STRATEGIC MARKET PERSPECTIVE

Worldwide Internet Market, 1995-2000

Internet Opportunities Program

Worldwide Internet Market, 1995-2000

INPUT®

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INPUT Worldwide

Abstract

This report analyzes market and technology trends for Internet software and services. It provides worldwide market forecasts from 1995 to 2000 as part of INPUT's Internet Opportunities Program.

Worldwide Internet Market, 1995-2000 provides market forecasts to help decision makers understand the impact of technologies. It also discusses trends, issues and future technology directions.

Worldwide Internet Market, 1995-2000 focuses on all of the Internet markets and breaks them down into systems software, applications software, turnkey systems, hardware, professional services and systems integration, network services, processing services, outsourcing, and product support services.

The report contains 95 pages and 28 exhibits.

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Internet Opportunities Program

Worldwide Internet Market, 1995-2000

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I

Introduction

This chapter describes the purpose and scope of this report and lists related reports published by INPUT.

A
Purpose of the Report

This report forecasts and analyzes trends associated with the Internet. It provides worldwide forecasts for software, services, hardware, and turnkey systems associated with the Internet.

Emphasizing systems and applications software, the report answers the questions:

- How will Internet software evolve over the next five years?

- What are the main technical trends and developments?

- How fast is the Internet systems and applications software market growing worldwide?

- What opportunities and risks for both users and vendors does the Internet present?

This report also provides insights into the Internet market for:

- Corporate strategists

- Purchasers of Internet technology

- Vendors of Internet software, systems, and services

- Investors in Internet technology

The forecasts and charts are intended for readers to develop market strategies, business plans and financial projections. They are also useful for presentations and sales support.

B

Methodology

A combination of primary and secondary research was used to assemble the this report, including:

- INPUT's vendor revenue and forecast databases

- Analysis of on-line information from on-line services and Internet sources

- User surveys of spending on Internet software

1. Primary Research

INPUT telephone surveyed 110 user organizations. They were asked to comment on Internet systems implementation plans. The user survey, together with vendor interviews and INPUT forecasts, provides the basis for trend analysis.

2. Secondary Research

Trade publications and on-line information networks provided additional information for this report. Industry trade shows and vendor literature offered additional insights.

3. Forecasting Methodology

INPUT creates annual forecasts in its Market Analysis Program based on vendor revenues, government data and user surveys. These forecasts are validated with industry data and analysts' judgments. This report's forecasts are based both on INPUT's Market Analysis Program forecasts and an analysis of Internet and client/server vendor revenues. They are integrated with information from the user survey on budget growth rates to estimate the size of the market. The forecasts also draw on more detailed forecasts found in other reports in INPUT's Internet program. INPUT also reviewed secondary literature to estimate the value of software sold on different platforms in different categories for the systems software forecasts.

Forecasts are adjusted into current dollars. For example, 1999 forecasts are in 1999 dollars adjusted for inflation. Market forecasts provided by vendors are adjusted for distribution channel to estimate the size of the market in user dollars.

For charts used in the body of the report, where appropriate numbers have been rounded:

- Markets of $1 Billion and over are rounded to the nearest $50 Million when expressed in $ Millions.

- Markets between $100 Million and $1 Billion are rounded to the nearest $10 Million.

- Markets under $100 Million are rounded to the nearest $5 Million.

- In some cases, rounding means that numbers may not add up to exact indicated totals.

C
Scope

INPUT views the Internet as a new platform for applications. This study forecasts user spending on the software products, turnkey systems, hardware and services that use or support the Internet. The forecast includes user spending on:

- Versions of databases designed to support the Internet, like Illustra's product when used to store Web documents

- Web server software

- Internet access services

- Gateways and interfaces that connect legacy applications to the Internet

- Systems integration to make applications accessible from the Internet

- Products and services whose existence depends on the Internet

- Network services revenues from Internet access charges and advertising

The forecast does not include user spending on:

- Standard databases, like Oracle's, that would still be sold if there was no Internet

- LAN E-mail software; but gateways to the Internet are included

- Goods and services provided using the Internet as an ordering mechanism

D

Related Reports

Other INPUT reports and related material include:

- *The Future of Web Software, 1995*

- *Internet Sales and Marketing Directions, 1995*

- *Using the Internet for Business Operations*

- *Internet Application Case Studies, 1996*

- *IBM's Repositioning of Notes for the Internet, 1996*

- *Internet Security: The Impact of Firewalls on Client/Server Applications, 1995*

II
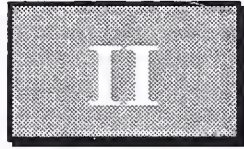
Executive Overview

A

Trends and Issues

The main trends in the industry are:

- Entry by major telephone companies and network service providers into Internet access

- Emergence of a cottage industry of content providers and value-added service providers

- Increased competition for bandwidth

- Migration of applications to the Internet platform

- Integration of Lotus Notes and other groupware products with the Web

- Explosion of multimedia on the Internet

- Firewall tunneling and virtual private networks (VPN)

- Development of Internet appliances

- Directory services integrated with the Internet

The main issues that concern vendors and users of Internet software and services are:

- Security

- Internet network reliability and performance

- The rapid pace of development

- Availability of application development tools

- Globalization of information access

- The time taken to find information

B

Market Size

The worldwide market for Internet applications market is expected to grow at a CAGR of 77%, from $12 billion in 1995 to nearly $210 billion in 2000, as shown in Exhibit II-1.

Exhibit II-1

Worldwide Internet Market, 1995-2000
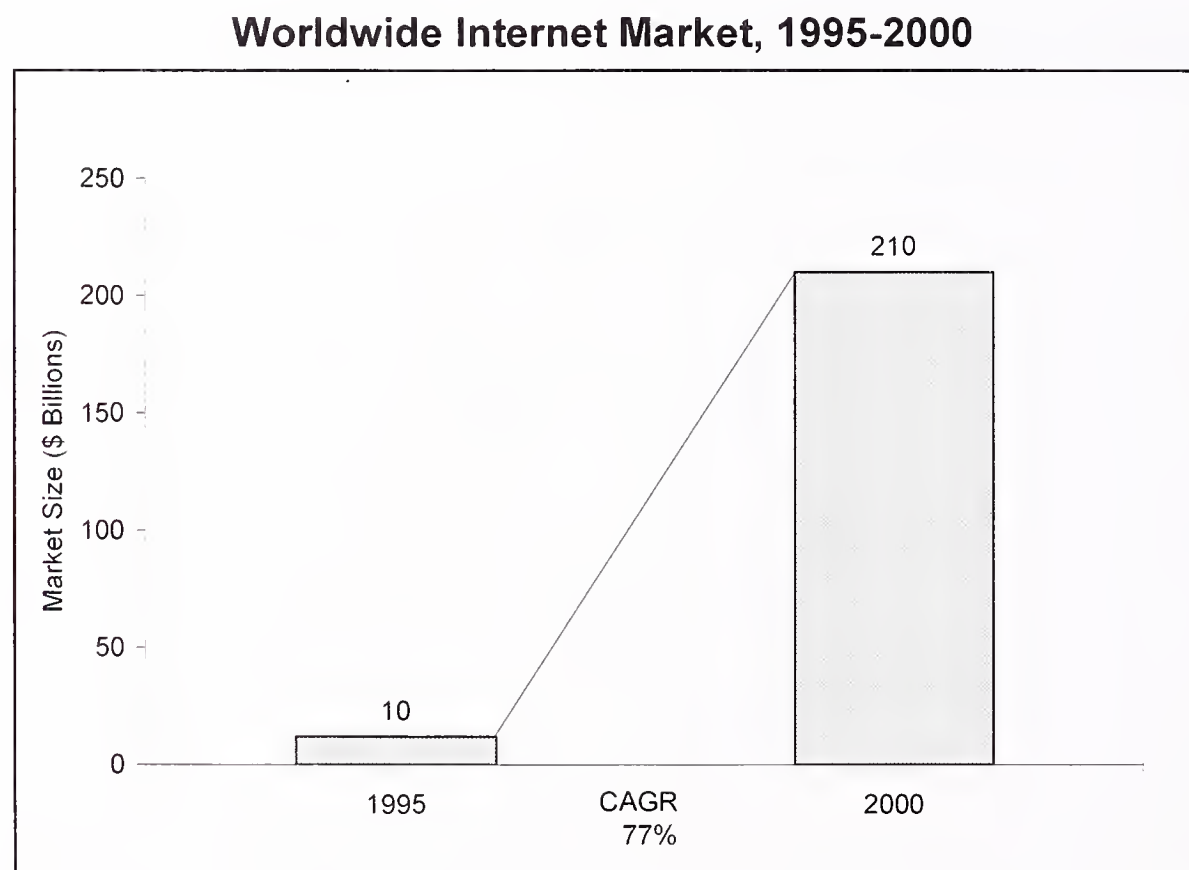
Source: INPUT

Exhibit II-2

Worldwide Internet Market By Category, 1995-2000
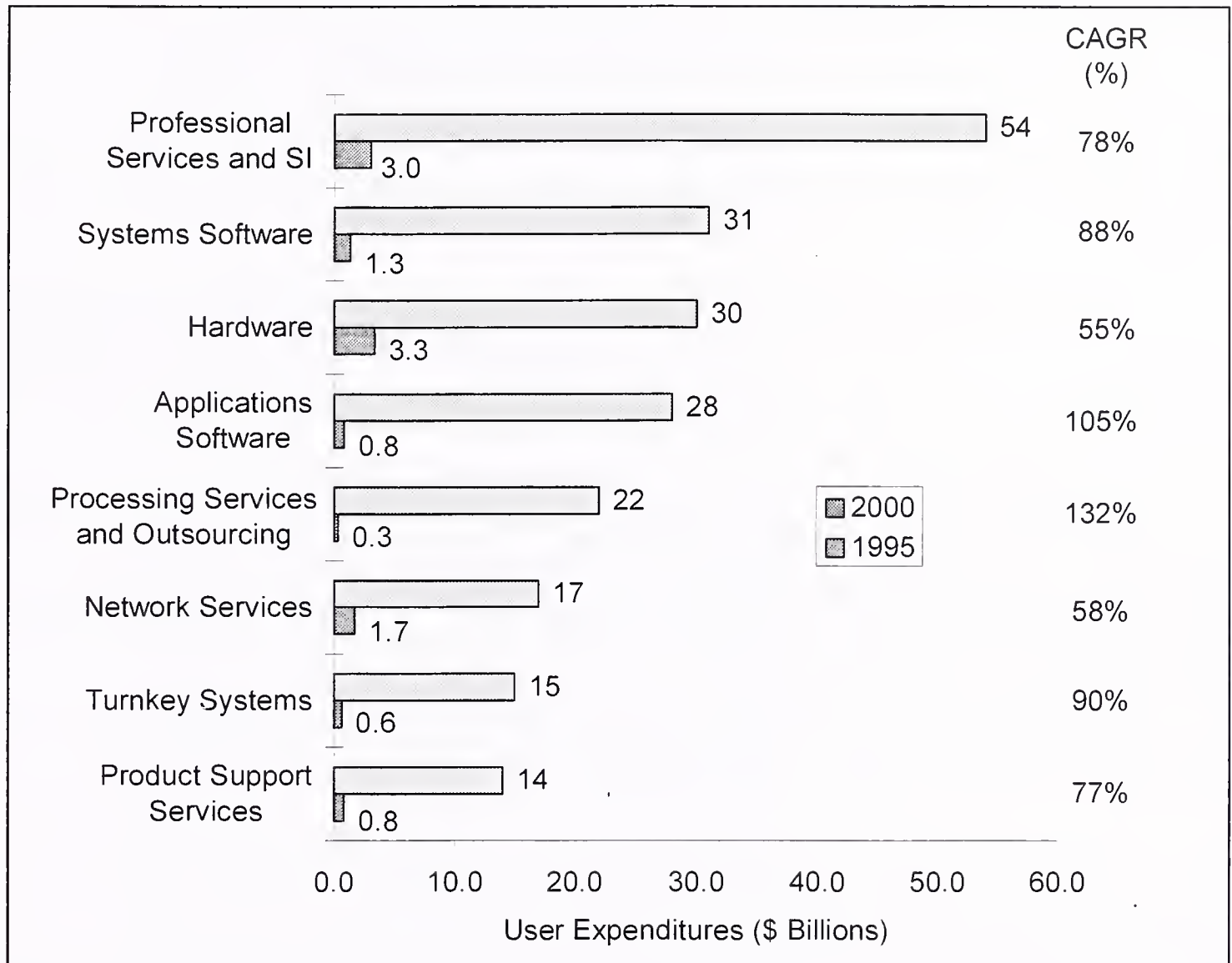
Source: INPUT

The Internet applications software market is estimated at $780 million in 1995; it will reach $28 billion in 2000 (a five-year CAGR of 105%). The Internet processing services and outsourcing market is estimated at $320 million in 1995, to reach $22 billion in 2000 (a five-year CAGR of 132%). The worldwide Internet network services market was estimated at $1.7 billion in 1995, to reach $17 billion in 2000 (a five-year CAGR of 58%). The worldwide Internet turnkey systems market was estimated at $610 million in 1995, to grow to $15 billion in 2000 (a five-year CAGR of 90%). The Internet product support services market was estimated at $800 million in 1995, to reach $14 billion in 2000 (five-year CAGR 77%).

C

Opportunities and Risks

In analyzing the Internet market, INPUT notes that:

- Simpler Internet computers are being built that threaten Microsoft's and Intel's dominance of the desktop computing market, particularly in homes.

- On-line service providers like CompuServe and America Online are providing access to the Internet by providing their customers with browsers and they are becoming sites on the Internet for finding specific content.

- Many mainstream software providers are developing new releases of their software to support the Internet platform

- The Internet platform provides the means for multimedia use to explode.

- The Internet platform threatens applications such as Notes and SAP, developed for legacy-based platforms.

- Directory services/file management applications are required on the Internet platform.

D

Recommendations

1. Recommendations for Software Vendors

a. Systems Software Vendors

Security and manageability of the Internet are the major concerns of users. Systems software vendors must provide tools to create and manage content, in addition to the tools to manage networks as they are connected to the Internet. Companies such as Novell can benefit by developing directory services/file management (NDS) software that runs over the Internet. Systems software vendors can also provide programs which make the Internet a more robust application development platform.

b. Applications Software Vendors

The migration of applications from legacy-based platforms, such as MVS, UNIX and Windows, to the Internet platform opens up a significant new market opportunity for applications software vendors. The Internet will

threaten many traditional applications software vendors. IBM/Lotus has already had to defend and adjust its flagship Notes product.

