine and a variety of industries to even the home and entertainment markets. Working together, progressive policy and IT infrastructure can enable economies and markets to grow rapidly—but in an orderly fashion.

UPON COMPLETION, THE CHINA EDUCATION AND
RESEARCH GRID WILL BE CAPABLE OF LINKING *more than* 200,000
students and faculty members FROM NEARLY 100 UNIVERSITIES
ACROSS THE PEOPLE'S REPUBLIC OF CHINA TO A VIRTUAL SUPERCOMPUTER—
BASED ON NEW WEB SERVICES TECHNOLOGY IN WEBSPHERE—CAPABLE OF
CONDUCTING 15 TRILLION CALCULATIONS PER SECOND.

SOMETHING VENTURED, SOMETHING GAINED

by Robert Grady, James W. Breyer, *and* Lip-Bu Tan

JAMES BREYER IS CHAIRMAN, AND ROBERT GRADY AND LIP-BU TAN
ARE BOARD MEMBERS, OF THE NATIONAL VENTURE CAPITAL ASSOCIATION, AN ORGANIZATION
REPRESENTING MORE THAN 400 MEMBER FIRMS WORLDWIDE.

THE VENTURE CAPITAL INDUSTRY during the bubble perhaps made one mistake—investing only in cutting-edge technologies being sold only to other, larger IT companies. When the big cap companies caught a cold, the little companies got pneumonia. We believe that the more powerful trend is the deployment of technology throughout the industrial economy—in automotive manufacturing, defense and aerospace, health care, logistics, transportation, you name it. Technology continues to penetrate and offer productivity improvements in each of these sectors. The reengineering of businesses in America and around the world is far from complete, and its daily story is very exciting to us. — ROBERT GRADY

SOME PEOPLE SAY OPEN SOURCE software has commoditized segments of the IT industry, but I would argue that it re-energized technologies that had stagnated and lacked innovation for some time. Customers have long felt exploited by the proprietary vendors who base their pricing on lock-in and market power, rather than innovation or value delivered. The open source movement is as much a customer rebellion against that exploitation as it is a developer movement. And it's not only about cost. On the flipside, traditional software companies had better be prepared to justify their value continually, or they risk falling prey to the next open source project. — JAMES BREYER

THE WILD EXUBERANCE surrounding the Internet resulted in a get-rich-quick euphoria that afflicted entrepreneurs, large corporations, venture capitalists and small investors. Huge amounts of money went into business models that never really made sense. Vast sums were spent on marketing and advertising to propel growth in an effort to IPO the company as soon as possible. Hopefully, the VC industry learned some good lessons. We are still very excited about the continuing innovations that we see in the IT sector. But, we have to build companies the old-fashioned way: with lots of entrepreneurial hard work and sweat equity, smaller rounds of financing, slower growth and self-financing revenue plans, and with more responsible involvement from venture capitalists in building the businesses. — LIP-BU TAN

IBM BELIEVES THAT VENTURE CAPITALISTS ARE A POWERFUL FORCE FOR INNOVATION. *We actively build relationships* WITH THE VENTURE CAPITAL COMMUNITY TO SHARE OUR VISIONS, STRATEGIES, STANDARDS AND ARCHITECTURES, AND TO IDENTIFY EMERGING BUSINESS OPPORTUNITIES.

From left to right:
ROBERT GRADY IS MANAGING DIRECTOR OF THE CARLYLE GROUP.
JAMES BREYER IS MANAGING PARTNER OF ACCEL PARTNERS.
LIP-BU TAN IS CHAIRMAN OF WALDEN INTERNATIONAL.

by Sanjay K. Jha

EXECUTIVE VICE PRESIDENT & PRESIDENT,
QUALCOMM CDMA TECHNOLOGIES (QCT), QUALCOMM

Wireless communications is one of the most exciting growth opportunities in technology. And its greatest impact may not be in the new multimedia devices that support CD-quality audio, integrated cameras, high-quality graphics for gaming, and video for news and teleconferencing that are generating most of the attention in the industrialized countries.

