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IBM Field Guide



*The*  
EXECUTIVE E-BUSINESS  
INFRASTRUCTURE  
*Guide*



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*The*  
EXECUTIVE E-BUSINESS  
INFRASTRUCTURE  
*Guide*

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# PREFACE

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INFRASTRUCTURE IS NOT GLAMOROUS or flashy. It doesn't win design awards. Until recently, the media didn't cover it. Cable talk show hosts didn't argue about it. Business columnists didn't write reviews about it.

It was invisible. Yet, in a connected world, a Web-centric e-business world, infrastructure *is* the game. Without the right infrastructure, the biggest ideas will fail. The most innovative business models will flop. The most cleverly planned Web sites will crash.

*Infrastructure is a technology issue, sure.*

But it's also a strategic issue, a customer-service issue, a sales issue, a supply chain issue, an HR issue – with everything, somehow, relating to infrastructure.

Remember the days when “the computer is down” meant the whole company was down? Well, in the future, it won't be “the computer” that is down; it will be “the infrastructure.” In the new world, networks of application servers, storage servers, messaging servers, middleware – infrastructure – are “the computer.” And when it “goes down,” it will cost companies massive amounts of time and money.

IBM first made its mark on the world in those days when “the computer is down.” We knew how to keep large companies up and running, day and night. And in an e-business world, we know how to keep your infrastructure up and running – how to plan it, design it, back it up, manage it ... all the things you will need to do in an e-business world to capitalize on the opportunities.

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*Like the duckbill platypus, e-business is a product of evolution.  
85% of all e-business infrastructures are mutations of existing systems.*

## CHAPTER 1: E-BUSINESS EVOLUTION AND THE ISSUES CUSTOMERS FACE.

.....

YOU WOULD HAVE TO HAVE BEEN on another planet not to have witnessed the passing revolution called e-business.

Remember? It was filled with the promise of wealth, the excitement of opportunity, the intensity of rapid innovation and the passion of entrepreneurship. High-flying startups and nine-figure IPOs.

The investments were enormous – the losses staggering. Only the noise of the backfire was louder than the early e-business sonic boom.

Business plans without profit now sound as ridiculous as, just a few months back, they sounded revolutionary.

Despite the fact that a lot of Internet retailers burst upon the scene proclaiming whole new business models, in reality, their business was built on a centuries-old value proposition: lower price.

We also saw the brief fascination with B2B marketplaces – many of them still alive today only in press releases, unmaintained Web sites, and penny stock.

*Predictably, the fever has passed.*

So where exactly are we? Lost in all the din of the dot-com euphoria were fundamental e-business truths:

- e-business is about transforming your business, moving core business processes online, making your company run far more efficiently.
- e-business is about improving the quality of service and relationships with all your company's important constituencies – customers, employees, vendors and suppliers.
- e-business is about real business value – cutting costs dramatically, increasing margins and finding new customers and new markets.
- e-business is about the future – staying competitive in a world in which universal connectivity changes the rules of the game.

And a business evolving into an e-business takes time. There are many stages of e-business. Companies move through these stages at different speeds, according to their own internal needs and the needs of their industry. The brokerage business went through multiple stages very quickly. The retail business evolved quickly but not quite as quickly as the brokerage business. The media and entertainment business is still in relatively early stages of e-business (but moving rapidly). Each stage has different characteristics and different benefits.

*Each stage of e-business has different issues and opportunities.**It is important that you understand them and be able to talk about them.*

FIRST-STAGE E-BUSINESS is about rudimentary information access – a simple connection to the Internet. E-mail-based communication. Maybe a dial-up account. Maybe a modest one-page Web site. You've been there. This larval stage is basic and inexpensive, requiring only a single person to make it happen.

Stage of Evolution	Stage 1 e-business	Stage 2 Integrated e-business	Stage 3 Dynamic e-business
<b>The Business Model</b>	e-business	Advanced e-business	Virtual Corporation
<b>The Technology Model You Build</b>	Web Infrastructure	e-business Infrastructure	Self-Healing Infrastructure
<b>The Technology Model You Buy</b>	Web Hosting	e-sourcing	Business Process Outsourcing

Fig. 1-1: Where are you now? Where do you want to be?

Then the first stage begins to require a little more of everything: more pages added to the site, more offerings beyond contact information, more bandwidth. Sales and service are expanded, but transactions are still conducted and completed primarily over the phone and by fax, although some customers, employees, and suppliers can execute simple transactions by putting a browser in front of an existing application. Do it right and you earn a bookmark from customers and other interested parties.

*Then it gets interesting.*

SECOND-STAGE E-BUSINESS. Pages multiply. Customers multiply. Problems multiply. Often efforts are fragmented: sales has a site for customers, purchasing has a site for suppliers, HR undertakes their own Web initiative. With the benefits of marketing and sales efficiencies comes the need for the integration of disparate applications and data.



“You’re So Ready for IBM” Situation #1: Time-to-Market



A newly profitable dot-com is celebrating its success on the deck of a San Francisco-based party yacht. The exuberant founder announces a new round of funding. But the twenty-million-dollar infusion has one catch. The company must roll out new capabilities “in Hong Kong, Tokyo and Singapore...and do it in ninety days.”

A deafening silence, until a reveler yells, “What do we have to do for ten million?”

Second-stage e-business is also about complete transformation: Web-enablement of all core business functions. Electronic outreach on a global scale. The amount of Web transactions explodes. Large volumes of data must be stored. Scalability – the ability to expand your network and software – becomes a huge issue. How powerful are our servers? Is the network wide enough not to choke data? Can existing desktop software keep up with the new flows of data?

*And the second stage is not just an IT concern.*

Staffs swell to handle the mushrooming of equipment and the maintenance it requires. A small army of programmers may be necessary to update and refresh the content of your Web site. Even translators may be needed to handle new language components as you attract attention from other regions.

That is, if an organization reaches beyond its boundaries to integrate customers, suppliers and other key constituencies.

You know about the companies in the second stage of e-business. They’re the companies you buy books from online. The sites where you trade shares. The place you locate and buy fifty tons of molybdenum.

What businesses in the second stage share is complete internal and external integration of their e-businesses. They’re reaching deep inside the operations of their suppliers, partners and financiers – everyone in the value chain. They’re intranet-, extranet- and Internet-based.

*This is where e-business is today. But what’s over the horizon?*

THIRD-STAGE E-BUSINESS. Beyond today’s most sophisticated e-business environments lies a new business model that combines people, applications and infrastructure in new ways.