A number of companies are developing applications that use the Internet as a platform, including RADNET Inc., developers of Web-based groupware products, and Applix, Inc., creators of Espresso, an Internet-based spreadsheet program. Additional application areas include telephony, video conferencing, multimedia, electronic commerce, and games.

2. Recommendations for Professional Services and Systems Integration Vendors

a. *Major Systems Integration Firms*

Interest by Fortune 500 companies and government agencies in the Internet's commercial value, combined with the lack of robust tools for integrating Internet applications with existing business systems, opens up a significant new market opportunity for major systems integrators. Systems integrators may proactively canvass their existing clients to determine their plans for using the Internet and on-line services, educate their clients about the "integration gap," and pursue these new opportunities. Significant opportunities also exist to develop entirely new applications on the Internet platform.

Those integrators without significant Internet and on-line services experience should develop or acquire that expertise; if their clients haven't already asked them to bid on Internet-related projects, they probably will within the next 24 months. This may be done by acquiring smaller firms.

b. *Smaller VARs*

Small and medium-sized businesses that are generally unserved by the major systems integrators should be a prime target of smaller VARs. There are significant opportunities for providing clients with turnkey Internet malls, customized Internet applications for vertical markets, and application integration services. Networking VARs should sharpen their Internet LAN/WAN interconnection expertise. Smaller VARs may specialize in niches for long-term profitability, or in a specific region.

3. Recommendations for Hardware Manufacturers

a. *Client Platform Vendors*

Vendors of personal computers and workstations can add value to their products in several ways. First, they can ship their systems preloaded with on-line and Internet access software, and preconfigure the systems with modems or network interfaces so that connecting to on-line services or the

Internet is simple. Next, keeping in mind that computer buyers typically purchase a large amount of additional software and peripherals within the first 90 days after buying the computer itself, they can ship their systems with an electronic catalog of their products and those of cooperating vendors. Finally, vendors can set up their own presences on on-line services and the Internet to provide customer support, present product information, and accept orders.

Vendors of Internet appliances will benefit because applications will run independently from the underlying OS and CPU. Therefore, users will purchase products offering the best price/performance. Consumer products vendors will benefit most, as prices of the Internet appliances fall below $100 by the year 2000.

b. Server Platform Vendors

Server vendors should evaluate ways in which they can add value by making it easier for merchants to use their systems for electronic commerce. Apple, BBN, Sun and Tandem have announced and/or released preconfigured Internet servers; Tandem's products are designed for fault-tolerant Web-based electronic commerce. Other vendors can follow their examples and offer:

- Turnkey electronic storefronts and Internet malls

- Back-end transaction processing servers for the Internet

- Database marketing servers for on-line and Internet applications

- Turnkey electronic catalog production/order processing servers

4. Recommendations for Network Services and Payment Processing Vendors

a. Telephone Companies

The growth of on-line services and the Internet will spur demand for conventional phone service, leased lines, ISDN and frame relay services. The best thing that the RBOCs and long-distance carriers can do is to make it as easy and fast as possible for businesses, organizations and individuals to get data services. This includes simplification of services and options (such as preset ISDN provisioning codes), service guarantees, uniform availability of data services, and increased sensitivity to the needs of the SOHO (small office/home office) and telecommuter markets.

b. Cable Companies

Most of the top 10 Multiple System Operators (MSOs) are testing or delivering data services (including on-line services and Internet access) in limited areas. Digital, General Instrument, Intel, Zenith and other hardware vendors are supplying the equipment for these services. As the outlook for "re-deregulation" of the cable industry remains cloudy, data services represent a very significant incremental revenue opportunity for cable operators. INPUT suggests that cable operators consider the level of customer and technical support required before they commit to widespread data services; cable companies will be required to understand and support their customers with the plethora of computers, communications equipment, software and services required to do business on line or on the Internet.

Once businesses use cable systems as their electronic commerce "pipeline," high uptime and fast restoration of service will be essential. Merchants will not tolerate deteriorated or unusable connections, so the cable plant and equipment used for data services will have to be maintained to a much higher degree of reliability than that used for conventional analog video.

c. Internet Service Providers

With the entry of America Online, CompuServe, IBM, the long-distance carriers and the RBOCs into the Internet Service Provider (ISP) marketplace, the outlook for even the largest independent ISPs is not good. Inevitably, the suppliers of high-speed network service for most existing ISPs will become direct competitors. ISPs can compete with:

- Specialized Internet malls: As MCI and other big players introduce "super-malls," smaller ISPs should identify and focus on specific vertical markets, and create targeted malls for those markets. Examples: A medical mall, with products and services targeted at specific medical specialties, or a video production mall, with storefronts for production and post-production services.

- Superior customer service: By providing a high level of customer service with the knowledge and experience to understand the problems associated with the myriad different computers, communications interfaces and software packages used to connect to the Internet, smaller ISPs can stay one step ahead of their bigger competitors.

- Mergers and acquisitions: BBN recognized that it had to expand its reach nationwide in order to survive, so it acquired ISPs on the East and West Coasts, and invested in plant and equipment to provide coverage for the rest of the country. Many smaller ISPs may have no choice but to team up with other providers.

- Flat fee service: The on-line services, long-distance suppliers and RBOCs all price their individual-user services on a per-hour basis, with some number of hours covered as part of the monthly fee. Smaller ISPs can attract and retain heavy Internet users with services that offer 50 to 100 hours a month as part of the basic fee, or are priced at a single flat fee for unlimited usage.

- Move up the value chain: ISPs can provide value-added services, such as electronic commerce consulting and security services. With the introduction of a bevy of security protocols and standards, businesses will seek assistance when determining which solutions are best.

5. Recommendations for Processing Services Vendors

a. Payment/Transaction Processors

Electronic commerce on line and across the Internet will be a significant contributor to revenues for payment and transaction processing companies such as First Data Corporation and Checkfree. The goal for all the companies in this segment should be to make it as easy as possible for merchants to process their check and credit card transactions through their services. Close business and technical relationships between these services and on-line services, Web server vendors, and Internet mall operators will give them the inside track for their share of transaction fees.

b. Credit Card Companies

Visa and MasterCard have been very active in establishing strategic relationships with on-line services and Web server vendors; Visa is closely affiliated with Microsoft, and MasterCard is working closely with Netscape. American Express has established a presence on America Online, but it is behind its two biggest competitors in forging Internet alliances. Discover and the smaller credit cards are still on the sidelines. Clearly, all major credit card companies have at least a defensive interest in enabling merchants to do business electronically with customers using their cards.

c. Banks

Banks have a key role to play in electronic commerce, as the repository of funds and verifier of microtransactions, as the EFT conduit for larger business-to-business transactions, and as issuers of credit cards and merchant accounts. Microsoft has made no secret of its ambition to become the central financial institution for electronic commerce on line and on the Internet, and banks should perceive this as a "wake-up call" to a significant business opportunity. Major banks can use their merchant accounts as a beachhead into electronic commerce. Because both Visa and MasterCard are

deeply involved in electronic commerce, their member banks can and should piggyback on their activities.

Electronic commerce also represents a new sales opportunity for banks. As interstate banking restrictions fall and banks get into new businesses (such as insurance and securities brokerage), on-line services and the Internet will be very cost-effective ways to reach new and existing customers with information about their services. Secure transaction systems can be used to enable customers to review their banking transactions and transfer funds between accounts on line. Banks should pursue on-line storefronts and Internet malls to expand their markets and improve customer service.

6. Recommendations for Other Vendors

a. *Recommendations for Catalog Publishers*

Electronic catalogs, on line services and Internet malls all offer significant new market opportunities for catalog publishers. There is virtually no risk that paper catalogs will become obsolete for many years, but electronic catalogs can offer significant printing, mailing, and transaction processing advantages over their paper counterparts. The largest catalog printers (R. R. Donnelley and Banta) have both made major commitments to electronic catalog development, and the time is right for catalog publishers in general to at least investigate electronic distribution.

b. *Recommendations for Retailers*

Electronic commerce via electronic catalogs, on-line services and the Internet can represent a significant new market opportunity for retailers, but to date, financial returns generally have been disappointing. The best opportunities lie with those retailers who:

- Sell to sophisticated computer users: CD ROM electronic catalogs require computers with CD ROM drives, multimedia cards and other hardware and software. On-line services require modems, and the Internet requires modems or network interface cards, routers and other equipment. Customers who don't have the required equipment or expertise can't take advantage of electronic commerce.

- Sell products that appeal to sophisticated computer users: Computer hardware and software are the biggest sellers, as are other products and services targeted at moderate- to high-income, well-educated males.

- Keep their presentations simple: Electronic retailing competes with paper catalogs and local stores. If an electronic catalog, on-line storefront or Internet mall is significantly more difficult or less convenient to use than a paper catalog or store, customers will return to their original buying patterns once the electronic shopping novelty wears off.

c. Recommendations for Wholesalers

Electronic catalogs and Internet malls are becoming a good opportunity for wholesalers. CD ROMs can take the place of thick paper catalogs that are expensive to print, mail, and update, and with good indexing and searching software, customers can find products far more easily using an electronic catalog than a paper one. Internet storefronts and malls offer the potential for lower transaction costs, faster distribution of pricing and product changes, and better customer support through immediate access to the latest product information. For any of these electronic commerce methods to succeed, however, wholesalers must ensure that their customers have the equipment and experience necessary to use them. Wholesalers should be prepared to train their customers and even sell or supply them with the required hardware and software, in order to enable them to take advantage of electronic commerce options.

d. Recommendations for Manufacturers

Manufacturers have much the same opportunities as wholesalers (see above): Electronic commerce through electronic catalogs and Internet storefronts and malls represents a significant opportunity for cost savings and increased customer loyalty, so long as manufacturers' customers have the necessary equipment and technical know-how. If manufacturers can realize big savings from lowered printing, mailing, customer support and telemarketing costs, it may be worth it to partially or even fully subsidize customers' costs for needed training and equipment.

III
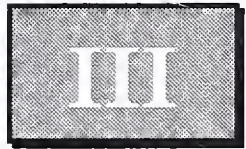
Trends and Issues

This chapter discusses the trends that are fueling the explosive growth in Internet software, hardware, and services.

A
Internet Trends

1. The Internet Revolution

The Internet has received enormous attention and stirred tremendous excitement and debate throughout the world in the last few years. As the Internet steadily increases in size and as more businesses link themselves to customers, suppliers, researchers, consultants, and potential clients via the Internet, the demand for browsers, Web servers, and tools to manage Web sites, content, and commerce will continue to rise. There are several reasons for the Internet's growth:

- Relaxation of restrictions on commercial use, which enabled the Internet to become the "universal transport" for E-mail between commercial on-line services (CompuServe, America Online, Prodigy, etc.), dedicated E-mail services (MCI Mail, AT&T Mail), and the government and academic communities

- Implementation of the World Wide Web (WWW) and the introduction of Mosaic, a software browser developed at the National Center for Supercomputing Applications, that was designed to take advantage of the WWW

- A dramatic increase in the amount and variety of information available on the Internet

- Availability of languages (e.g. PERL, Java) and software tools to develop Internet applications

2. Uses of the Internet

Corporations, government, nonprofit organizations and consumers are
increasingly using the Internet in new ways. The World Wide Web is
replacing many traditional forms of information dissemination, including:

- Messaging—E-mail, video, sound, multimedia

- Electronic publishing—Web browsers and servers, directories

- Electronic commerce—interactive shopping, trading, reservation systems,
  EDI, on-line catalogs, price comparisons, auctions

- Electronic marketing— sales materials, on-line advertisements, tracking
  Web browsers' preferences, product demonstrations, electronic sales
  support materials

- Customer support—forums, product literature, help desk information

- Connection to back-office systems—for accounting, human resources and
  inventory management

- Interactive tours—house tours, travel planning

- Interactive communications—chat, E-mail, lobbying

- Logistics and shipping

a. Electronic Marketing

Almost every major corporation is using the World Wide Web, at least for
promoting its products. Even TV commercials are providing WEB site URLs.
Movie companies have discovered that producing an entire WEB site to
promote a new movie is far less expensive than promoting it using
traditional means. Web sites are also becoming an advertising medium for
ambitious businesses to attract customers.

b. Customer Support

Customer service applications allow companies to provide service facilities
whereby customers can query parts of the corporation, request specific
information, and access knowledge bases of technical bulletins, customer
issues, and questions databases. Most companies profiled offer customer
service WEB pages for their users.

FedEx's site lets customers track their packages' delivery status. The
company's site saw traffic rise 40 percent when it placed an advertisement
on the page of a popular Web browser.

c. Human Resources

Companies are finding that the Web is an excellent means of recruiting new employees. Most students graduating from college are familiar with the Internet and the World Wide Web, and have turned to the Net in search of career opportunities. Many companies are offering HR WEB sections that typically include information about the company, job listings and facilities by which to E-mail resumes to the company.

d. Transaction Processing

As transaction security, reliability and business process integration issues are resolved, the primary focus of electronic marketing will shift from gathering information to buying goods and services. A number of companies offer integrated transaction processing solutions for the Internet. Digital, for example, has designed a line of its servers as Internet servers with integrated hardware and software for the Internet. The software to be licensed includes versions of Netscape's and CyberCash's encryption, security, and electronic commerce software.

3. Intranets

The Web has become the *de facto* standard for disseminating information to potential customers on the public Internet. The ease with which information can be published and accessed has caused the Web to be used in the same way for company internal use. Internal networks that use Internet technology are called intranets. Many corporations, such as Merck, Sun Microsystems and Schlumberger, are migrating their corporate applications to support the Internet. Schlumberger, with permanent operations in 35 countries and employees in remote areas of 50 other nations, uses 20,000 Internet E-mail addresses, 20 internal Web servers, and 30 Gopher servers to disseminate information throughout the company.

Companies uncertain that the Internet will pay off may be simply looking at its external use. Internet technology will be used extensively within the corporation as an application development platform. INPUT believes that 75% of the sales of Internet-related technologies will be used for intranets.

Web servers can be inexpensive to buy and maintain—depending on the volume of traffic they will be expected to deliver, they can run on a low-end Windows NT or UNIX machine and be attached to a department's LAN. They can deliver any information, including multimedia, to any company department that is either connected to the public Internet or can connect directly to the Web server.

The Internet is particularly attractive for large companies that need not only to give online access to their staff but also need to connect their

geographically remote offices. Large North American companies that have connected their remote operations via the Internet have had a significant influence on Internet implementation in many parts of the world outside the U.S.