Perhaps less appreciated, though more consequential, is the role the wireless industry is playing in bringing simple voice communication and Internet connectivity to newer, emerging markets, such as India, Southeast Asia, Latin America, and of course China, which now has more wireless users than users of traditional landlines.

QUALCOMM develops the chipsets and integrated applications to make wireless devices smaller, more versatile and less costly. To do that, we have to manage our global supply chain and understand the needs and preferences of consumers in each regional marketplace. We also have to be acutely sensitive to governmental practices in each of the dozens of countries in which we do business, because the scarcity of wireless spectrum invites a high degree of regulation.

With so much to know and so little time to act on that knowledge, we knew we'd have to stay extraordinarily focused if we were to succeed. From the beginning, we were convinced the most successful companies would be those that concentrated on their core areas of expertise while depending on the proficiencies of their partners. The transition from an innovative idea to a commercially successful product requires an enormous amount of collaboration among consumer electronics device manufacturers, applications developers, wireless carriers, and partners like IBM, whose technology development expertise we rely on to deliver leading-edge semiconductors.

WORKING TOGETHER FOR *more than 10 years,* QUALCOMM AND IBM HAVE MANUFACTURED AND SHIPPED MORE THAN 300 MILLION CHIPS FOR THEIR CELLULAR PRODUCTS, HELPING QUALCOMM TO BECOME THE WORLD'S LARGEST "FABLESS" SEMICONDUCTOR COMPANY.

by Stuart Cohen

CHIEF EXECUTIVE OFFICER, OPEN SOURCE DEVELOPMENT LABS

OPEN SOURCE SOFTWARE is very much like science. You have an idea, you make something, you test it, and if it works, then you and others in the world go do something useful with it.

It's all open so people can understand how the software works, how to improve it and where the bugs and security problems might be. It's a much more efficient way to get things done. This is very valuable to business.

The openness can also speed time to market with new services and software. And it's much easier and less expensive to adapt open source software to meet your business requirements than it is with proprietary software.

We believe that Linux, in particular, offers a very compelling value proposition. Customers like things that are faster, better, cheaper and more reliable and flexible. That's Linux in many markets already.

by Ian Foster

ASSOCIATE DIVISION DIRECTOR, ARGONNE NATIONAL
LABORATORY AND ARTHUR HOLLY COMPTON PROFESSOR OF
COMPUTER SCIENCE, UNIVERSITY OF CHICAGO

GRID TECHNOLOGIES are very much an evolutionary step forward, made possible by the sharing and integration of resources and services within distributed, dynamic, multiorganizational settings. And although early grid deployments are comparatively modest in scope, even these are already doing far more than today's office networks or the Web. Their benefits fall into three main areas: increased productivity, reduced costs and the enablement of entirely new applications.

The ultimate goal of grid computing, however, is revolutionary: to virtualize computing, so that individuals or companies can call upon the computing, storage, data and software that they need to do their work, regardless of location and from the lowest bidder.

Open standards are vital to the success of grids because grids are about integration, and without standards our ability to integrate is limited. Decisions you make now will make it far easier (or harder) to provide grid capabilities as you move forward.

IBM IS A LEADER, SIGNIFICANT CONTRIBUTOR OR
IMPORTANT PARTICIPANT IN NUMEROUS OPEN SOURCE PROJECTS.
Key areas include: LINUX, INTERNET STANDARDS, HTTP SERVER, XML, SOAP,
WEB SERVICES, APACHE, ECLIPSE AND THE GLOBUS ALLIANCE.

In the company of IBMers

A publicly held corporation is a legal entity, but it is also a set of relationships—between the company's people and its shareholders, and among clients, suppliers, distributors, organizations and the communities where its people live and work. For 319,000 IBMers around the world, relationships are the context for our work, where collaboration fosters innovation and leads to client success.

In July 2003, tens of thousands of IBMers reexamined their relationship with this company and with each other in a 72-hour online discussion that took place via IBM's global intranet. They discussed, debated and explored what it means to be an IBMer today and what needs to change to keep them motivated for tomorrow. In the end, they shaped and committed to three values that will guide everything we do.

IBMers value:

• Dedication to every client's success
• Innovation that matters—for our company and for the world
• Trust and personal responsibility in all relationships