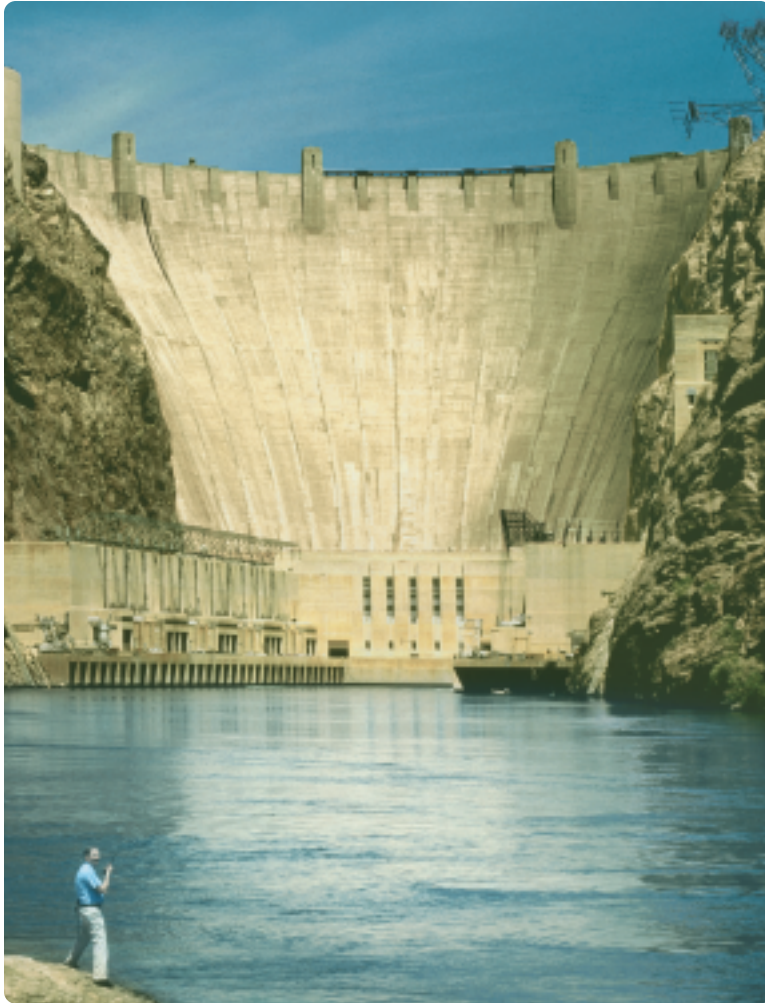
This upcoming stage is called “dynamic e-business” and it moves beyond systems that merely enable Web-based transactions to encompass complete steps in the process that until now have required human intervention.

In this stage of e-business, organizations will reassess their business model, determine which functions are core and which are peripheral (accounting, purchasing, etc.), and outsource the extrinsic. The Internet and a new generation of applications and infrastructure will tie the two together.

Some companies may never move beyond being a first-stage e-business – certain companies may have divisions or departments that are third-stage e-businesses and others that are still in the first stage. Our objective is to help companies maximize their e-business investment regardless of what stage of e-business they are in – while preparing them to move on to more advanced stages.

Learn more about e-business, assess where you are, and determine how you can be more productive. Log on to [ibm.com/e-business](http://ibm.com/e-business)

*Read on. Learn more. Be ready.*



*Infrastructure. It can be big and powerful. According to Business Week, three out of four venture dollars will be invested in infrastructure organizations, rather than content providers.*

## CHAPTER 2: WHAT IS INFRASTRUCTURE?

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AMAZINGLY, “INFRASTRUCTURE” – a term that’s been associated for fifty years with highways, pipes and dams – has suddenly, overnight, become trendy.

Look no further than the number of industry events that are billed as “infrastructure” seminars. Or at how many companies suddenly claim to be “Internet infrastructure specialists” these days.

Infrastructure is the great invisible enabler. The stuff behind the wall. Servers, software, middleware, routers, storage – the things people never see. It’s end-to-end. Top-to-bottom. It’s your e-business skeleton.

Today it reaches from cell phone to mainframe, from smart car to customer database, from PDA to storage network.

With the right infrastructure, companies are able to reap the advantages of lower costs, faster speed to market, increased customer loyalty and customer reach. But without a solid infrastructure, none of these are possible.

Much of it is equipment that has been around for decades, but has taken a backseat to more glamorous PCs, laptops and workstations that sit on the desks in front of us.

To those charged with running an e-business, infrastructure is the foundation required to build, run and manage their core e-business processes – processes

**in-fra-structure** (in'fra-strīk'chūr) *n.* 1. An underlying base or foundation, especially for an organization or a system. 2. The basic facilities, services, and installations needed for the functioning of a community or society, such as transportation and communications systems, water and power lines, and public institutions including schools, post offices, and prisons. 3. The greatest factor in determining the future success of any 21st century business.

Fig. 2-1: Infrastructure. Definition as recently updated.

that enhance the customer experience, streamline the effectiveness of supply chains and extend a corporation's reach into new markets. And an e-business without the right infrastructure is living on borrowed time.

*Most of the infrastructure in business today grew in fits and starts.*

Ten years ago, few people imagined the Internet would grow to be a major force affecting business and customers. Nobody thought the computers in marketing would have to be connected to the billing and payment systems – or that integrating different computer systems would spell the difference between the success and failure of merging corporations.

Yet it can make or break a business. One thing is for sure: the infrastructure of the next century isn't about rediscovering the old, or existing, back office. The new e-business infrastructure will be open, not proprietary (more on this later). It will not only accept multiple computing platforms and protocols as a matter of course – it will be massively intelligent.

It will allow micro devices to intermingle with macro-sized mainframes.

## Glossary of e-business Infrastructure Terms

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**AVAILABILITY:** *The measure of the amount of time a network, computer or connection is running. 99.999% availability amounts to a mere five minutes of downtime per year.*

**DATABASE:** *An organized collection of data; for example, a mailing list, patient records, or a compilation of baseball statistics.*

**e-SOURCING:** *The delivery of business processes, applications and infrastructure over a computer network, as a service.*

**HUB:** *A central connecting device in a network that joins communications lines together.*

**MIDDLEWARE:** *The software that connects two or more devices.*

**ROUTER:** *A device used to connect multiple local area networks and wide area networks. More powerful and intelligent than a hub.*

**SCALABILITY:** *The ability of applications or systems to grow or expand to handle new and larger amounts of data, users or transactions.*

**SECURITY:** *The protection of data against unauthorized access. The protection of your systems against unauthorized users. The protection of your information assets against debilitating attack.*

**SERVER:** *A powerful computer that processes data, hosts Web sites and allows communication with everyone, inside and outside of organizations.*

**SOFTWARE:** *The instructions that tell a computer what to do.*

**STORAGE:** *Where data resides awaiting recall.*

Infrastructure will need to be end-to-end (everything connected, front-to-back) and always on (with billions of devices constantly “on”).

Infrastructure will need to be based on open, cross-platform standards (Linux®, TCP/IP, XML) that provide frictionless e-business.

Infrastructure will have to be massively scalable (consider thousandfold increases in Internet traffic as standard growth in the next few years).

Infrastructure won't be a one-time, one-stop shopping spree. Chances are you'll spread responsibility around, and over time: servers from one vendor, routers and cabling from another. Software from a third. Or you may find sense and huge savings in a single source.

Or, you may even choose to go the outsourcing route – and let the costs and investments be absorbed by suppliers who rent the equipment, the software, the networking.

Then come the hard questions: Is the vendor who installed your storage system the best organization to install firewalls and wireless capabilities? Does the outfit that is currently drawing up your e-business blueprint even manufacture or support hardware? At what point do you stop building and finally say, “Voila! There it is, my infrastructure.”?

*The time and cost issues are monumental.*

We know one size doesn't fit all. One of IBM's core strengths is our understanding of the unique demands and business practices of individual industries: finance, aerospace, retail, healthcare, media and entertainment, government, automotive, manufacturing, telecom, and more.

The infrastructure requirements of one kind of business simply won't fulfill the demands of another kind. IBM has decades of experience in all of them.

IBM's long history of helping companies build mission-critical systems and keep them going 24 hours a day is almost legendary. Just as important is the vast experience in business consulting and planning of IBM Global Services.