Several vendors are offering intranet solutions, including Hewlett-Packard. HP's solution is based on its Series 9000 minicomputers and uses third-party products, including 100VG-Any-LAN and Ethernet, database products from Informix and Oracle, firewall products from Raptor Software Inc., and Web browsers and servers from Netscape Communications.

4. Cost of Mail versus Cost of Communications Networks

While mailing, printing and handling costs have continued to rise, increased competition between long-distance telecommunications companies, the start of competition in the local telephone service arena and the widespread introduction of new technologies such as ISDN, frame relay and ATM have caused dramatic reductions in the cost of electronic communications. The Internet is an alternative to the long-distance phone network (albeit relying on underlying phone company connections), mail services, and value-added networks. Substituting the Internet for expensive and proprietary value-added networks (VANs) will decrease the cost of EDI while increasing its reach.

Virtual private networks (VPN) or tunneling allow a LAN in one location to link to another LAN through the Internet. Digital offers a tunneling product that even creates an encrypted tunnel between a private LAN and a portable computer.

B

An Emerging Applications Platform

The widespread use of the Internet defines a new software platform that promises to radically change:

- Traditional software structure and architecture

- Software distribution

- How organizations communicate

- C/S systems management and support

The shift from traditional platforms to the Web-based platform is occurring rapidly today, although only a handful of applications have migrated to the WEB-based platform. But as Web technology matures, current applications

written for PC-, server- and mainframe-based operating systems will migrate to the Internet-based platform by the year 2000.

The Internet changes the way in which applications are developed because applications are no longer dependent upon a particular operating system or application, as depicted in Exhibit III-1.

Exhibit III-1

Applications Developed on the Internet Platform
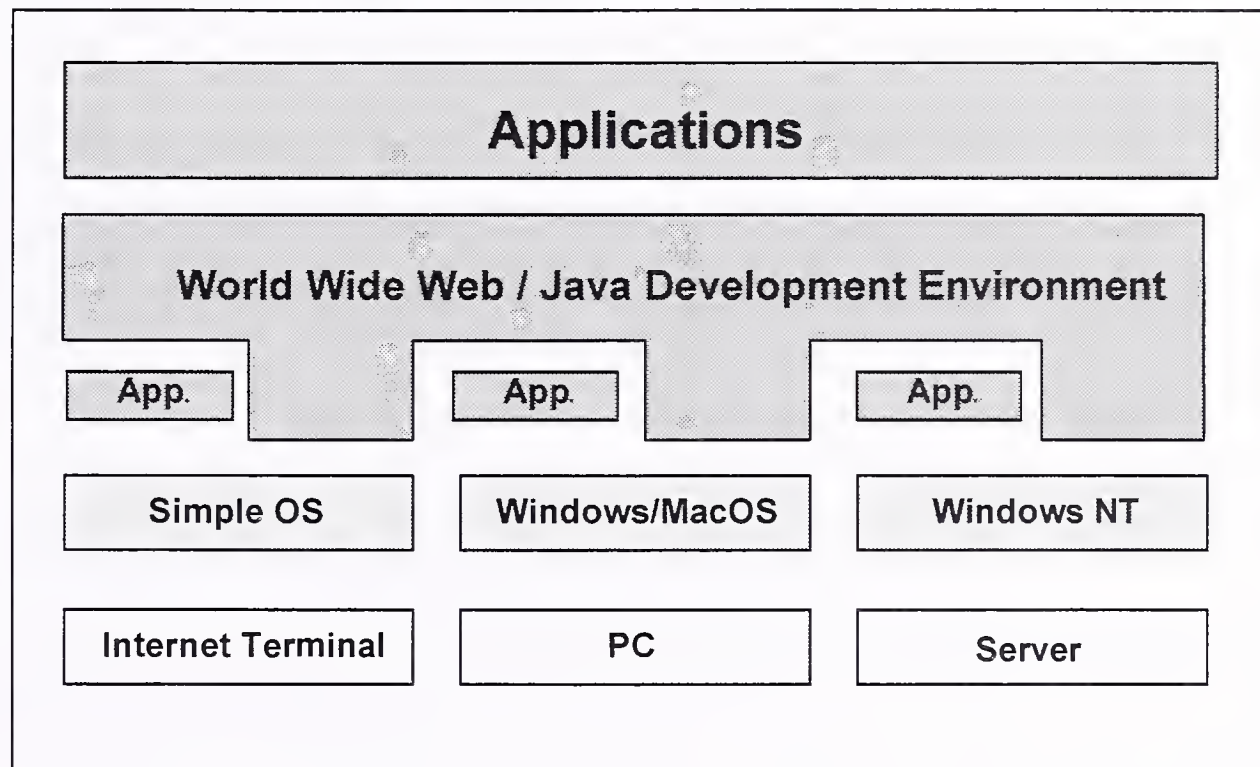
Source: INPUT

Instead of developing different software for every different type of computer operating system, software is developed to support a high-level language like Java or a compound document format like HTML that works on any platform.

A client software package, called a browser, can be used for many different applications. This saves companies time in developing client software. For a software vendor, the advantages of programming for the Internet are:

- Software portable to any platform

- The opportunity to lead a new market segment

- Rapid, simpler programming environment

- Simplified distribution and support using the Internet

- Lower document production costs

Internet technology will be used extensively within the corporation as an application development platform, and will continue to threaten popular enterprise applications such as Lotus Notes and SAP.

1. Pace of Development and Implementation of Internet Applications

The pervasive impact of computers and communications has affected the pace of business decision making. The ability to get critical information when it's needed enables companies to anticipate and quickly react to changing conditions.

In both the user and vendor communities, the Internet is accelerating the pace of business. Simple Internet applications can be developed quickly. The use of common client software, an Internet browser, reduces the time to create cross-platform client software as, for early Internet applications, all the programming is done for a server.

2. Web Objects

Applications will begin to migrate from legacy-based platforms, such as MVS, Windows, etc., to the WEB platform. The number of applications that need to be written is growing exponentially and using traditional programming means will prove impossible. Thus, the general trend will be for these applications to be written with WEB objects. Web object products include NeXT's WebObjects, Art Technology Group's Dynamo, General Magic's Telescript, Apple's Cyberdog, Microsoft's VB Script, and Sun's Java.

3. Cross-Platform Development Tools

a. Application Development Tools

There is a wealth of cross-platform development tools for intranet applications development. The market is crowded and in the next few years, many vendors will be acquired or will need to change their businesses significantly to survive.

Tools like Visual Basic, SQL Windows and PowerBuilder initially addressed the Windows market only. Powersoft has been slowly migrating to other platforms. Oracle's Developer/2000 supports UNIX, Windows, MacOS and character-based interfaces; it will give development tool vendors increased competition, as will Informix's New Era toolset. Enterprise cross-platform tools from companies like Forté have emerged. Four Seasons provides 4S-SuperNova across MVS, DOS, Windows and UNIX.

b. Internet Development Tools

A new class of tools in the multimedia publishing area is emerging from companies like RAD Technologies and Macromedia. These enable multimedia servers to create client applications that can be read by Web browsers. Spider Technologies is aiming to be the Powersoft of the Internet, by providing development tools for corporate applications that run across the Internet.

c. Java

Sun's Java language is only slightly higher level than C++, yet it has grabbed the attention of developers who create Internet applications. Higher level scripting languages, such as JavaScript from Netscape, are emerging so that distributed processing across the Internet becomes a reality. America Online, Apple, AT&T, Borland, Brio Technology, Computer Associates, Digital Equipment, Hewlett-Packard, Illustra, Informix, Intuit, Novell, Oracle, SCO, SGI, Spider Technologies, Sybase, and Verity are some of the companies that plan to incorporate JavaScript into their products. Microsoft is licensing Java from Sun, integrating it with OLE to link application components across networks. Competitors to Java include General Magic's Telescript and TCL, a public domain language.

C

Winners and Losers on the Internet

Exhibit III-2 identifies winners and potential losers as a result of the widespread growth of the Internet. The losers have been labeled as "potential losers," as they will only lose if they fail to adapt their business model. This is how some companies are attempting to change their approach to the market:

- Apple - leveraging its strength in desktop publishing into electronic publishing for the World Wide Web

- IBM - interfacing traditional products (e.g., DB2) and services (IBM Global Network) to the Internet

- IBM's Lotus division - reducing the price of Lotus Notes, adding a WEB browser to Notes and implementing Java to integrate it better with the Internet (InterNotes already enables Lotus databases to be published on the Internet)

- Microsoft - redefining the Microsoft Network as a node on the Internet that will have quality content and developing an overall Internet strategy that enables MS Office applications to support the Internet

- Oracle - transforming its database engine into a database for the World Wide Web

The Internet changes the manner in which data is entered. Instead of data being entered centrally, it can be entered by users with WEB browsing software. This means that there are opportunities for developers like Spider Technologies to create application development toolkits for accessing databases over the Internet.

Exhibit III-2

The Impact of the Internet—Winners and Potential Losers

Product/Service	Winners	Potential Losers
User interface for messaging	• Browsers • Netscape, Spyglass	• E-mail vendors • Qualcomm, Lotus
Information storage and retrieval	• Web servers and add-on features for WEB servers • Illustra, Netscape, Open Market	• Document storage and retrieval systems • Wang, Viewstar
Internet access	• Well-funded Internet access services • AT&T, MCI, Sprint, RBOCs	• Regional Internet access services • Many small companies
Operating systems	• Small OSs • Apple (for Newton OS), General Magic	• Traditional OSs • Microsoft, SCO
Network operating systems	• TCP/IP stack vendors • FTP Software, Firefox	• NOS vendors • Novell, Banyan
File management / Directory services	• Novell's NDS mapped onto TCP/IP networks	• Windows, Traditional OSs • FTP, E-mail attachments
Collaborative applications	• Groupware for the Internet • Netscape/Collabra, Illustra • RADNET	• Traditional groupware • Lotus Notes
Transaction systems	• Open Market's OM-Transact • Premenos' Templar for Internet	• EDI solutions over value-added networks (VANs)
Application development tools	• Java-based tools • Sun, Borland, Symantec • Spider, Bluestone, Speedware	• Visual development tools that create proprietary clients, C++, COBOL • Powersoft, Gupta (Centura)
Hardware	• Internet appliances	• Intel Processor PCs
Communications	• Access Switches • Cascade	• Access Routers • Ascend

Source: INPUT

D
Internet-Based Applications

1. Multimedia and Video

The use of multimedia content with on-line and Internet commerce services is less prevalent, because of the time required to download audio and video data. As ISDN and cable television-based data services drop in price and become more widely available, multimedia presentations will become more common on line and on the Internet.

Multimedia will begin to merge with the Internet as new technologies are introduced. Macromedia's Shockwave will have a dramatic impact on the look and feel of the Web. Shockwave allows animations to be embedded into HTML documents for viewing in a WEB browser. Java is a great technology, but when it comes to adding interactivity and multimedia to WEB sites, Shockwave for Director is much better.

For the future, Macromedia plans to add streaming features to Shockwave for Director. This feature will be very similar to the streaming ability of Progressive Networks' RealAudio system, which Macromedia had planned to integrate into Shockwave in the first quarter of 1996. Macromedia also plans to add streaming ability to the video XObjects in its Lingo scripting language, which will allow for video playback on the Web.

2. File Management / Directory Services

As companies connect their local networks to the Internet and create virtual private networks between remote offices, the demand for an application to effectively manage files and directories on these networks will arise. Internet file management software will enable Web browser users to access file servers that are connected to an Internet-based network.

Today, users of the Internet can transfer files either using file transfer protocol (FTP) software or by attaching files to an E-mail message, but both methods have their problems. Attaching files to E-mail messages is a problem because different E-mail software packages support different attachment schemes. For example, a user in a company using cc:Mail supporting encoding cannot send attachments to another user using Eudora, which supports MIME attachments. With FTP, the directories are not very user friendly and do not provide graphical user interfaces. FTP is now supported to run within WEB browsers, but it is still difficult to administer and manage files and directories on the server side.

For the future, companies will need file management software that provides a graphical interface and transparent access for users, and management

functions for administrators. Novell's Netware Directory Services (NDS) software, developed for the Internet platform and others, will allow administrators to establish security and users to store, copy and transfer files over the extended LANs.

3. Groupware

The emergence of Internet-based groupware systems is initially a change of platform rather than a fundamental change of application. Over the last 20 years, however, as a platform shift gave rise to new application possibilities, so the shift to the Web will enable new types of groupware applications.

The benefits of Web-based groupware over proprietary systems include the following:

- Only the server application must be purchased; existing Web browsers are used as clients and the application runs over the existing Intranet network infrastructure.

- Training costs are reduced, as users will already be familiar with the application's interface, the Web browser.

Installation and management costs are reduced, as no client software has to be installed. Application upgrades are performed only on the server.

4. Voice over the Internet

A promising direction—using the Internet for voice connections—could bring profound benefits to companies that are currently using client/server systems. Currently, using the Internet for voice transmission is somewhat awkward, as transmission is half-duplex, but it is expected to improve over time.

Voice would become an integral part of an application. The current scenario—telephone networks integrated with user PCs or terminals for such applications as customer support—would be augmented by one in which the Internet carries both voice and data traffic.

5. Agents

Agents are programmed tasks carried out on behalf of a user or program. Agents for systems management, searching databases and automating mouse actions on a client workstation are common. There is tremendous interest in intelligent agents for automating business processes. Exhibit III-3 shows representative applications of agent technology, including some research projects.

Exhibit III-3

Applications of Agent Technology

Company	Projects
Andersen Consulting	Bargain hunting - shops music stores to find lowest priced CDs - demonstration
Bunyip Information Systems	Internet searching - a Canadian government prototype
California Software	Intelligent WWW browser - agents perform browsing, technical support, E-mail
CA/LEGENT	AgentWorks systems management tools
Digital Equipment	Restaurant recommendations demo (Programmed In Obliq)
General Magic	Telescript agents for messaging across Internet to PDAs
IBM, Sun and Ki Networks	Systems management agents - Common Agents
Lockheed	SHARE Project - engineering design, satellite applications (with Teleos)
MIT Media Lab	HOMR - recommends music Webhound - recommends interesting WWW sites
Oracle	Oracle Mobile Agents - wireless computing support
Palindrome	Target Service Agent - file and database backup

Source: INPUT

E

Hardware Trends

1. Emergence of Internet Appliances

The widespread use of the Internet defines a whole new class of computers referred to as Internet appliances, network computers, Internet terminals, etc. Internet appliances are basically stripped-down PCs that connect to the Internet and run Web-based applications.