IBM is working with Safeway® to reduce operating costs by leveraging its database and IBM server-based infrastructure to operate a real-time supply chain. Safeway's Web-based supply chain has resulted in a 5 percent improvement in service levels, a 10 percent improvement in promotional item forecasting and a 100 (yes, 100) percent ROI in less than 12 months.

IBM is helping long-time customer UPS® integrate all of its servers and databases to provide up-to-the-second information around the clock. UPS is constantly cited as having the most sophisticated logistics and fulfillment services in the world.

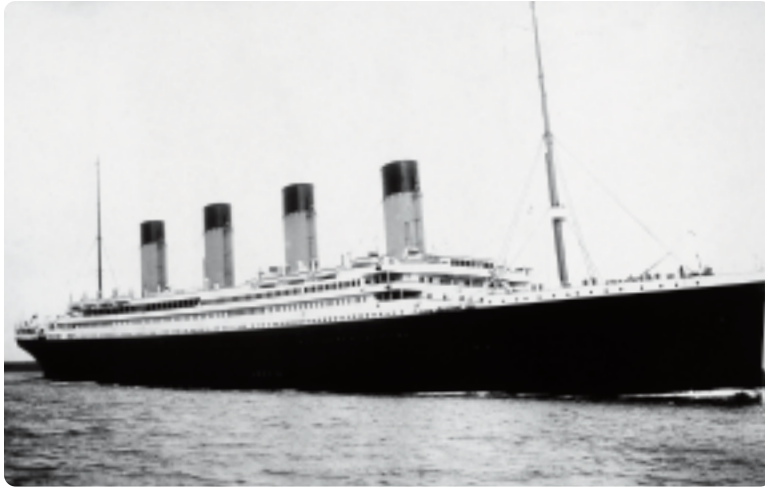
IBM has assumed day-to-day operational support of the Daimler-Chrysler® IT systems at their North American production facility of M-class vehicles. Through at least 2006, IBM is providing the IT infrastructure and systems wherewithal (software, servers, support) throughout the plant.

What these companies have in common are large, integrated and flexible infrastructures. The kinds of infrastructures that create value, slash costs and streamline the value chain inside and outside of organizations (a well-planned, well-run infrastructure, like a rising tide, floats all boats).

IBM has also been involved with these and many other firms at the conceptual level – leveraging existing IT investments and company practices – to prevent system redundancies and brand-new charges for equipment and training.

Call us early – in the planning stages – when existing infrastructures can be leveraged, current investments protected, and modifications kept within reason. Learn all the facts at [ibm.com/e-business](http://ibm.com/e-business)

*Read on. Learn more. Be ready.*



*"All systems go. We're unsinkable!"*



*"Uh-oh. Is that what I think it is?"*

## CHAPTER 3: HOW IT COULD MAKE OR BREAK YOU.

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THE FORECASTS ARE STAGGERING: \$7.5 trillion in Internet business commerce this year alone; \$4.2 trillion in B2C activity; \$100 billion in mobile commerce.

By now, you've discovered that taking orders over a Web site is only a fraction of what's needed to complete a successful sale. e-commerce triggers a chain reaction throughout your entire enterprise: across pricing systems, inventory, logistics, credit, and distribution, and on out to the supply chain. Like it or not, your e-business infrastructure is your business model.

If you're charged with running an e-business infrastructure, this raises a handful of issues: Can my systems handle 2 or 3 million transactions per hour? How do I get 20 or more platforms working together? How fast can I deploy applications or new capabilities? Should I run a conglomeration of servers or consolidate onto a single machine? How do I keep existing customers and also attract new business?

These questions are what's driving huge investments today in applications for supply chain, e-procurement and customer relationship management.

And it is these applications that are most responsible for either realizing a return on investment or swimming in a sea of red ink.

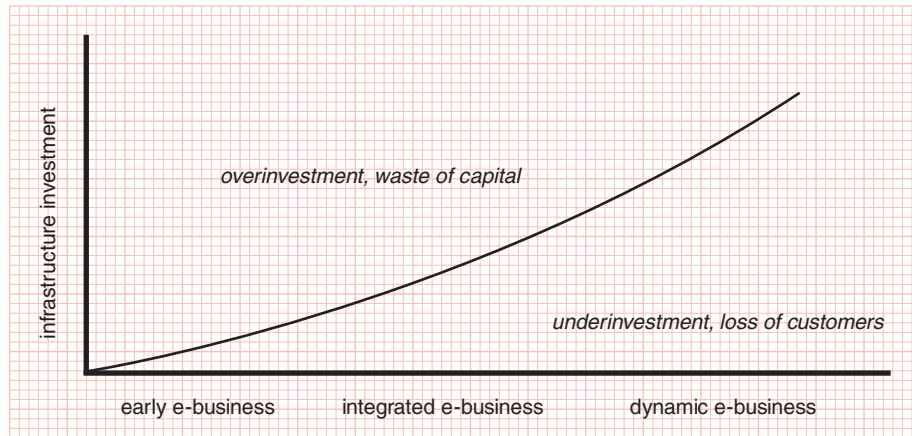


Table 3-1: Optimal infrastructure investment

*At a strategic level, this creates all sorts of issues for a company:*

And not just the chest-tightening IT issues, but the most basic issues of e-business strategy and planning: if you design a new business model around an old business infrastructure, your plan may come crashing to a halt.

Or have undiscovered costs (big costs). An old business model grafted on to new and better equipment may just speed outdated ideas to clients faster and add nothing to the bottom line.

That's why companies are contacting IBM Global Services Consulting in the strategic planning stages. We can not only talk about the opportunities e-business brings to a given industry (say, banking or manufacturing), we can also determine what infrastructure is needed to actually make a solution work.

Of course this requires tackling the technical issues like scalability, security, and interoperability. Experience shows that customers can't just suddenly roll in PCs and bandwidth to avoid meltdowns from usage spikes. Or fend off viruses or

hacker attacks, or assume their systems are compatible to everyone else's in the supply chain. This all takes foresight, planning and experience.

*This is when it becomes complicated:*

What platforms should I use? How do I plan for the unexpected? Will it grow when I grow? Can I link to my suppliers' systems? What about outsourcing?

*Then it can become expensive:*

How much infrastructure is enough to satisfy customers and partners? At what level is my investment overkill (Table 3-1)? How do I finance all of this?



**Launching and maintaining a Web site consumes only 10% of a medium-sized business's annual IT outlays. The remaining 90% of costs lie under the surface in the form of integration expenditures, software investments and staff costs.**

*Of course, changing everything at once is disruptive.*

Even when everything works. Which is rare. On average, bite-sized IT projects are five times more likely to succeed than corporate Moon shots.

IBM spends every day helping companies with issues like integration, return on investment, speed of deployment, security, and availability.

### “You’re So Ready for IBM” Situation #2: Planning



A corporate bigwig is crowing about the new e-business strategy to an assembled group of employees. The \$2 million plan has both the bigwig and the board “psyched.” The bigwig has only one final question, “*Will it work with our current technology?*” After an uncomfortable pause in the room, a chorus of “No”s.

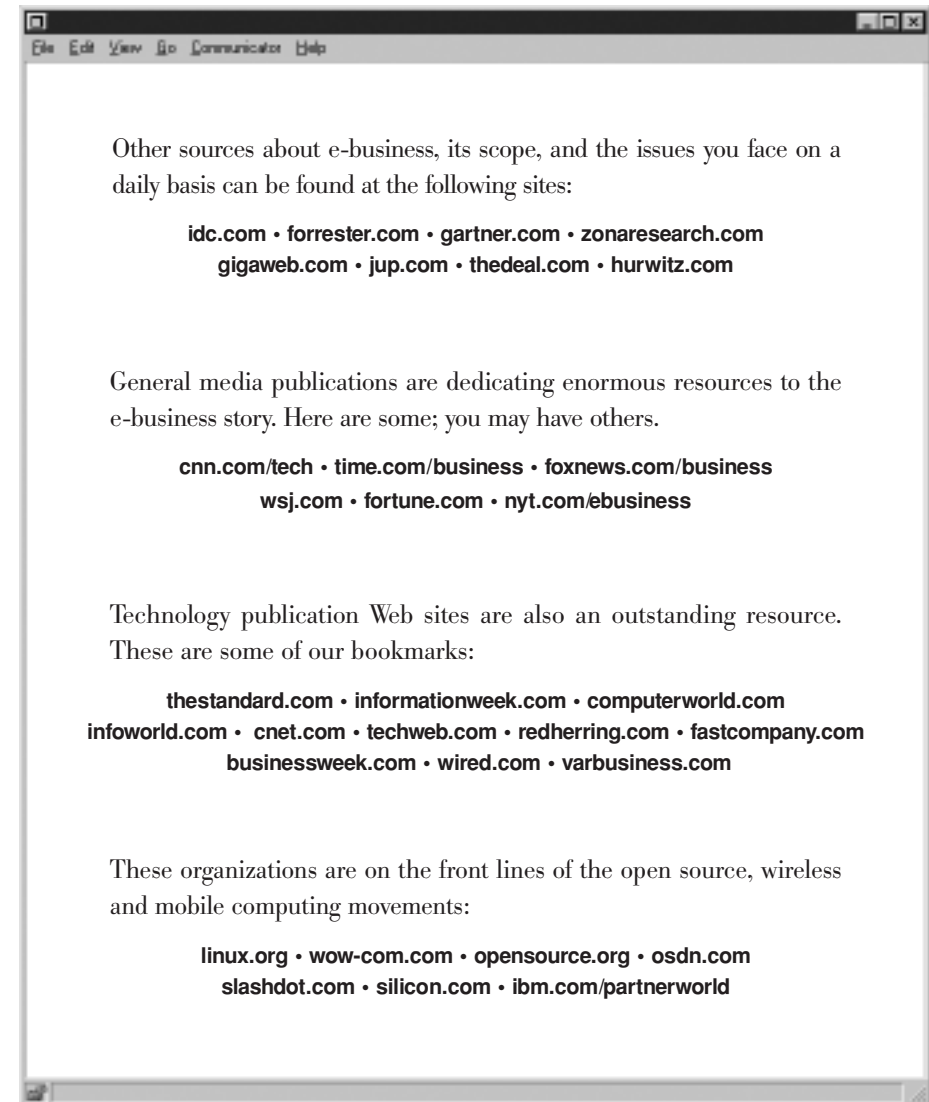
The bigwig deflates. “*Still psyched?*” he is asked.

We solve these issues with flexible, open technologies, such as Linux-enabled servers, storage systems that scale on a pay-as-you-go basis. With help from security organizations like Symantec™ and Check Point™. And with IBM software tools like Tivoli® and WebSphere® for rapid deployment.

So what do you do now? How do you find out more about e-business infrastructure?

Follow the news and updates through some of the Web sites listed at the end of this chapter. They are at the front end of the e-business movement and help you understand the e-business worldview. These sites are updated daily (in some cases, hourly) and provide valuable links to other stories and events.

Or bookmark [ibm.com/e-business](http://ibm.com/e-business) first. There are literally thousands of pages devoted to e-business, technology, research and product information. Keep up with the latest e-business solutions. Find out how our entire organization is dedicated to creating the kinds of solutions that can quickly transform your business, your bottom line, your world.



*Read on. Learn more. Be ready.*



*Linux has reached a fever pitch. It has attracted one million new users in the last year. It has launched over one hundred thousand new applications in the last eighteen months.*

## CHAPTER 4: OPENNESS. WHY PEOPLE LOVE IT.

.....

EVERY STEP OF INFRASTRUCTURE development includes a choice: going with a proprietary solution or a solution built on open industry standards.

Only open standards give you the flexibility to change your technology as your business changes. To embrace new developments. To integrate internally and with other e-businesses. And to avoid becoming beholden to any one vendor or platform that may or may not be compatible with your future.

The piece parts that you'll hear about in the following chapters would hold no value – wouldn't all work together to form a solid foundation – if there were no easy way to integrate them all.

IBM is leading the charge for open standards by investing in, developing for and delivering on open industry standards like TCP/IP, XML, and most importantly, Linux.

Why Linux? For decades, the Holy Grail of interoperability has been sought by the industry. With the Linux operating system, it's finally within reach.

And what is Linux? Linux is an operating system that was initially created as a hobby by a graduate student, Linus Torvalds, at the University of Helsinki in Finland. A hobby that would change the face of computing.



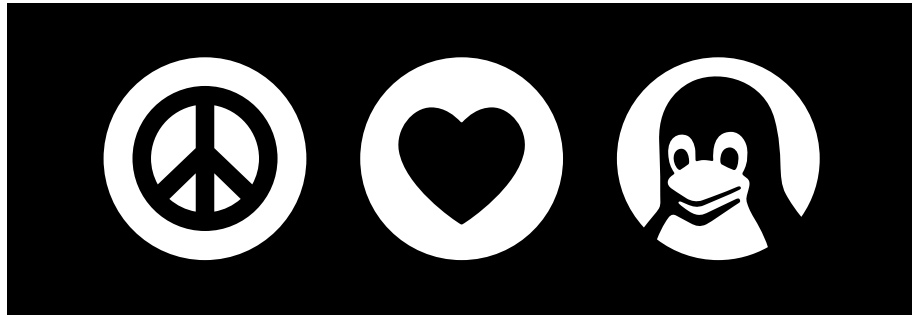


Fig. 4-1: Linux. It's an international movement.

Linux may be used for a wide variety of purposes including networking, software development, and as an end-user platform. Linux is often considered an excellent, low-cost alternative to other more expensive operating systems.

*Linux is a disruptive technology (it changes everything for the better).*

Unlike Linux, most other operating systems are proprietary; unlike Linux, other operating systems are controlled by the individual companies that own them.

Linux runs on the widest range of platforms in the industry. The Intel server platforms, UNIX® RISC platforms, new information appliances, even mainframes (including IBM z900) run Linux.

*Linux has clearly moved beyond the days of experimentation.*

Like wildfire, it has moved from its birth in the world of academia to become a full-fledged, powerful and increasingly robust operating system that plays a pivotal role in the world of e-business systems. The foundation of the business case for open-source Linux is high reliability.



Fig. 4-2: Linux is huge. Developers love it.  
Linux is growing faster than any other server operating system.

Because it's peer-reviewed, every programmer participates in its development and debugging. Yes, it's a radical idea to many executives, but Linux has a lot to offer businesses.

- Support for multiple platforms.
- Companies and individuals are able to collaborate on a product that none of them could achieve alone.
- Rapid bug fixing by the peer environment.