Because Internet applications, developed in languages such as Java, can run within Web browsers on virtually any machine, it doesn't really matter what kind of OS or CPU is inside of the Internet appliance. Java is a high-level interpreted language that runs on a virtual machine. In other words, the Java run-time engine insulates applications from the OS and hardware. For this reason, the market for Internet appliances is expected to explode because Internet applications will run on devices from almost any vendor as long as they incorporate the runtime engines from vendors such as Sun, NeXT, and General Magic.

A number of companies are developing Internet appliances. For instance:

- Oracle's network computer will cost under $200 to manufacture and can run simple operating systems. It will use an ARM 7500 microprocessor, which is as powerful as a 66 MHz, 486-class PC chip.

- Acorn, which helped Oracle build its prototype, plans to introduce an Internet PC for home users to be based on the company's ARM multimedia chip.

- Sun Microsystems plans to unveil a personal computer that will use Java as both the operating system and browser, making it less costly to maintain than typical PCs. The Internet box measures five by nine by two inches and comes with a 110-MHz processor, standard Sun monitor, and basic memory.

- Commodore is bringing back the Amiga computer as the Amiga Surfer, a low-cost machine designed to browse the WEB. The new device, priced at about $720, will ship with two megabytes of RAM, a 260-megabyte hard disk, a 14.4K baud modem, and browser software called MindWalker. The device also comes with applications software including a word processor, a spreadsheet, and a database manager. Escom AG bought the rights to Commodore's Amiga technology last year and created the Amiga Technologies GmbH subsidiary.

- JVC USA has demonstrated a prototype of its "iBox" Internet device, to include a CD ROM drive, a 14.4k baud modem, and a custom Mosaic browser.

- ViewCall America plans to sell a TV-top box, dubbed WEBster, nationwide in June for $300 and an undetermined monthly fee. A trial begins in Atlanta next month.

- A unit of Philips is currently testing a TV-top box in London that allows users to browse the Web.

Promising markets for the Internet appliance, priced around $500, include consumers without computers and some business offices, such as bank branches, that need simple computers for Internet-based applications. Internet appliances may be beneficial for some client/server applications such as order entry, sales support and information retrieval. Schools also represent an attractive market for Internet appliances.

2. Hardware

The growth of the Internet, telecommuting, dial-up remote access, and multimedia access are all driving the need for networking products such as

routers and switches. ISDN is gaining popularity, it's easier to order, and consumers now know what it is. The phone companies are offering it at affordable rates, though these rates will increase over time.

Cable modems don't threaten ISDN right now because most cable company systems are unidirectional. Cable modem technology will not be ready for at least three years.

As more users connect to the Internet, demand for dedicated bandwidth will be paramount. Today's Internet access routers provide shared bandwidth, meaning that as the number of users dialed into the router increases, the speed of access decreases. Internet access routers will be integrated with network switches to provide dedicated bandwidth when accessing the Internet. Cascade Communications recently introduced the HyperPATH product, an ISDN-based remote access solution fully integrated with the B-STDX multiservice WAN switch.

F
Operational Issues

1. Security and Authentication

The Internet presents serious issues for corporate security. How does a company allow customers access to internal networks and how does it protect itself from unwanted intrusions? Security will remain an issue, though it is being addressed by a number of products, including firewalls, token cards, better authentication routines, user training, and encryption, all intended to make it less of a concern in the future.

2. Ease of Content Creation, Installation and Maintenance

As more content is developed for the Internet platform, managing and maintaining it will become critical.

- Internet documents can be created using a variety of off-the-shelf tools, including HTML editors and add-ons such as SoftQuad's HoTMetaL Pro and Microsoft's Internet Assistant for Word 6, and any of dozens of paint, draw and image processing programs for Windows, Macintosh and UNIX platforms.

- Sun, Digital, Silicon Graphics and others sell turnkey workstations and servers for creating Internet applications and connecting to the Internet.

3. Reliability

Internet extensions to intra- and inter-enterprise applications lead to more complexity. Intranet systems will continue to push the limits of reliability.

Once a system becomes stable, it will be extended and modified, leading to new problems. Hence, reliability is expected to remain an issue over the next five years, providing excellent opportunities for services and products that can troubleshoot distributed applications.

4. Bandwidth

As intranet applications are developed with sophisticated technologies such as Java, the strain on the internal network will be compounded. Companies like Cisco Systems, Bay Networks and 3Com are working on switching technologies to alleviate some of these problems. They are developing new protocols to carry multimedia applications. Networking companies are seeking to address the increased needs for bandwidth-intensive and delay-sensitive applications, because they see network demands increasing as companies migrate mission-critical applications—which must include real-time updates, quick access to data, and fault tolerance—to the Internet.

5. Billing Systems

In order to gain wide market acceptance, any electronic commerce system must:

- Protect the security of businesses' and individuals' personal, financial and business information

- Ensure that a business or individual is who he/she says they are (authentication)

Encryption-based security is rapidly gaining acceptance as the favored solution, with Netscape Communications' Secure Sockets Layer (SSL) and Terisa Systems' Secure Hypertext Transaction Protocol (S-HTTP) the most popular choices.

MasterCard International and Visa International have agreed on standard software for safe shopping with a credit card on the Internet. Visa, which has been pushing its Secure Transaction Technologies (STT) specification, and MasterCard, pushing its Secure Electronic Payment Protocol (SEPP) spec that was developed with the help of Microsoft, will work together on the Secure Electronic Transactions (SET) standard. SET will use encryption methods developed by RSA Security. SET testing will begin in spring of 1996, and the technology could be in use by the end of the year.

Along with MasterCard, Visa, Microsoft, and Netscape, companies endorsing SET include IBM, GTE, CyberCash, and the Science Applications International Corp. Other credit card associations are expected to endorse it as well.

G

Commercial Issues

1. Business Model

Many vendors do not want to be in the Internet access business, believing that it is a low-margin, commodity business. Microsoft, for example, has opted to invest in UUNET, an Internet access provider. Both AT&T and MCI have announced intentions to offer Internet access, with services similar to phone-line services.

2. Copyrights, Trademarks and Licensing

The ease of sending graphics, images, sound and video across the Internet means that schemes are being created for copyrighting or limiting access to intellectual property. Vendors and their contractors must take special care to insure that multimedia use and reproduction rights are obtained for all copyrighted and trademarked content they use.

3. Responsibility for Content

Another high-profile issue is the responsibility of on-line service providers for the content that users access through their services. For instance, CompuServe has banned subscriber access to adult material. After concerns were raised by a German prosecutor, CompuServe blocked worldwide customer access to 200 electronic Internet bulletin boards because it was unable to limit the ban to just German customers. But keeping users from accessing censored content may prove impossible for access providers.

In a rare Internet regulation victory, CompuServe has agreed to follow the recommendations of German authorities by restricting users in the country from accessing material that regulators deem to be pornographic. Last November, prosecutors raided the offices of CompuServe's German subsidiary and confiscated material on numerous services.

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IV
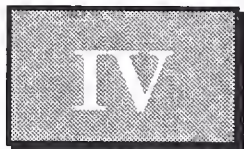
Market Segments

This section identifies market segments and discusses new applications that are being developed for the Internet in each segment.

A
Market Segmentation

The market is segmented by the types of products and services offered. INPUT divides markets into cross-industry and vertical market segments. Products include systems and applications software. The applications software market is broken down into cross-industry and vertical market segments. Turnkey systems forecasts are provided. In addition, forecasts are provided for professional services, systems integration, network services, processing services and outsourcing.

B
Systems Software

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. Systems software includes: communications infrastructure, operations management, applications development tools, information storage and retrieval, and transaction management.

1. Communications Infrastructure

Communications infrastructure supports basic Internet communications. It includes communications client and server software.

a. Client Browsing Software

The most significant client communications software is the browser. Client browsing software includes E-mail for the Internet and excludes bundled browsers with OS or on-line service providers. Netscape holds 70 percent of

the browser market. Although Microsoft holds only 5 percent of the market, the company continues to aggressively gain market share by heavily promoting and giving the product away. The other significant browser company is Spyglass, which licenses its product to a number of companies, including Spry and IBM.

b. Client Add-on Utilities

Client add-on utilities support security, digital cash, electronic wallets, user profiling codes, and OS enhancements. Netscape Navigator 2.0 features a plug-in architecture that allows third-party vendors to develop add-ons. The plug-ins allow differerent media types to be embedded directly into HTML code, and deliver extra functions such as multimedia, video and audio streaming, and virtual reality. The leading plug-ins are Adobe Systems' Amber, Macromedia's Shockwave, Paper Software's Web FX, and Progressive Networks' RealAudio.

Xing Technology released its StreamWorks program that enables PC users to view video from the Internet. Although the product has problems with low-speed connections to the Internet, a number of other companies are developing similar products because of the potential of video streams over the Internet. VDONet plans to release a similar product in early 1996.

First Floor Software's "smart bookmarks" notifies users as information changes on selected Web sites or within certain documents. Netscape is even bundling the software with its Navigator product.

c. Middleware and Protocol Stacks

In 1994-95, there was a market window for selling protocol stacks to support TCP/IP. Windows 95 integrated the TCP/IP stack into the operating system. TCP/IP stacks are now bundled with most OSs, meaning that network protocol vendors are forced into providing more advanced network services.

Novell recently introduced a NetWare Web server, an integrated, server-based method for linking its customers' LANs to the Net. In the future, Novell plans to offer an Internet Protocol/Internetwork Packet Exchange gateway that would convert the IPX protocol of NetWare clients to the Internet's IP and let users communicate directly with a UNIX system.

Firefox Communications allows companies to link Novell's NetWare-based LANs to the Internet and other Internet protocol-based networks. On-line services companies added Internet capabilities to their offerings, allowing users to move from the proprietary on-line service to the World Wide Web.

d. Media Server Support

The forecast includes software to support multimedia, broadcast, audio and video over the Internet. The MBONE protocol supports multicast broadcasting of events. Sales of software to support audio and telephone calls over the Internet have been slow to take off, but are expected to explode as bandwidth expands. VocalTec and Quarterdeck are offering software for telephoning over the Internet, though the quality is not as good as that over conventional phone systems. IBM is a late entrant into the telephony-over-the-Internet market. IBM says it will boost the security of future versions of the software using encryption technology and fully integrate new features such as conference calling and the ability to check electronic mail.

e. Communications and Mail Gateways

The forecasts include gateway software for linking corporate mail systems and databases to the Internet. They do not include forecasts for basic LAN E-mail and database software that is already part of the corporate infrastructure. The Lotus cc:Mail Link to UUCP products enables cc:Mail users to exchange mail with users of Internet-based or UNIX-based mail systems. Similarly, Lotus' Link to SMTP product allows dedicated line users to link cc:Mail to the Internet via the SMTP protocol.

2. Operations Management

Operations management tools are software programs are used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included in Internet operations management are server management, security management, directory management, and network and systems administration software.

a. Client

This segment includes security software solely for the Internet, such as key management software and specialized virus checking related to the Internet, as well as firewall software that is purchased by users for client machines.

b. Security

A significant portion of the operations management software segment is concerned with security. Firewall software, discussed in INPUT's report *Internet Security: The Impact of Firewalls on Client/Server Applications*, is estimated to be over a $5 billion market by the year 2000. Software for user authentication, encryption and network security is also included in the operations management software forecast.

Operations management software includes systems administration software that is purchased to manage WEB sites. This includes software utilities to reorganize WEB sites that are not built into a WEB server.

c. Directory Management Software

The main standard for directory management is X.500. Directory management software includes X.500 directories, name servers, user and resource directories. This enables directories of user names and resources to be interconnected across service providers and corporate boundaries. Specialized software packages, based on other standards, may also be used to manage directories. Included in directory management is software to manage domain names, Internet network resources and software to manage directories of Web sites.

As the Internet market matures, software similar to that used in telephone companies for yellow pages management will be needed to manage directory content. For example, the artwork and images used in a directory will need to be managed. The logistics software to support directory services is also included in this category. Software to track and schedule advertisers will increasingly be needed by service providers.

d. Network and Systems Administration Software

Network and systems management software includes support for user tracking, resource management and billing support at the systems level. Systems administrators need to manage Internet gateways as if they are part of their internal networks. Companies need to be able to troubleshoot connections to public Internet services. This means that network management software is extending beyond the LAN boundary into WANs and into tracking Internet performance and protocols. INPUT believes that Novell will continue to dominate the Internet network management software market as it moves from proprietary network protocols to the open Internet protocols.

For example, NetCarta has developed a Web mapping tool that allows users to visualize sites and eventually entire networks. The software is intended to make the Web more usable for IS departments in companies.

3. Applications Development Tools

Applications development tools are software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions.

Applications development tools include Web authoring tools and utilities added to software such as MS Word, MS Excel and IBM/Lotus Notes to allow

them to create Internet (HTML) documents. Leading Web authoring software products include Adobe's PageMill, SoftQuad's HoTMetaL Pro 3.0, and Vermeer's FrontPage. Microsoft also plans to enter the Web site authoring market with its Internet Studio, which was previously Blackbird, the tool for professional content developers on Microsoft Network.

Currently, most of the Web authoring tools produce documents from static data. Other tools produce Web documents on the fly—for example, as data is retrieved from a database. Increasingly, tools that handle dynamic data will be able to produce reports from databases and Web servers either on demand or at preset times.

Tools to add interactivity to Web pages will become a competitive market. Macromedia, clearly the leader in multimedia development, will dominate the multimedia-over-the-Internet development market with its flagship Director product.

Compilers and software libraries for programmers include PERL, TCL, Java, etc. Also included is software to support the development of agents, and scripts for programmers. For the professional programmer, compilers and software libraries for languages like Sun's Java will become popular. Already, Symantec has announced Espresso, a modification to its C++ application development toolkit, and Borland is working on Latte, a similar product. Compiler vendors are rapidly adopting their software to support Internet code. The development tools market is likely to become crowded, as products that support Internet languages and formats (CGI, HTML and Safe-TCL) are designed. Software to support the development of agents and scripts for both programmers and users will become widely available.

Microsoft plans to include Visual Basic Script and C++ scripting capabilities directly with Internet Studio to automate the publishing and design process. Visual Basic Script allows Web content developers who are not programmers to link and automate a variety of objects in Web pages, including OLE objects and applets created in Java.

4. Information Storage and Retrieval

a. Web Servers

The main storage mechanism for Web documents will be a Web server. Currently, many of these are public domain packages, but Netscape, Open Market and others are making them secure so that publishers can restrict access to documents, either by using a password or by charging an access fee. Web servers will also be linked to databases. With appropriate scripting software, database reports can then be accessed via the Internet and they can be published in HTML. (Please refer to INPUT's report, *The Future of Web Software,* 1995)

b. Client Search Software

To retrieve software, users will initially use their Web browsing software. Over time, specialized software packages for retrieving data on the client, such as Verity's TOPIC, may be customized for the Internet.

c. Databases

Object-relational databases, like Illustra, have specialized libraries and objects to support Web documents. Database administration software needs to support interactive functions, such as forms, image maps and CGI scripts. Allaire's ColdFusion software enables the creation of interactive forms and accesses databases using ODBC. Iband offers object-oriented Web content management tools that allow users to create customized Web sites in a visual environment. Its features include forms to facilitate E-mail, discussion groups, and connection to databases.

Innovex has created an effective content-indexing package for mapping high-volume content, such as online magazines, for Web environments. Net.Form is a forms processing engine from net.Genesis. It enables HTML documents to be created from database queries.

IBM is beta testing middleware for OS/2 Warp Server (called DIS Webkit), designed to give Web users access to data warehouses. New Web versions of Visual Age and Visual Gen are expected to ship by the middle of next year. IBM also announced general availability of DB2 for the Web, a gateway to connect relational DBMSs with Web servers.

Computer Associates plans to provide Web access to databases with its new Unicenter/ICE (Internet Commerce Enabled) systems management console. Informix plans to release a set of JavaScript class libraries that allows developers to connect to their databases through Java applets. Sybase will introduce its web.works Internet architecture in 1996.

d. Search Engines

Search engine server software allows information publishers and providers to build applications that include sophisticated search and retrieval capabilities.

Search engine software complements the traditional hypertext navigation capabilities of standard Web servers with the capability of searching indexed information across the Internet. Search servers typically communicate with standard Web servers via a low-overhead gateway program. Leading search engine software vendors include Fulcrum, Verity, and WAIS, now part of AOL Productions, Inc.

e. Bulletin Boards

Bulletin boards, suitable for dial-up access, are likely to be casualties of the Internet revolution. Although they can organize collections of data and may provide Internet gateways, they are typically used for ASCII data and will in the main be replaced by Web servers. The forecast for bulletin board interfaces to the Internet is small, and likely to decline.

5. Transaction Management

Transaction management software allows for a secure and robust transaction environment for electronic commerce. Transaction servers are built around a distributed architecture that separates transaction processing from Web serving activities.

Open Market's OM-Transact offers companies a complete back-office infrastructure for secure Internet commerce. OM-Transact enables companies to offer secure payment, complete order management, and on-line customer service.

C

Cross-Industry Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems.

Cross-industry applications software products are software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc. Cross-industry applications software products are categorized as accounting and finance (including procurement, inventory and billing software), engineering and scientific, human resources, office automation (including workflow and telecom support), planning and analysis, and sales and marketing.

1. Accounting and Finance

Users selling goods over the Internet will need billing systems. In some cases, they will interface their corporate accounting software, like SAP, to the Internet. For example, Andersen Consulting showed order entry into SAP's R/3 client/server system as part of its DaVinci Virtual Corporation demonstration. This enables a user, with appropriate authentication, to enter data into R/3 using a Web browser from anywhere on the Internet. Order entry will be one of the first accounting modules to be migrated to the

Internet platform for many corporations, as it enables remote sales personnel and customers to enter data directly.

Hyperion Software offers a complete suite of financial software products for client/server environments. Hyperion focuses exclusively on financial management solutions that have proven to be highly attractive to CFOs, corporate controllers and CIOs who are seeking major improvements in their financial processes. In the future, the company plans to introduce a number of financial products that run on the Web platform.

2. Engineering and Scientific

The original use of the WWW was to share scientific data at CERN in Geneva. Technical document publishing has evolved into new applications to support sharing of engineering drawings, circuit diagrams and blueprints. Three-dimensional (3-D) modeling will be supported by VRML, an extension of HTML, for visualization. Specialized applications to support joint engineering development will emerge. These will be used for applications such as molecular modeling, simulation, automobile designs and fluid dynamics.

CambridgeSoft Corporation first gave chemists a way to draw chemical structures from the desktop with its introduction of ChemDraw in 1986. A year later, Chem3D hit the scene, allowing users to convert structure drawings to 3-D automatically, rotate models, and perform vital analyses. In 1992, ChemOffice made the chemist's life even easier, by offering drawing, modeling and information all in one package, and incorporating communications with outside databases and chemistry tools. For 1995 and beyond, there's much more in store.

Now, with the introduction of ChemOffice Net, a software program designed to allow anyone in the world to view and print work done in ChemOffice, CambridgeSoft has once again set the standard for chemistry software.

As the Internet becomes a mainstream communications medium, ChemOffice Net makes it possible for all scientists to share their chemistry work with the world on line.

Like Mosaic or Netscape, which allow users to move between Web sites, ChemOffice Net allows the user to quickly and easily move between ChemOffice documents. Structure drawings, molecular models and reactions can be viewed, movies can be made, and information can be gathered. Users can search CambridgeSoft's 15,000-compound database and download these drawings and models for use. Users can print a hard copy, share the images and information with colleagues over the Internet or a corporate network, or file the information on their hard drive.

3. Human Resources

Job applicants search the Net for opportunities. Software to support job advertising and applicant tracking will become increasingly specialized, with early implementations using standard Web servers. Job applicants are also creating resumes in HTML.

Employers are using intranets to select benefit plans, enter employee record data and publicize corporate policies. Increasingly, HR systems will have Web browser interfaces for users, as this reduces the cost and complexity of system deployment.

Most students graduating from college are familiar with the Internet and the World Wide Web. Companies are finding that the Web is an excellent means of recruiting these graduates.

Rockwell has developed a number of human resources Internet applications. Two versions of the Rockwell Employment Application are available for users. The first is a DOS version, which can be downloaded to a PC. By downloading, users can complete the application at their convenience and forward it via modem to Rockwell's central database. This feature can be especially useful for those who find it necessary to search for addresses, dates or other detailed information required for successful completion of an employment application.

Users can also fill out an Internet version of the application, which takes approximately 15 to 20 minutes to complete. It has field-sensitive help, which can be accessed by clicking on the pertinent field description. To facilitate completion of the application, users are asked to be prepared to supply personal, academic, employment, government/military service, clearance and achievement information.

The on-line employment application is an abbreviated version of Rockwell's standard employment application. Upon completion, users are instructed to attach their resume in ASCII text format. Both their applications and resumes are placed in a central database from which participating Rockwell divisions review user qualifications for current and future openings.

4. Office Automation

Lotus Notes can be used to publish documents on the Internet using InterNotes. Increasingly, office suites will support collaborative computing over the Internet and enable reports to be published as HTML files. Already, Microsoft offers the Internet Assistant for MS Word as a free add-on package. Digital offers Workgroup Forum to support collaborative computing over the Internet.

LAN E-mail systems are vulnerable, as Internet mail clients embedded in browsers like Netscape's Navigator become more widely accepted. Users may prefer to support a shared PPP server, either in-house or at a service provider's. Microsoft's Exchange and Apple's PowerTalk are built into the operating system and enable fax, E-mail and other messages to be collected in a single in box.

Keyfile has pioneered the development of easy-to-use, integrated document management and workflow software products. These solutions are focused on automating the tasks—such as filing, annotating, retrieving, faxing, routing to co-workers and archiving—associated with managing documents. All of this is accomplished with desktop computers. For the future, the company plans to develop a Web-based client using Sun's Java technology. Eventually, the company will offer an entire workflow system developed for the Web platform.

5. Planning and Analysis

Multidimensional OLAP models will be ported to the Internet platform for users who need rapid multiuser access to consolidated enterprise performance data that can be viewed from multiple dimensions, regardless of the complexity of the query. For example, Arbor Software Corporation develops high-performance, multidimensional database software for business planning, analysis, and management reporting applications. OLAP servers will connect to the Internet network similarly to today's Web servers.

Virtus Corporation offers 3-D modeling and multimedia products, including the Virtus Player, an Internet 3-D model publishing utility, and Virtus Voyager, a VRML browser for the Macintosh and Windows 95. Virtus is incorporating VRML export capability into its entire line of 3-D modeling and visualization software. Its authoring packages will enable users to build and maintain 3-D Web sites that others can move around in and interact with.

Models can be created using Virtus WalkThrough Pro+, Virtus VRML or other modelers capable of exporting VRML files. Plans for advanced features include 3-D stereo support, OpenDoc compliance, collision detection and much more.

6. Sales and Marketing

Electronic marketing is revolutionizing promotions. Many companies are using part of their direct mail budgets to create Web servers where they can put sales collateral, product demonstrations and corporate information. Advertising agencies have staffed departments to create Web presences for corporations.

Product configurators, for example a car option selector, enable customers to choose product options. Dealer locators on the Web, where users type in a postal code or telephone number to get the location of the nearest dealer, are proving popular in the high technology and automobile market segments.

ASCII Group, which represents the nation's independent computer dealers, plans to create a computer marketplace on the Internet that will link hardware and software makers, distributors, dealers, and consumers in one place. ASCII Group will offer its service in cooperation with Electronic Data Systems.

FAO Schwartz recently established a Web site and, according to the company, two percent of its customers use it now, a number that could rise to 40 percent by the year 2000.

Many corporations have discovered that the Internet is an ideal tool for obtaining valuable market information. Although some companies try to obtain feedback by inviting browsers to register in their guestbooks, the more successful ones gain useful market feedback by providing contests, such as riddles and scavenger hunts, to obtain user demographic information.

CompuServe, a leading on-line service company, recently created the largest Internet promotion ever. Users are able to go to the CompuServe $1 Million Internet Hunt site to find answers to weekly, hyperlinked clues and submit correct answers to win.

Web measurement software is often used to track customer visits to a Web site hourly, daily, weekly, and monthly, and then process and present this information in an understandable form. Tracking user demographic information using codes provides consumer marketing companies with predictions of buyer behavior. I/Pro provides analysis of Web site access using an I/Code that is linked to a user's demographics.

A number of companies are developing technologies to conduct commerce over the Internet. Netscape Communications, VeriFone, DigiCash, CyberCash, First Virtual Holdings, and a number of others are teaming with commercial banks and credit card companies to process payment transactions in cyberspace.

D

Vertical Applications Software Products

Industry applications software products are software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (or vertical) market and sold to that market only. Examples include software products to perform such functions as demand deposit

accounting, MRP, medical record keeping, automobile dealer parts inventory, etc.

Vertical applications software products discussed here fall under the following categories: discrete and process manufacturing, transportation, telecommunications, utilities, retail distribution, banking and finance, insurance, health services, education, business services, and the federal government.

1. Manufacturing

A number of manufacturing applications will migrate to the Web platform, including software for factory automation, production testing, robotic and welding control, fluid power design and training, scheduling, planning, tracking, MRP and QC solutions. Automated inventory tracking solutions will migrate to the Web platform and will connect to a variety of peripherals such as bar code readers and printers, thermal printers, portable computers, robotic and welding meters, and more.

Process manufacturers suffer from market dynamics similar to those in discrete manufacturing, namely the desire for on-demand, custom production. For this industry, however, that marketplace requirement is far more complex to execute; the output of every step in the process is, in fact, a raw material for the next step. Controlling the timing and the content for each customer requires very sophisticated systems integrated end to end. Even with this added burden, costs are constrained by the amount of competition and manufacturing overcapacity in some segments.

On-line services are becoming more attractive to process manufacturing companies. On-line catalogs, shipment information and product research are all part of the applications companies plan to have.

Respondents believe that within the next five years, the Internet will be used to communicate material safety data sheets and other related product data. INPUT noted the high ratings for the technology and service areas as they relate to direct communication capabilities for both customers and employees.

2. Transportation

CEL Corporation has successfully "linked" the mainframe-based SABRE Travel Reservation system to the World Wide Web. Using its LEGACYLINK technology, CEL developed a link that allows a Web browser user direct access to all air, hotel and car reservation information on the SABRE system, the world's largest, privately owned real-time network. Employees of corporations can use Web browsers to access SABRE's travel information to check availability and book their reservations at any time. With the CEL

system, a corporation can even impose "house rules" about traveling with certain carriers and users can create a profile file with their individual "travel rules" that they want to define the output that they see. In the future, even travel agencies will access the SABRE system with a Web browser.

Alaska Airlines allows passengers to book travel and purchase tickets with their credit cards from their Web site. On the Web site, users can search for the lowest fare and most convenient schedule, book flights, and pay for tickets. Alaska plans to add features for securing seat assignments on line and for Mileage Plan frequent flyers to redeem awards and check mileage accounts.

3. Telecommunications

Internet applications software for telcos include billing systems, call centers, customer service, Internet marketing, mailing list and directory systems, and network management. There are opportunities for the telcos to develop complex billing systems on the Web platform and to integrate them with other accounting and financial systems, like credit card billing systems.

Call center systems may be used in customer service centers to handle large numbers of phone calls. The software required to support these systems is changing and there are new opportunities to integrate it tightly with the Internet.

Additional opportunities include software for building on-line services-like offerings, operations support systems, and video delivery systems.

There is a current requirement for modular operations support systems for telcos. Telco operations support systems traditionally have been massive in-house projects. Modern programming technology means that organizations like Bellcore and AT&T Bell Labs are under pressure to compete with more modular and open systems from outside companies. The Internet represents the ideal platform for the development of these modular operations support systems.

Such systems include data warehouses with Web visualization that interface to database and back-office systems. These systems can use the Web platform to combine systems for inventory, service orders, and work orders.

More sophisticated customer support systems that integrate billing and engineering systems with customer records are also necessary. The telcos can use the Internet for software maintenance and to upgrade services.

4. Utilities

The Web represents an excellent vehicle for utility companies to get closer to their customers. Today, several utilities offer on-line energy guides to educate customers on how to save money on their utility bills. Also, access to customer records via the Internet may be a key component of reestablishing customer contact.

San Diego Gas & Electric Company uses the Web to provide customers with information to help them increase their energy conservation awareness, save energy, and save money. Its Web site provides users with 100 ways to save energy around the house and still have all the comforts of home. It also provides useful information to help customers buy energy-wise appliances and tips to help them control the ones they already have.