The open source model has a lot to offer customers.

- You aren't a financial prisoner to proprietary software.
- Access to source code (you aren't locked out).
- You aren't at the mercy of unfixed bugs.
- You can buy support affordably.

*Linux is the future of e-business.*

According to IDC, Linux is the world's fastest-growing server operating system and is projected to have 38 percent of the server operating system market by 2004. Its growth is huge. Its momentum is building.

IBM has embraced Linux as a pillar of e-business and is committed to helping Linux grow through new technology, devoted specialists and active support to the community of Linux developers.

IBM is investing \$1 billion in Linux and has dedicated 1,500 programmers to enable every IBM hardware and software product for Linux. IBM is accelerating Linux's adoption as a platform that can support heavy-duty, enterprise workloads.

IBM is Linux-enabling our hardware and software products, dedicating thousands of Linux developers and technical support experts, and implementing



Fig. 4-3: From senior management to summer interns, Linux has captured the imagination of every IBM employee.

porting centers where IBM Business Partners can develop, test, and refine their applications for Linux.

We put Linux on the mainframe. We're Linux-enabling our entire server line. We're spending \$300 million over the next three years to create mission-critical-level support for Linux. We've built a Linux wristwatch. And the list goes on.

A good place to spend time today is [ibm.com/linux](http://ibm.com/linux)

*Read on. Learn more. Be ready.*



*Our hands are in everything that is e-business.*

## CHAPTER 5: END-TO-END CAPABILITIES. THE IBM STORY.

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TODAY, MORE PEOPLE own mobile phones than own PCs. In three years, PDAs will outnumber PCs. By the same date, 25% of the workforce will be mobile. And according to many people, the primary source of contact with the Internet will be a mobile device or appliance.

By all indications, there is an explosion of data coming. Inside IBM, we talk about 10 times as many connected people. A hundred times more network speed. A thousand times as many devices – and a million times as much data.

Whatever it is, very soon this networked world is going to be orders of magnitude more complicated than anything we know today.

Customers will not be able to add technical capabilities or recruit people fast enough to deal with spikes in usage, or all of the devices, or all of the security requirements, or the load balancing. So the infrastructure for e-business is going to have to get a lot more automatic, more self-managing, based on a greater level of intelligence built right into the infrastructure itself. It will have to be end-to-end.

Obviously, e-business workloads aren't going to be processed on desktops. The work is going to be done by data transaction and Web servers, by middleware, by storage devices. And more and more, some of the work is going to be managed in

the network itself – somewhere between the end user initiating a transaction and the data center.

If you are charged with making sense of all of this, if you want to keep your CIO on board, you will need a massive infusion of help.

Help from hardware vendors, software vendors, network specialists. Thinking from theorists and strategists. Elbow grease from implementors.

You may want to spread the responsibility around: Servers from one source. Applications from another. Even your e-business blueprint, in some cases, from a separate party. Or you may decide to award much of the labor and equipment acquisition to a single source.

Increasingly, it's becoming more and more economically sound to consolidate your infrastructure under one source.

This is why organizations large and small are coming to IBM for more reasons

#### “You’re So Ready for IBM” Situation #3: End-to-End Integration



After the big merger, a CEO finds himself with two of everything – including two CIOs. He tells one of the two CIOs that he only needs one guy. Yet he still has the hairiest integration projects on his hands – servers, software, storage – stuff that was never meant to work together.

“Kevin,” the CEO says, “You’re the guy!” The CIO wants to know how he got saddled with the integration project, and not Phil, the other CIO. “Oh, he took a job in Paris. You’re the guy.”

The CIO ruminates, “Paris...?”

than IBM’s size and breadth of offerings. IBM is no startup (we had our initial public offering more than 80 years ago). Our experience transcends both business and technology.

- IBM is the world’s largest and most diverse server company.
- IBM is the world’s largest Web-hosting company.
- IBM Global Services is the largest organization on the planet for designing, deploying, and maintaining e-business infrastructures.
- IBM is the world’s second-largest software company, and growing.
- IBM matches EMC® in delivering storage solutions.
- IBM Financing has \$40 billion in assets to help fund and finance e-business infrastructure.

Now add reputation. Year in and year out, IBM adds lasting value to both organizations and the individuals charged with running them. The evidence is overwhelming:

- IBM is ranked #1 in e-business services.
- IBM is ranked #1 among leading global consultancies.
- IBM is ranked #1 in unaided brand awareness and in the top tier for client preference among e-business service providers.

If your organization could use a little help (or a lot), IBM can put the deepest talent pool and broadest line of solutions at your service.

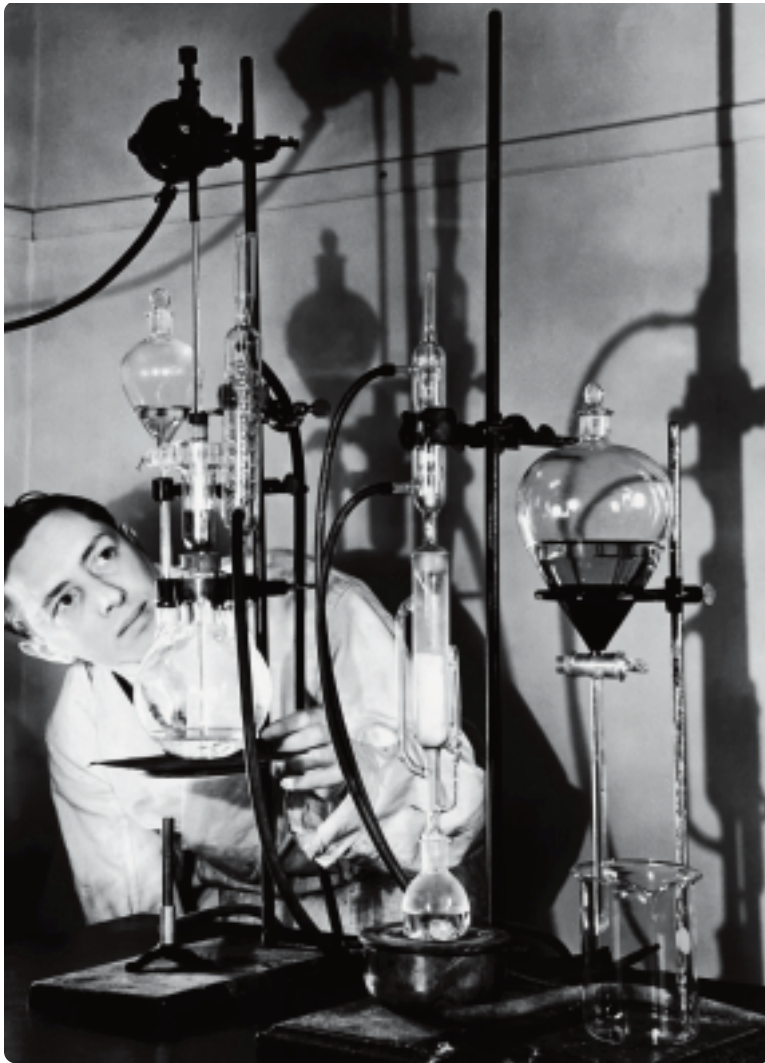
Again, log on to [ibm.com/e-business](http://ibm.com/e-business). The more you visit, the more you will learn about the enormous opportunities and potential pitfalls of e-business.