Edison International, formerly SCEcorp, uses the Web to provide energy efficiency, environmental solutions, and energy marketing to businesses and governments throughout North America. Edison's HomeLink is its first step in linking customers with energy-efficient solutions that can help them save money on their energy bills.

Regional electric utilities, prompted by the impending deregulation of the electric utility and telecommunications industries, are becoming more diversified and will offer their customers everything from software to Internet access.

Glasgow Electric Plant Board in Kentucky implemented an electrical system upgrade of 120 miles of multipurpose cable. The utility can now engage in real-time monitoring and management of energy usage. Because this task requires minimal cable capacity, the company can also offer phone, Internet, and cable TV services on the same wire.

Pacific Gas & Electric is testing a fiber optic system in which residents are programming their appliances through the Internet.

The Internet will also be used to monitor energy usage in real time. Eventually, sensor servers, or smart energy meters, will be installed in homes and businesses with a connection to the Web. Not only customers will be able to track energy usage, but also the utility companies themselves. The utilities have a tremendous incentive to decrease the amount of energy consumption. With the ability to track energy consumption in real time through the Web, load balancing will be easier to accomplish.

5. Retail Distribution

Retail markets are enjoying the creeping rise in consumer confidence. During these days of cautious optimism, there is a focus on increasing margins through application of technology. POS enhancements and greater use of communications among manufacturers, distributors and retailers is common.

One linkage of strong interest to retailers is the use of on-line services. Retailers are attracted by the demographics of current on-line users and the ongoing activities designed to create electronic commerce. Many retailers report having Web pages up or in development, and some report strong sales of selected items. Even the late adopters suggest that new market segments and on-line catalogs are attractive opportunities. As the number of on-line service users increases, retailers will become more interested in electronic commerce.

Outsourcing service providers also have an opportunity to implement and manage Internet-based on-line transaction and information services.

Connectivity, perhaps through the Internet, will be the dominant objective of systems integration throughout this forecast period. Facilitating linkages among all constituents (manufacturers, distributors, retailers, customers, credit card clearing houses, etc.) will be critical to maintaining the loyalty of customers who are ever more cautious and skeptical. Key efforts likely will extend to such strategies as POS couponing, in-aisle promotions, and couponing on the Internet.

6. Banking and Finance

The increasing competition, merger activities and efforts to improve low-margin business segments have stimulated banking industry uses of network services with special emphasis on the Internet. The use of new technology is at the center of the industry's efforts to leverage increasing size and improve profits. Retailers and third-party service providers are stimulating the growth of electronic commerce and this is adding further fuel to the Internet-related activity in the banking sector. In addition, commerce is promoted by proprietary network providers who are managing financial transactions for network-based goods and services.

As in many industries, the Internet is being adopted by banks for marketing and corporate communication via the Web, as well as for interoffice E-mail services.

Security First Network Bank began an Internet-only operation in October 1995 and carries out a limited range of transactions. In the future, the company plans to offer purchases of certificates of deposit, money-market

accounts, and credit cards. Security First also has a software operation, Five Paces Software, which sells the Virtual Bank Manager software used to run a bank on the Internet.

IBM plans to build an electronic shopping mall for NationsBank and BankAmerica. The financial services network will allow customers to purchase on-line bank products and services, such as mortgages, mutual funds, and credit cards.

Electronic Data Systems and Checkfree plan to sell to financial firms a package of services consisting of EDS's Virtual Branch remote banking products and Checkfree's electronic payment system. Companies that buy the packaged services would then be free to offer them to their customers.

Intuit plans to provide consumers with electronic banking over the Internet. Users will be able to download free software on the Internet and will not be required to purchase a copy of Quicken, Intuit's money management software. The freeway will allow users to establish a home banking link to check account balances, transfer funds, and pay bills. Security will be provided by data encryption and a system of personal identification numbers (Pins) authenticating each user.

Nippon Telegraph and Telephone has developed a secure electronic cash system for making transactions on the Internet. Users of the system can transfer money from their bank accounts onto smart cards, which contain coded information about users as well as a microchip to store the electronic cash.

XCELSOFT has been providing banking solutions for over 10 years to banks all over the world. Its Home Banking system is classified as "Customer Direct Banking" and allows customers to bank directly from existing IBM legacy systems through the Internet or Datapac (in Canada).

7. Insurance

Insurance companies look to on-line services as a means of staying close to their customers on both sides of the equation: producers (i.e., employers and their employees or the self-insured) and providers (i.e., those in the health care network: physicians, dentists, hospitals, ancillary services). Membership and policy information are likely to be the first two on-line services available to be followed by claims status reporting and electronic payments. Many HMOs are already moving toward on-line membership and policy information.

The Professional Insurance Agents (PIA) of California and Nevada and the Internet service InsWeb plan to put some 1,000 independent insurance agent members from those states on the World Wide Web with their own home

pages. InsWeb, which came on line in October, is attempting to offer a service enabling consumers to purchase insurance policies over the Internet. The company's most innovative on-line business process is its system for processing orders.

8. Health Services

Specific health services systems are also receiving attention. In pharmaceuticals, for example, Computer-Assisted New Drug Applications (CANDA) are now required by the FDA for some drugs. These electronic submissions for approval of drug development require the extraction of related information from disparate databases and compilation of the data in text and graphic form. Other types of manufacturers have similar requirements, generally from regulators.

Medical records will be shared via the Web. A number of companies are developing health services applications, including Belmont Research Inc. in Cambridge, MA. The company is developing (with three participating hospitals—Beth Israel, Children's and Massachusetts General) standard formats for patient information that will be shared on the World Wide Web. Belmont will develop the software tools that each of the hospitals can use to extract information from its own databases to the common record format.

Other health services applications on the Web will include programs that describe interactions between drugs, diseases and anesthetics; software accessing the full MEDLINE (and many specialty subsets), CANCERLIT, HEALTH, PsycLIT, and CINAHL databases; software for women dealing specifically with obesity, osteoporosis, and iron-deficiency anemia; programs for managing diabetes, with an emphasis on nutrition; software that assesses health risk from toxic chemicals in the environment; and more.

9. Education

The introduction of affordable Internet appliances will allow more schools to connect their students to the Internet. This will drive the demand for educational applications that can be downloaded over the Internet.

LOGAL Software, Inc. develops, publishes and markets a unique line of interactive, simulation-based software and probeware in the fields of science and mathematics for high school, college and middle school. The Biology Explorer: Photosynthesis simulates, in a controlled environment, the process used by plants to produce food from light.

In another educational area, National Computer Systems (NCS) offers the Entrata electronic services, a complete electronic data interchange (EDI) program for applications and transcripts. The National Student Loan Clearinghouse partnered with NCS to provide an Internet-based EDI

solution for enrollment verification that is currently supporting over 150 postsecondary institutions.

10. Business Services

The Internet will provide many new opportunities in such segments as real estate, travel, entertainment and recreation. Companies that can augment staffs with connectivity expertise and knowledge of how to exploit the power of the Internet will be in strong demand.

Major motion picture production companies are promoting blockbuster movies by creating entire Web sites. A company such as Universal Pictures has found that the cost of developing a Web site for a movie might cost $30,000, whereas the promotional budget for a movie usually runs closer to $25 million.

A number of hotels, including Hilton, are providing means to check hotel availability and make reservations over the Internet. Even Relais & Chateau provides colorful pictures of affiliated hotels throughout the world.

11. Federal Government

A number of federal government agencies have made their information databases accessible to users browsing the Web. Last year the Occupational Safety and Health Administration (OSHA) put a program on the Web to help people determine if they were complying with asbestos regulations. Future plans include creating another program for lead contamination. The Federal Communications Commission's Web site provides a list of its most recent rulings. The State Department provides information on acquiring a passport. The Library of Congress' "Thomas" site provides legislative and congressional information.

The United States Postal Service (USPS) is planning to offer the delivery of electronic mail. The agency has already spent $21 million developing its E-mail project, which will be tested among 10,000 users next year. If the project succeeds and is given the go ahead, it could be implemented as soon as by the end of 1996.

E

Internet Turnkey Systems

A turnkey system integrates equipment (e.g., CPU, peripherals), systems software, and packaged applications software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and professional services provided. INPUT classifies turnkey systems into two groups, as it does for

applications software products—those systems that are industry-specific and those applicable to the cross-industry markets.

Turnkey systems have three components:

- *Equipment* - computer hardware supplied as part of the turnkey system

- *Software Products* - prepackaged systems and applications software products

- *Professional Services* - services to install or customize the system or train the user, provided as part of the turnkey system sale

Internet turnkey system platforms include UNIX, Windows NT, MacOS, Appliance OS, and other OSs.

Internet turnkey system components include authoring systems, Web servers, Internet browsing, and other systems.

Internet turnkey systems includes Internet appliances, which are stripped-down PCs that connect to the Internet and run Web-based applications. The devices run a microkernel OS and platform-independent software written in an interpreted language such as Java. Users download component-based programs and applets over the Internet or an internal network when they need them. Companies offering or developing Internet appliances or licensing their technology include Acorn Computer, Apple Computer, General Magic, Geoworks, IBM, LSI Logic, Oracle, Silicon Graphics, and Sun Microsystems.

The initial market opportunities for the Internet appliances include corporations, schools, and consumers. Corporations are interested in the appliances because their product support services costs have soared over the past few years. Corporations can benefit from these devices because of the reduced costs to service them, in addition to eliminating the costs of upgrades.

Schools are interested in cheaper computers that will allow students to access the Internet. For schools, the $500 price target of the new Internet appliances is reasonable.

Consumers who might not already own a computer at home will be more inclined to purchase a $500 Internet appliance to surf the Web. These devices will be very popular around the holiday season.

F

Hardware

The following definitions have been included to provide the basis for market segmentation in the software products markets.

1. Servers

- *Computer Equipment* - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Departmental Servers* - These are generally minicomputers or midsize computers priced from $5,000 to $350,000. Many client/server computers are in this category.

- *Enterprise Servers* - Traditional mainframe and supercomputers costing more than $350,000.

2. Internet Access Devices

Access devices include all hardware that facilitates communication, from telephone lines to an Internet POP (point of presence). Leading Internet access routers include the Proteon GlobeTrotter Router, Livingston IRX Router, Morningstar 3001 Router, and Cisco 2501 & 2514 Routers. Internet access routers are typically expandable and provide full packet filtering for added security.

Cascade Communications recently introduced the HyperPATH, an ISDN-based remote access solution fully integrated with the B-STDX multiservice WAN switch. Cascade's product represents the industry's first integrated remote access device and frame relay switch.

3. Modems

Internet hardware forecasts include modems purchased by corporations and by home users. Desktop, ISA card, and PC card versions are included. A number of companies have banks of modems whereby employees can dial into the private intranet.

G

Professional Services and Systems Integration

1. Definition of Services

The line between systems integration and professional services continues to grow fuzzier. There are a number of contributing reasons:

- The "systems integrator" moniker has an image attached to it that seems to say, "We are more than your supplier, we are your partner—in business issues and in the information services support you require to accomplish your business goals." The notion of a "full-service" professional services vendor does not have quite the same panache as the systems integrator.

- Many SI vendors are also PS vendors, depending on what is required and where the better margins are on a given assignment. Services providers have learned that the customer comes first. Each project is unique in scope and requirements and each is tailored to the company and its objectives from a rich experience and resource base.

- The same staff works in both areas because many of the same skills are required. (Systems integrators might argue that "true" systems integration projects require a level of project management that is more complex than is found in PS projects.) There may be differences in given projects, but the overlap is extensive.

By INPUT's definitions, the real differences between systems integration and professional services are that PS engagements include expenditures on people *only*, whereas SI projects have the people component *in addition to* hardware and other related service components (e.g., site preparation, etc.). SI contracts give responsibility for the entire solution to a single prime contractor, the systems integrator.

2. Systems Integration Overview

Systems integration continues to increase in importance as an effective means of aligning business objectives and infrastructure support for those objectives. Integrators now frequently are as much a part of the planning of a project as they are of its execution. This positioning of the integrator as a key member of the reengineering team is likely to be enhanced as companies grapple with Internet issues. As use of the Internet and related on-line services spreads, impacting primary and other support functions of corporations, integrators will be called upon to build and implement the required interfaces among users, suppliers, and customers for use on the Internet.

The complexity—and plethora—of solutions calls for expertise far beyond the capabilities of most internal information services organizations. Systems integrators offer this expertise as well as assume the risk that is inherent in the solutions' complexity. Though the assumption of risk is no assurance of project success, customers have the added advantage of knowing that someone with experience is in charge and has very strong motivation for getting the job done right.

3. Professional Services Overview

Professional services, especially the staff-augmentation aspects, continue to be in demand. This approach is generally seen as a cost-effective solution to getting development efforts completed in the face of shrinking in-house personnel resources. The bad news is that many laid-off employees are forming their own companies and competing directly against more established and well-known firms. Frequently, they are successful in attracting contracts from their former employers because they have the advantage of knowing the client's systems better than an outside professional services vendor would. The market is growing, but the number of companies competing in that market is growing as well.

The Internet represents a particularly bright spot in which no competitor has a significant edge at the moment. Established vendors should be able to capture Web site development business initially, then help companies integrate Internet-related products throughout the corporation as the need develops.

Web design and creation services are included in professional services. Most of the Internet service providers, such as BEST Communications, offer Web page creation and maintenance services including custom Web page design, image scanning and modification, creating imagemaps, registering the site with Internet search engines and popular sites, CGI programming, feedback forms, keyword searches, guestbooks, and many others.

It is difficult to estimate the cost of creating a Web site. The cost depends on the size of the project. Companies that want to get started but are not sure how big they want their Web site to be can, for example, take advantage of introductory packages typically priced at around $300 that include design of up to six pages, scans of up to four images, and configuration and setup of everything on the new Web site.

Although the respondents to INPUT's Internet survey indicated low expenditures for Internet activities so far, the astounding increase anticipated in staffing could represent a key opportunity. Manufacturers are anxious to exploit the capabilities of the public networks for research, logistics, and sales and service, and will need help to make the Internet a real part of their future on-line experience.

H

Network Services

Network services include a variety of telecommunications-based functions and operations, including Internet access services, Internet presence services, and directory and search services.

1. Internet Access Services

Internet service providers (and more recently telcos) offer a variety of Internet access services, including 28.8K full-time IP access (single IP number only), 28.8K full-time LAN dial-up access, network 56K dedicated access, network fractional (128K & 384K) T1 dedicated access, and network full T1 (1,544M) dedicated access.