*Read on. Learn more. Be ready.*

	NT servers	UNIX servers	Traditional mainframe	Storage devices	Storage software	Enterprise software	Middleware
IBM	◆	◆	◆	◆	◆	◆	◆
HP	◆	◆		◆	◆	◆	
Sun		◆		◆	◆		
Microsoft	◆	◆				◆	◆
Compaq	◆	◆		◆	◆		
Cisco							
Oracle						◆	◆
EMC				◆	◆		
Juniper					◆		
Novell						◆	
SAP					◆	◆	
Motorola							
Veritas					◆	◆	
Exodus				◆			
Accenture							
Intel	◆						

	Large-scale Linux support	Consulting services	e-Sourcing	Web hosting	Alliances	Networks	Database software	Wireless suites	Net Gen offerings	PowerPC chip technology
IBM	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
HP		◆	◆	◆	◆	◆				
Sun		◆	◆		◆					
Microsoft		◆			◆		◆			
Compaq	◆		◆		◆		◆			
Cisco	◆				◆	◆				
Oracle		◆			◆		◆	◆		
EMC		◆					◆			◆
Juniper					◆	◆	◆	◆		
Novell		◆			◆	◆	◆	◆		◆
SAP	◆	◆			◆		◆	◆		◆
Motorola					◆			◆	◆	◆
Veritas					◆		◆			
Exodus	◆	◆	◆	◆	◆		◆			
Accenture	◆	◆			◆					
Intel	◆	◆	◆	◆	◆					◆

Fig. 5-1. Infrastructure capabilities



*e-business. The big bang.*

## CHAPTER 6 : THE INGREDIENTS

(SERVERS, SOFTWARE, STORAGE).

.....

SERVERS ARE THE HEART of an e-business infrastructure. Without servers, there can be no e-business. No commerce. No collaboration. Nothing.

Think about it. Everything depends on the server. How people find you. The experience they have once they're at your Web site. How securely and effectively their data is handled.

The ever-growing number of people on the Internet will tax your servers as never before.

You will have to be able to handle more users performing more complex transactions and increase the capacity of your networks frequently and rapidly.

It's important to know about your servers, who makes them, what their capabilities are, and why they're the backbone of an e-business infrastructure.

Because when a server can't handle sudden spikes in traffic, it becomes a customer service problem. When a server fails, it can become a shareholder issue. Or worse, a lead story on the nightly news.

IBM has released an entirely new line of servers designed specifically for the rigors of e-business.

New @server models are driven by new faster technologies like IBM copper chips and silicon-on-insulator technology, new capacity-on-demand scalability, powerful mainframe-inspired reliability, and above all, new intelligence. They range from the Intel®-based xSeries™, now with the ability to run Linux (see Chapter 4), to the lightning-fast pSeries™ UNIX Web servers.



IBM INTEL-BASED @server, the IBM xSeries, starts at under \$900. They are all based on industry-standard processor technology and run Microsoft® Windows NT™/2000, Linux, Novell® and other operating systems.

### Glossary of Hardware Operating Systems:

.....

**UNIX (YEW-nihks):** *an operating system that originated at Bell Labs in 1969. UNIX built the Internet and is the leading operating system for the world's most trafficked Web sites. UNIX is the technology behind IBM pSeries servers.*

**AIX®:** *IBM's open UNIX operating environment. It provides increased levels of integration, flexibility and reliability essential for meeting the high demands of today's e-business applications.*

**WINDOWS NT:** *the Microsoft Windows personal computer operating system designed for users and businesses needing advanced capability, especially on Intel-based computers. IBM offers the most powerful, most affordable line of Windows NT servers.*

**LINUX (LIH-nuhks):** *a UNIX-like operating system that was designed to provide personal computer users a free (no charge!) operating system comparable in power to traditional UNIX systems. Its reliability, flexibility, and legions of followers have made Linux the fastest-growing operating system in the world.*



IBM UNIX @server systems are the most powerful, technically advanced UNIX servers and include the new IBM pSeries and IBM RS/6000, with models from workstations to enterprise servers. They start as low as \$118 per month at **ibm.com**



IBM iSeries™ @server systems are the premier integrated business servers that are ideal for small to medium-sized businesses that want to enter the sophisticated world of e-business without having to manage the complexity the new world can bring.

But what if tomorrow, fifty or a hundred times more people need access to your Web site than do today? Are you ready?



IBM zSeries™ @server systems are the first e-business enterprise servers designed for the high-performance data and transaction needs demanded by next-generation e-business. Mainframe heritage, mainframe reliability, and copper-based speed and processing.

IBM is also building for a day when our @server models are virtually impossible to outgrow. We're almost there now. Not just "always on" or available or reliable – you can get that with today's technology (for example, load-sharing when spikes hit your Web site). It's important, but not enough.

The next step is IBM @server equipment that extends and cooperates with Cisco®-based networks. When loads increase, the network gear doesn't just indiscriminately spray transactions at the server, it picks the ones the customer wants handled first, with the best response and the highest quality. Buyers go first, browsers wait. Shoppers stay online. Shopping carts remain full till checkout.

A good example of powerful servers in action is at **ibm.com/servers**

*Software is the infrastructure.*

The software that matters most in an e-business doesn't live in your PC or laptop. Most of the work is done behind the scenes, in the network, by bigger computers running powerful and complicated software.

In the e-business world, a single transaction can involve dozens of different applications flitting across hundreds of servers, routers and hubs in different states. How do you funnel this into one enterprise, indivisible, when your infrastructure is literally all over the map? Software.



**Fig. 6-1: The Codernauts. They came from a parallel universe in search of a better way. What they found was the world's best software: WebSphere, Lotus, Tivoli and DB2.**

**MIDDLEWARE SOFTWARE:** Middleware software is the indispensable glue that unites the hundreds of systems and software applications inside your walls. It's what makes all the pieces fit.

Consider this: A single software program can contain over a million lines of code. A single network may connect thousands of devices from scores of

manufacturers. If just one thing goes wrong – anywhere – nothing happens. And these days, “nothing” costs five figures a minute.

Our Tivoli software, along with our Business Partners, offers the leading e-business infrastructure management solutions in the industry. Our products and services deliver integrated solutions critical to the success of your e-business. From security to storage, we can help eliminate time, complexity, and cost associated with implementations.

**DATA MANAGEMENT SOFTWARE:** Every business interaction requires software from somewhere – and produces new information in the process. In a networked world, the volume of interactions goes up exponentially, producing an avalanche of new data that must be stored, searched and recombined, like DNA, with other data, in order to be valuable.

IBM invented the relational database technology that does this. It's called IBM DB2.<sup>®</sup> And DB2 is now the world's most trusted and stable database-management software.

DB2 provides universal data management across all major operating systems – from two-ton servers to palmtops. This means your customers don't see hourglasses on their screens. Suppliers don't see red. And reps in the field rarely have to wait for data.

**ENTERPRISE SOFTWARE:** Most, if not all, businesses are still carrying older software on their books. Database software. Collaboration software. Billing software. Most of these apps were installed before the Internet.

IBM WebSphere software extends all of your core business investments to the Web and vice versa. It connects leading databases, Web applications, and transaction systems. It speeds development, can help meet high transaction demands and make up to 35 separate platforms work as one.



**COLLABORATION SOFTWARE:** In e-business, it's not just equipment that must communicate. Lotus® software from IBM (collaboration, e-learning and knowledge-enabling software) provides collaborative e-business solutions that securely bring people and information together. These solutions will enable your organization to collaborate effectively, maximize your investment in existing technology and provide a competitive advantage.

All IBM software is industrial strength, designed for the next generation of e-business. And in some cases, the next, next generation of e-business. Log on and learn more at [ibm.com/software](http://ibm.com/software)

*Storage. Where do we put all this stuff?*

If you read the October 2000 *Forbes* magazine, you came across the claim that “Today customers spend as much on storage as they do now on computing power; in a few years, three times as much as they do on computers.” It makes you wonder.

By some estimates, many e-businesses will need an exabyte (1 million terabytes) of storage capacity. Which means your storage solution, if it mirrors those of other top e-businesses, already is bursting at the seams.

But raw storage capacity is not the answer. Comprehensive storage management is, from open and interoperable solutions like IBM's newest Network Attached Storage (NAS) products to IBM Storage Area Network (SAN) products to Enterprise Storage Servers.™

**IBM NETWORK ATTACHED STORAGE:** NAS products are high-performance storage appliances that provide shared data to clients and other servers on a Local Area Network (LAN). NAS devices are designed and preconfigured specifically for serving files.

**IBM SANs (STORAGE AREA NETWORKS):** SANs are the foundation of storage networking – providing an architecture that groups storage systems on their own high-speed networks. The data most important to your customers can coexist with your internal e-mails, electronic time sheets, etc., saving money and reducing costs.

IBM Storage Area Networks are interoperable – they attach to the servers and storage devices manufactured by Sun®, Dell®, Compaq®, HP®, and StorageTek®. IBM Storage Area Networks also work across a range of platforms – UNIX, Windows, Novell, zSeries, iSeries, and, of course, Linux.

**IBM TOTALSTORAGE™ ENTERPRISE STORAGE SERVER:** Small servers can't hold the enormous flows of e-business data. Even mainframes max out at five or six terabytes of capacity. You'll need large, high-capacity storage servers for the next generation of wireless, intranet, extranet, and Internet waves of e-business.

The next generation Enterprise Storage Server (ESS) can store up to 11 terabytes of data from a wide range of IBM and non-IBM servers attached to your SAN. With up to 32 gigabytes of cache, unique serial-attached disk drives and advanced functions, the ESS can deliver the high performance your e-business customers require while also storing your essential internal data.

IBM Enterprise Storage Server shares with IBM tape devices (IBM LTO, Virtual Tape and Magstar®) a legendary reputation for reliability and security.

**IBM MICRODRIVE:** Just 20 years ago it required a 2,000-pound server the size of a refrigerator to hold one megaflop of data. That amount, and more, can now be stored on a single IBM MicroDrive™ that is smaller in size than a quarter.

But this is all part of a pattern. IBM was awarded the Year 2000 National Medal of Technology® for 40 years of developing the technology of hard disk drives and information storage products. Learn more at [ibm.com/storage](http://ibm.com/storage)

*Read on. Learn more. Be ready.*



*There are some things you'd just rather not build yourself.  
IDC forecasts that organizations will spend almost \$100 billion on external  
service firms to consult, build and operate their e-commerce sites by 2004.*

## CHAPTER 7: OUTSOURCING. LET SOMEONE ELSE DEAL WITH IT.

.....

UP UNTIL NOW, if businesses wanted information technology, they had to buy, build and manage it themselves. Whether they executed the details themselves or hired people to do it for them, the effort required precious resources and focus which could have been directed toward advancing their core business.

Soon, we'll look back on this phenomenon much in the way we look back at businesses and their power generators during the Industrial Revolution.

Back then, businesses had to build their own steam engines and/or generators – there was no power grid.

But soon, the time and resources you focus on building and managing the information technology and applications that support your core business will be redirected toward advancing it.

Because there's an alternative way to get the information technology you need on a pay-per-usage basis.

*It's called "e-sourcing."*

The logic is compelling: companies can significantly reduce the up-front capital, risk (technology and financial), time and staffing required to deploy and manage

e-business initiatives. It's an idea made for the Internet. Made possible by IBM. In the very near future, it won't be necessary for an enterprise physically to own, install, manage or even house, any aspect of a traditional computing environment – processing storage, applications, security or load balancing.

*How does IBM make e-sourcing possible?*

By creating a security-rich, scalable computing infrastructure that can maintain service levels without incurring the costs of excess capacity.

By enabling capacity on demand and managed services that monitor and resolve issues before they become problems.

By developing pre-integrated hardware and software components built on open standards.

By wrapping it all with IBM know-how ... which will help you avoid expensive and time-consuming integration pitfalls.

By providing the e-sourcing alternative, IBM does what we do best: building infrastructure, delivering on the promise of standards-based computing and addressing the challenge of integrating hardware and software components.

By implementing a secure, reliable, e-business infrastructure, at a fraction of the time and cost it would take to build and operate it internally.

*What if you don't outsource?*

Now more than ever, financing makes good business sense. In fact, financing accounts for more than 80% of all IT acquisitions. Financing provides creative and cost-effective options for acquiring the technologies companies need to migrate to new business models.



Fig. 7-1. IBM will have over 47 data centers in over 19 countries by the end of 2001.

IBM Total Solution Financing combines hardware, software, services, integration, maintenance and more – from IBM and other vendors – into a single periodic invoice that makes it remarkably easy and efficient to track your leases and financed assets.

And IBM Global Financing representatives will work with you to find the best possible solution to fit your budget and the total value of your e-infrastructure transactions.

Learn more about financing at [ibm.com/financing](http://ibm.com/financing). It's where smart businesses head to find out about the world's premier single-source provider of financing solutions and to learn how businesses in more than 40 countries capitalize on IBM's \$40 billion in assets for e-business financing.

*Read on. Learn more. Be ready.*



*Like the de-orbited Mir, infrastructure is big, complicated, and full of wires.*

## CHAPTER 8: NOT JUST A BIG COMPANY ISSUE.

.....

SMALL COMPANIES require infrastructure just like large companies require infrastructure – only on a smaller scale.

Just like those of large companies, the e-business infrastructure demands of small and medium-sized companies require powerful and scalable servers. Their information needs to be protected inside storage devices and accessed over storage networks with enormous bandwidth. Their software must be open, flexible and stable enough to handle around-the-clock transactions.

And as do larger companies, burgeoning e-businesses must wrestle with the same strategic and tactical issues: Making money. ROI. Getting to market quickly. Integrating diverse technologies. Keeping long-term options open.

*But what about growth?*

Building an infrastructure with an eye to growth is important for companies of virtually any size. Critical for companies in their growth years.

*And if you don't plan for growth, you will pay for the oversight.*

But as a rule, small companies can't issue new stock to pay for these growing expenditures, or take enormous "one-time" accounting charges for elaborate



*IBM Blue Velocity, for Net Gen businesses, provides equipment and affordable support.*

IT deployments and staffs. Fortunately for the small and medium-sized, there has never been a better time to enter e-business, or to extend e-business functionality at costs that aren't prohibitive or crippling.

Web-hosting providers are allowing businesses of all sizes to have superior availability while at the same time to incrementally add services like business intelligence and data mining.

IBM, a leading technology supplier to almost every blue-chip corporation, now has e-business offerings for small and medium-sized companies that offer more selection, more diversity and more value than ever before.