Internet access services also include dial-up SLIP and PPP accounts that allow users to dial in with the SLIP or PPP software of their choice and directly access the Internet. With SLIP or PPP, a machine can run multiple Internet applications at the same time using just one modem. With a user environment such as MS Windows or Macintosh, all the Internet applications fully use the graphical user interface capabilities of the user's computer. And with SLIP or PPP, a user can run Mosaic, the Internet browser, and read news and upload and download files all at the same time. And due to the way SLIP and PPP work, users can open multiple windows to their shell account at the same time, and can even run X Windows applications.

Internet access services also include the Internet services offered by value-added networks (VAN) vendors. VAN services are enhanced transport services that involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

2. Internet Presence Services

Internet presence service providers basically rent disk space on their Web servers to provide customers with Web sites. The appearance is that each user has his or her own machine running the http server. With a custom domain (company.com for example), users anywhere on the Internet can access the home page as: http://www.company.com.

3. Directory and Search Services

Yahoo! - arguably the pioneer Internet guide, Yahoo! has been accepting submissions since what seems like the beginning of it all. There's an editorial filter at work here—not every college student's home page makes it into the

directory—but Yahoo's veteran status has allowed it to build a comprehensive cross-discipline resource base.

Alta Vista - offering compact or detailed searches through what the company claims is the largest Web index, Digital Equipment Corporation's Alta Vista can help you find your way through 8 billion words filling 16 million Web pages. It also provides a full-text index of more than 13,000 newsgroups.

Excite - tracks down information by searching for concepts, not just keywords. Updated weekly, Excite's database contains what the company claims are more than 1.5 million Web pages, 50,000-plus Web page reviews written by journalists, the latest two weeks of Usenet news, and classifieds. Excite also includes City.Net, news from Reuters, and an interactive cartoon.

INFOSEEK GUIDE - this searchable directory provides reviews of popular Internet resources—Web sites, Usenet newsgroups, and FTP and Gopher sites—cross-referenced across multiple topics. Once you've found a relevant site, the "Find Similar" function searches for more of the same. The guide performs precise searches for specific phrases and proper names, and searches are sensitive to case, numbers, and special characters (for example, AT&T or 49ers).

I
Processing Services

In general, processing services are characterized by industry and cross-industry specialization. In the case of industry specialization, vendors generally provide high-volume processing services for their customers. Examples include invoicing services for the utility industry, point-of-sale data access and analysis for the retail industry, item processing for the banking industry, and billing and accounts receivable for the health care industry. Cross-industry services include payroll processing, invoicing and accounts payable service, credit and debit card processing, and image processing services.

The principal components of processing services are:

- *Transaction Processing Services*—these are provided on a cross industry or industry-specific basis. Generally, vendors offer these services from off-site platforms using tailored, proprietary software developed to vendor specification. Cross-industry services include payroll processing, invoicing and accounts receivable, and EDI network services. Industry-specific services include airline reservation system services, check processing, health care claims processing and point-of-sale data transmission, and analysis services. These services and others are

classified as and billed on a per-transaction basis; the charges are based upon the delivery of a transaction.

- *Backup and Disaster Recovery Services*—these provide off-site hardware, software and database resources that can be accessed by the customer in response to interruption of on-site data processing capabilities. The contract pricing calls for the customer to pay a recurring fee for access to the as-needed recovery service. This service continues to grow in importance to customers concerned about operational stability in the face of disruptions such as power outages or natural disasters.

Several vertical-industry markets and processing service subcategories will experience growth rates considerably in excess of the aggregate rate. For example, in addition to the expected cost-saving potential that the Internet offers for intra- and inter-company communications, the link the Internet will offer for home banking and credit card transaction processing will inevitably drive up the growth rate. The Internet offers new ways for transactions to be communicated and arrive at the processing site. In general, it is expected that the Internet will drive the growth of electronic commerce. The direction and growth rate promoted will create new roles for processing service vendors.

Internet service providers will be required to increase the amount of value-added services in order to compete. They will deepen their relationships with businesses and consumers by offering secure transaction processing systems that both authorize and settle transactions on line and in real time. A large percentage of merchants will want to contract their back-office transaction processing services to these Internet service providers.

J

Outsourcing

Businesses contract with vendors to staff, manage and operate all or a portions of business activity or function. The outsourcing activity may be for either an entire information systems (IS) operation, including related communication system services, or one in which the information systems activities account for at least 30% of the overall operation budget.

The vendor undertakes responsibility for a specific operational activity. The contract duration is at least one year and, in many instances, is as long as ten years. Typically, a single vendor takes responsibility for outsourcing management and operation, although, in the future, vendor alliances may evolve to support a single client with requirements to support several functions or operations.

INPUT categorizes specific Internet systems-related activities and selected business operations in its outsourcing analysis.

- *Platform Outsourcing* - The vendor manages and operates the computer systems to perform the client's business functions, without taking responsibility for the client's application systems.

- *Applications Outsourcing* - The vendor manages and operates the computer systems to perform the client's business functions, and is also responsible for maintaining, or developing and maintaining, the client's Internet application systems.

- *Network Management* - The vendor assumes responsibility for operating and managing the client's data communications systems. This may also include the client's voice communications resources. A network management outsourcing contract may include only the management services or the full costs of the communications services and equipment plus the management services.

- *Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity of the personal computers and/or Internet appliances in the client organization. The services may also include performing the help-desk function. Equipment as well as services can be part of a desktop services outsourcing contract.

  Note: This type of client service can also be provided through traditional professional services, where the contractual criteria of outsourcing are not present.

- *Applications Management* - The vendor has full responsibility for maintaining and upgrading some or all of the application systems that a client uses to support business operations and may also develop and implement new application systems for the client.

  An applications management contract differs from traditional software development in the form of the client/vendor relationship. Under traditional software development services, the relationship is project based. Under applications management it is time and function based. These services may be provided in combination with or separately from platform outsourcing.

- *Business Operations* - Business operations outsourcing (also known as business outsourcing or functional outsourcing) is a relationship in which one vendor is responsible for performing an entire business/operations function, including the information systems outsourcing that supports it. The information systems outsourcing content of such a contract must be at least 30% of the total annual expenditure in order for INPUT to

include it in the outsourcing market. Examples of Internet business operations that are outsourced include the security management and Web content development typically provided by advertising agencies.

The Internet presents a new set of consulting opportunities for the outsourcing vendor. In particular, a built-in opportunity exists in ongoing outsourcing contracts to help customers decide how and for which operations the Internet should be adopted. Strategic consulting would address the fundamental questions of how and in what context the Internet should play a role in the business operation, if at all. Vendors with Internet experience will provide invaluable insight into possible uses. Tactical consulting activities provide a broad spectrum of opportunity for planning and design of Internet uses and laying out of the interfaces between the Internet and ongoing operations. Finally, there are myriad opportunities for outsourcing providers in the implementation phase, including the design, installation and management of Internet-based services. Since a number of the implementation activities are not of major contract value, opportunities are presented for outsourcing providers to form alliances with smaller, specialized Internet consulting firms, particularly during the design and implementation stages.

The rapid adoption of the Internet for inter- and intra-company communication raises new requirements for firewall infrastructure in response to security concerns. These add to the complexity of installation and maintenance of the entire network environment. The interface to the Internet presents a significant consulting and outsourcing opportunity to vendors with network and security expertise.

Ford Motor Company recently signed a three-year agreement with Hewlett-Packard for an estimated $6 million annually to support Ford's private Internet. Under the agreement, HP provides proactive network monitoring, troubleshooting, fault isolation, and performance reporting. HP also maintains multivendor networking equipment and manages systems for multivendor servers, clients, and software.

EDS is providing outsourcing services for PointCast by supporting the PointCast network (PCN). This support ensures that viewers receive consistent, uninterrupted service from the network. EDS also will provide backup services to accommodate large numbers of people downloading PCN from PointCast's Web page. These services include telecommunications, data center and technical support.

K

Product Support Services

The main driving force behind the evolution of the computer services market is the widespread adoption of new product technologies and applications. The increasing popularity of the Internet and open systems software products is creating opportunities for product support. As the open market for Internet products grows, so too will the market for product support services.

INPUT defines product support services as the continuing activities provided by a vendor that are necessary to make the product work effectively, outside the delivery of the product itself. The most common elements of product support services include:

- Software installation

- Phone support

- Software updates

- Remote diagnostics

- Software problems database

- On-line support

- Initial training

This formal definition is convenient for the purposes of analyzing user and vendor activity, but it should be noted that in some organizations the responsibility for carrying out these activities is shared between a number of departments, and that other organizations may have a single department that carries out these and other activities.

1. Sources of Product Support Services

The growth of the market for product support services will attract providers from different market segments. Systems vendors, software product vendors, VARs/dealers, professional services companies, training companies, and firms specifically focused on product support services will all penetrate the market. Their views of the market can be summarized as follows:

- Systems vendors view the market as an opportunity to provide multivendor support at the enterprise level and preserve revenue streams. Furthermore, product support is often seen as a means of gaining a competitive advantage.

- Software product vendors have witnessed the erosion of product license revenues as products have become increasingly standardized and available from multiple sources, leading to a growing tendency for the customer to migrate. They view the support market as an opportunity to regain lost revenue streams and to maintain customer loyalty.

- VARs/dealers will take the opportunity to focus on the provision of specialist support for vertical markets. They will aim to maintain customer loyalty by positioning themselves as specialists.

- Professional services vendors view the market as an after-market services opportunity following a solutions-sell, i.e., as a value-added extra.

- Training companies often follow a similar approach to professional services vendors in that they view support as an extra. However, there is growing evidence to suggest that many training providers are actually making a strategic move into the product support services market in order to gain leverage from their existing in-house skills.

- Independent vendors that specialize in product support will exploit the Internet market as barriers to entry become less impenetrable.

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V
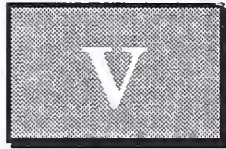
Market Size and Forecasts

This chapter provides forecasts for the worldwide Internet market and explains how the Internet market is measured. Forecasts are made for the period 1995–2000 for systems software, applications software, turnkey systems, hardware, professional services and systems integration, network services, processing services, outsourcing, and product support services.

A

Assumptions

1. Number of Internet Users

Estimates of the Internet market size were created by estimating the number of unduplicated Internet users worldwide. The worldwide number of Internet users will grow at a CAGR of 38%, from 50 million in 1995 to 250 million in 2000, as shown in Exhibit V-1.

Exhibit V-1

Worldwide Number of Internet Users, 1995-2000
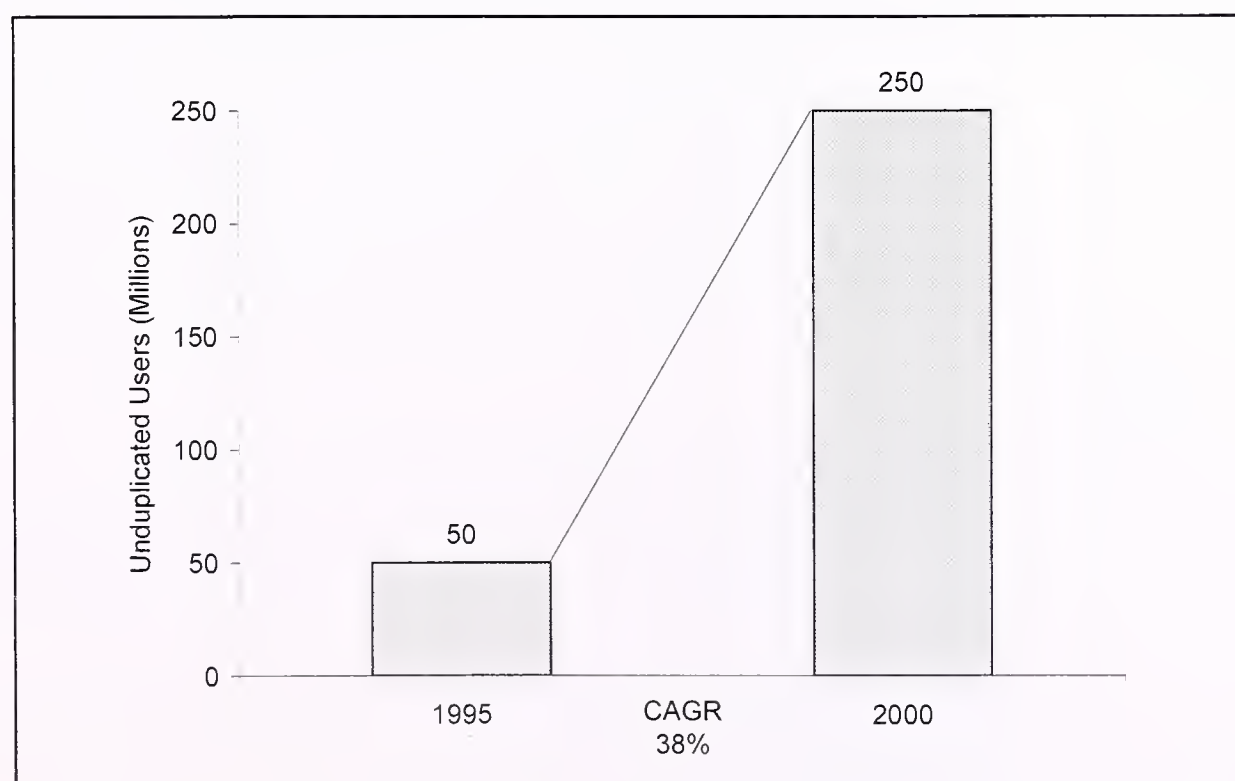
Source: INPUT

2. Number of Internet Servers

Estimates of the Internet market size were also made by estimating the number of Internet servers worldwide. The worldwide number of Internet servers will grow at a CAGR of 119%, from 742,000 in 1995 to 37 million in 2000, as shown in Exhibit V-2.