**IBM QUICK LAUNCH:** Provides e-businesses with all the infrastructure elements they need – including financing. Designed for new enterprises that want to grow quickly, key elements and options include:

- Rapidly deployable, next-generation IBM @server and IBM storage systems.
- Ready-to-run solutions on your choice of UNIX, Linux, Windows 2000 and OS/400® operating systems.
- The latest e-commerce software and advanced Web applications such as streaming video and activity distribution.
- Onsite technical and business education.
- Competitive terms on financing for your technology solution.

But what if your business is already an e-business and looking to gain more altitude, add more customers or technologies? What if the usual economies of scale don't work when deploying additional hardware and software?

*IBM can help balance your internal needs with IBM solutions.*

**IBM "E-SOLUTIONS":** Professionally manage skill shortages and diminish outlays for new infrastructure. Scaling your servers, software or storage is a phone call away, and you don't need to pay right away.

**IBM STARTNOW:** For instant e-business, StartNow for infrastructure comes with IBM software (WebSphere, DB2, Lotus, and Tivoli), an IBM @server system, and IBM applications. It is wrapped together with IBM Global Financing, and allows you to cost-effectively join the world of e-business.

**IBM SUCCESSLEASE:** Quick, simple and straightforward. SuccessLease™ makes financing easy for small and growing businesses with fewer than 100 employees.

Now you can acquire the IT solutions your company needs, while preserving cash flow and other lines of credit, with SuccessLease from IBM Global Financing.

SuccessLease lets you finance any combination of IBM and non-IBM hardware, software and services. It provides fast, single-source shopping for a total IT solution. Businesses with fewer than 100 employees can quickly finance transactions up to \$100,000.

The SuccessLease plan is offered and administered by third-party providers of business financing, approved by IBM Global Financing, who can package a complete e-business solution with Web-enabled access to convenient financing.

There's a lot more to learn, more to absorb about financing and establishing your Web presence. Log on frequently at [ibm.com/smallbusiness](http://ibm.com/smallbusiness)

*Read on. Learn more. Be ready.*



*Infrastructure. Some assembly is required.  
The 145,000 business and technology specialists at IBM can deploy an  
IT infrastructure in the time it takes most consulting firms to assign a team.*

## CHAPTER 9: NOW THAT YOU KNOW THE WHY AND WHEN, HERE'S THE WHO AND HOW.

.....

JUST FIVE YEARS into the 30-year revolution that is e-business, and already e-business has challenged many of the fundamental principles the business world holds near and dear.

Yet if anything has proven true, it's that e-business must translate into real value: better service for customers, better communication between employees and partners, and most of all, rapid return on investment. Higher profits, earnings and customer retention rates; lower overhead, costs and time to market.

### *How do you get there?*

You find great people. Fast. People who understand both business and technology, strategy and execution. People who not only know what is possible – but know how to help make it actually happen. People who can deliver on their promises.

People who have been there and done it ... people who saw e-business coming and know where it's going. People who can see past the hype and get down to making it all work together. People who “get it.” People who get it done.

“You’re So Ready for IBM” Situation #4: Connectivity



An executive from London is assessing the status of the upcoming pitch. “Are we there?” she queries. Her European staff assures her that the pitch materials, indeed, are there. “But they’re not here,” a man explains. It appears there was a “glitch.” The New York files are garbage. The Milan server is history. And everything from Asia has just plain vanished. Adios. Arrivederci. Sayonara. The executive wants to know what they are going to present the next day.

“Discuss our global capabilities,” the man seated next to her volunteers.

Whatever “it” happens to be: quick ways to cut costs, dynamic pricing, customer loyalty methods, supply chain efficiencies, connecting old systems to new ones, the latest changes in your industry; whatever issues you’re battling or opportunities you’re grabbing.

*People who get it done.*

No matter who it takes to get it done: cost analysts, rapid implementation teams, integrators, coders, industry specialists, finance gurus, systems designers, more coders, project managers, middleware experts, scientists, troubleshooters, whoever.

*This is what sets IBM apart.*

Ultimately, strategy without execution is futility; the brightest idea without the know-how to make it work is an empty exercise at best, a costly debacle at worst.

Poor planning can doom infrastructure projects to costly do-overs (a significant proportion of IBM Global Services customers come to us on the rebound).

IBM spent the last decade building an organization of 145,000 employees in the form of IBM Global Services. It is by far the deepest and widest talent pool of any technology company in the world.

It is full of people with the kind of experience you can build but you can’t acquire – from ethical hackers whose job it is to test and monitor the security and integrity of your e-business systems to survival specialists whose job it is to imagine the worst disaster possible, to help you prepare your e-business systems for it, and to preclude expensive downtime.

*When do you need them?*

Now. Before the economy unexpectedly shrinks. Before you’re looking down the barrel of another quarterly report. Before your two biggest competitors merge.

Merger/Acquisition Checklist	IBM WebSphere	IBM Lotus	IBM MSeries®	IBM Tivoli	IBM DB2
Combining online efforts	◆	◆	◆	◆	◆
Connecting multiple departments and teams	◆	◆		◆	◆
Absorbing customer buying histories	◆			◆	◆
Consolidating 30 different systems	◆		◆	◆	◆
Installing dozens of wireless protocols		◆	◆	◆	◆
Delivering Web content in 15 different sizes	◆		◆	◆	◆
Integrating all IT systems within 180 days	◆	◆	◆	◆	◆

**Fig. 4-1. Nearly 70% of large companies will absorb other organizations within the next twelve months. Integration is all about software. IBM has tens of thousands of people who understand this.**



*Business Partners. One of our secret weapons.*

Before the acquisition is acquired. Before your toughest foe leapfrogs you in technology. Before that foe starts courting your best customers.

*What can they do for you?*

Name it. Core strategic capabilities from digital branding to merger and acquisition services. Business intelligence and security and privacy. Business-critical implementation that goes beyond Web development and includes networking and connectivity through to total systems management services.

If you're already up and running, IBM maintenance services find opportunities to consolidate your IT systems internally or let you wash your hands of your network entirely. These are the people at IBM hosting facilities and data centers.

*IBM Business Partners.*

The scale of e-business has become too large and complex for any company (even IBM) to go it alone. Especially for small and mid-sized companies. That's

why IBM also has 100,000 independent Business Partners around the world who can easily help you navigate the complexity and assist you with all your e-business infrastructure needs.

They're skilled problem solvers who understand the kind of time and financial constraints most businesses face – integration on the fly. Debugging of local-level software. Instant upgrading of hardware and applications.

These are the kinds of problems that can stop a small firm dead in its tracks. Our Business Partners' skill sets are immense and they bring a trove of business knowledge and pragmatic experience to help you veer around roadblocks on the Web.

IBM Business Partners are working with companies large and small, global and local. Now that you know about them, where will you find all these people?

*Where do you find this help?*

At **ibm.com/e-business/people** or, to find a partner, at **ibm.com/partnerworld**. We can help your company with business and e-business.

*So, we've come to the end.*

You know how important infrastructure is. How big a part it is of your business, and the once-in-a-lifetime opportunity it offers to separate yourself from the pack.

There's more (always) to learn, more to soak up.

Go to **ibm.com/e-business** to learn how IBM people, servers, storage, and software are driving e-business.

Call 1 800 IBM-7080 (ask for Guide) and talk to a specialist about how IBM can help your company with e-business.

Keep this book. Or hand it to a colleague. Or call to order more.





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