Exhibit V-2

Worldwide Number of Internet Servers, 1995-2000
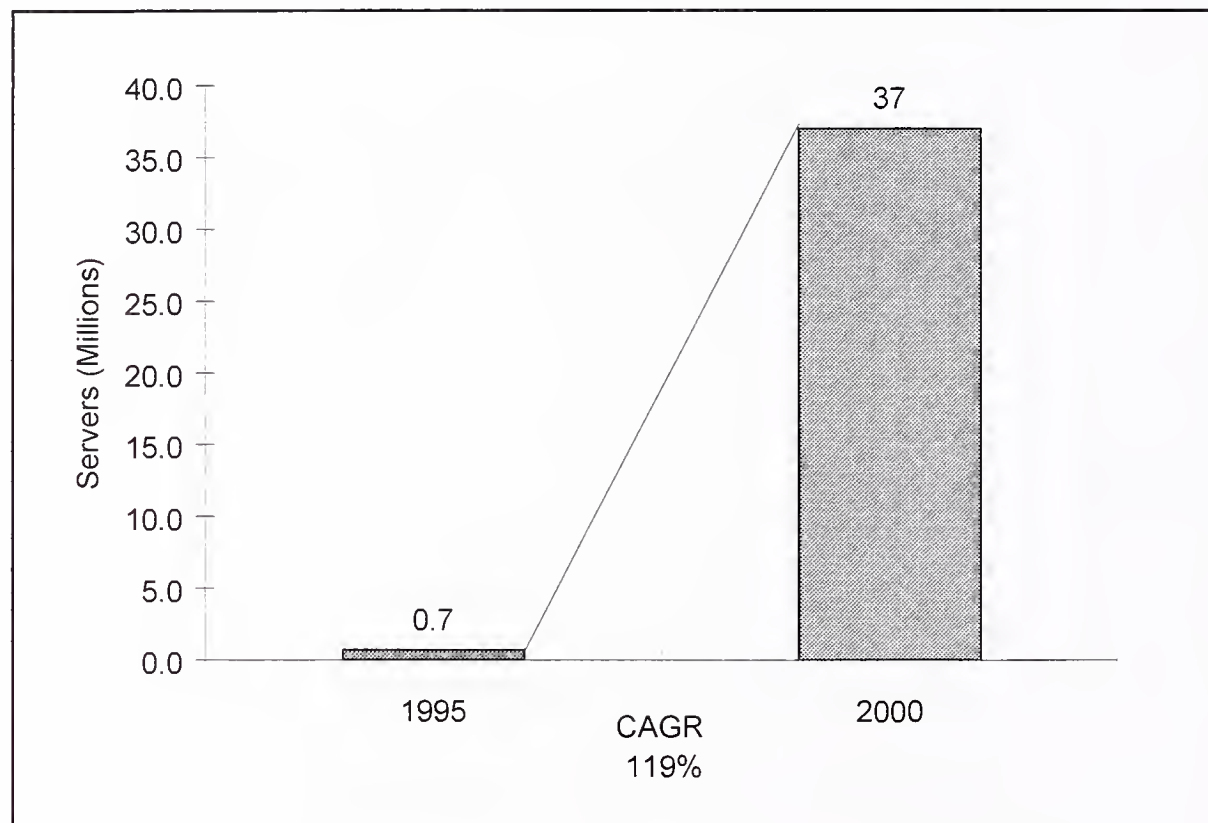
Source: INPUT

3. Measurements Used in This Forecast

INPUT forecasts user expenditures on software, hardware, and services. For some categories of Internet software and hardware, forecasts of the market size were made by determining software and hardware vendor revenues and marking up the prices paid by users according to distribution channels. For other categories of Internet products, research from INPUT's earlier Internet and C/S reports, and Market Analysis Program data was used.

4. Treatment of Software Vendor Revenues

The forecasts here are for hardware and software products that are licensed to users, not for custom software and hardware that is paid for as part of a professional services (or contract programming) contract.

Software license upgrades, leases and maintenance are included in revenues, unless the upgrade is included with professional services, in which case it is included under professional services and is not a part of this forecast. For example, if Microsoft offers a $99 upgrade for Access, it is included here, but

if a mainframe software vendor provides a contract at 15% of the purchase price for fixing bugs and technical support, then it is included in professional services.

Service revenues of software vendors with a significant consulting business, like Oracle, are omitted from the calculations used to derive the market forecasts.

5. Internet Service Provider (ISP) Spending

The forecasts here are for Internet products that are licensed to users, not for Internet products that are paid for by ISPs. The spending for these products would be reflected in the user spending for network services provided by the ISPs.

B
Systems Software

The worldwide Internet systems software market will grow at a CAGR of 88%, from $1.3 billion in 1995 to $31 billion in the year 2000.

Exhibit V-3 shows the worldwide Internet systems software market broken down by category. The most rapidly growing area is transaction management, which is expected to grow at a CAGR of 206% over the next five years. This is due to the growth of electronic commerce and the increase in transaction servers, such as Open Market's OM-Transact, which are separate from the Web servers. Worldwide sales of goods and services traded over the Internet will increase from $70 million in 1995 to $255 billion in 2000, a CAGR of over 400%, according to INPUT's Electronic Commerce Program.

Exhibit V-3

Worldwide Internet Systems Software Market by Category, 1995-2000

Operations Management — 15.0 / 0.7

Information Storage and Retrieval — 6.7 / 0.3

Other Server Software — 4.4 / 0.1

Transaction Management — 2.0 / 0.0

Communications Infrastructure — 1.6 / 0.2

Applications Development Tools — 0.7 / 0.03

Other Client Software — 0.4 / 0.01

□ 2000
■ 1995

User Expenditures ($ Billions)

0.00   3.00   6.00   9.00   12.00   15.00

Source: INPUT

C

Applications Software

The worldwide Internet applications software market will grow at a CAGR of 105%, from $780 million in 1995 to $28 billion in the year 2000.

1. Cross-Industry Software Market

Exhibit V-4 shows the worldwide Internet applications software market, broken down by cross-industry segment.

Exhibit V-4

Worldwide Internet Applications Software Market by Cross-Industry Segment, 1995-2000

Accounting and Finance — 8,850 / 100
Other Cross-Industry — 3,200 / 60
Sales and Marketing — 1,450 / 70
Planning and Analysis — 900 / 0
Office Automation — 740 / 40
Human Resources — 660 / 15
Engineering and Scientific — 190 / 20

Legend: □ 2000 ▨ 1995

User Expenditures ($ Millions)

0 — 3,000 — 6,000 — 9,000
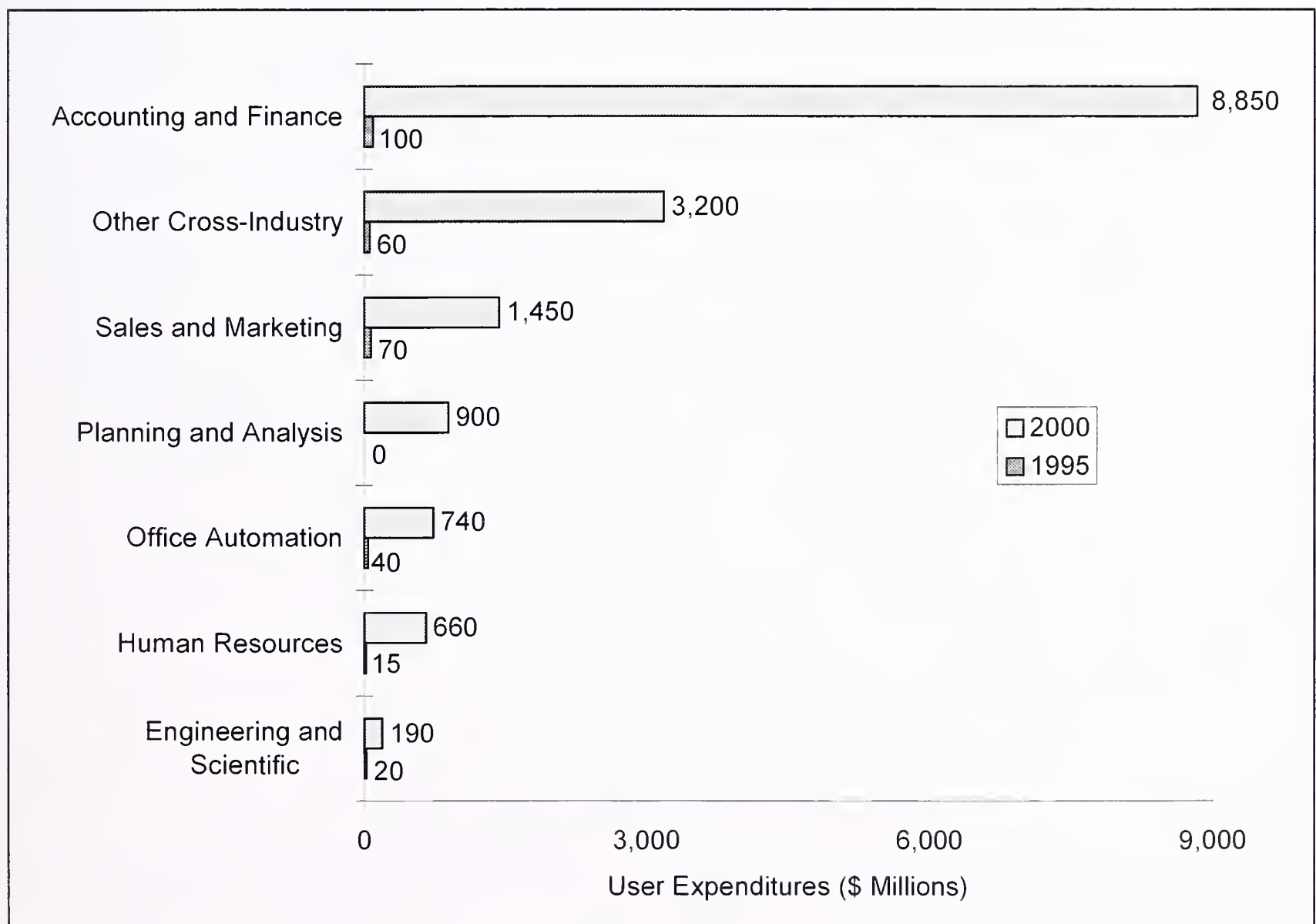
Source: INPUT

2. Vertical Software Market

Exhibit V-5 shows the worldwide Internet applications software market, broken down by vertical market segment. The growth of the Internet is expected to fuel tremendous growth in telecommunications. The telecommunications segment includes cable TV and other media industries using both wireline and wireless communications.

Exhibit V-5

Worldwide Internet Applications Software Market by Vertical Segment, 1995-2000

Segment	2000	1995
Education	2,300	25
Discrete Manufacturing	2,000	80
Telecommunications, Media and Entertainment	1,950	55
Banking and Finance	1,800	200
Business Services	1,250	1
Retail and Wholesale Trade	900	50
Transportation	600	30
Process Manufacturing	600	15
Utilities	350	20
Government	320	0
Misc. Industries	200	0
Health Services	70	0
Insurance	25	0

User Expenditures ($ Millions)

D

Turnkey Systems

67
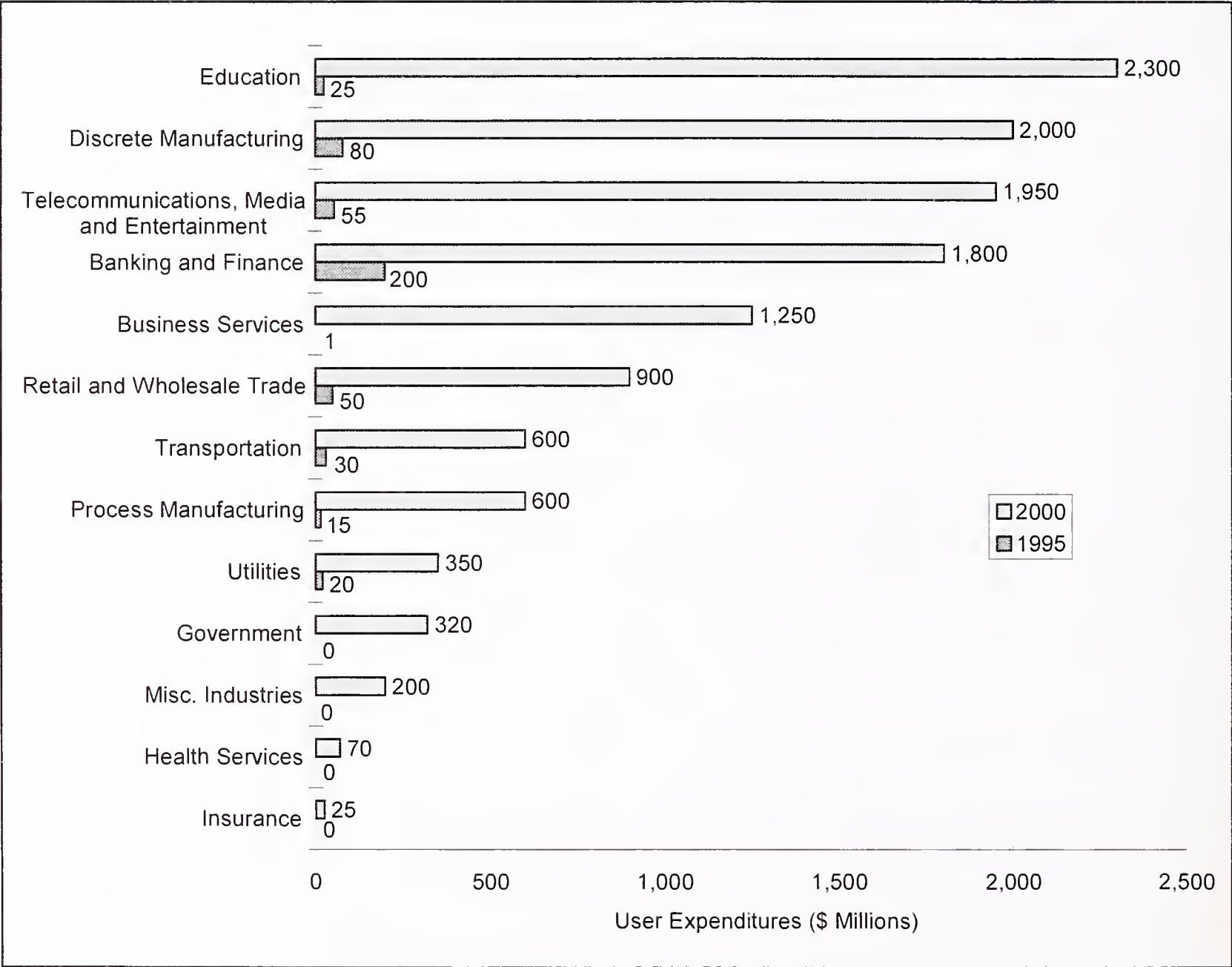
The worldwide Internet turnkey systems market will grow at a CAGR of 90%, from $610 million in 1995 to $15 billion in the year 2000.

Exhibit V-6 shows the worldwide Internet turnkey systems market broken down by platform.

Exhibit V-6

Worldwide Internet Turnkey Systems Market by Platform, 1995-2000
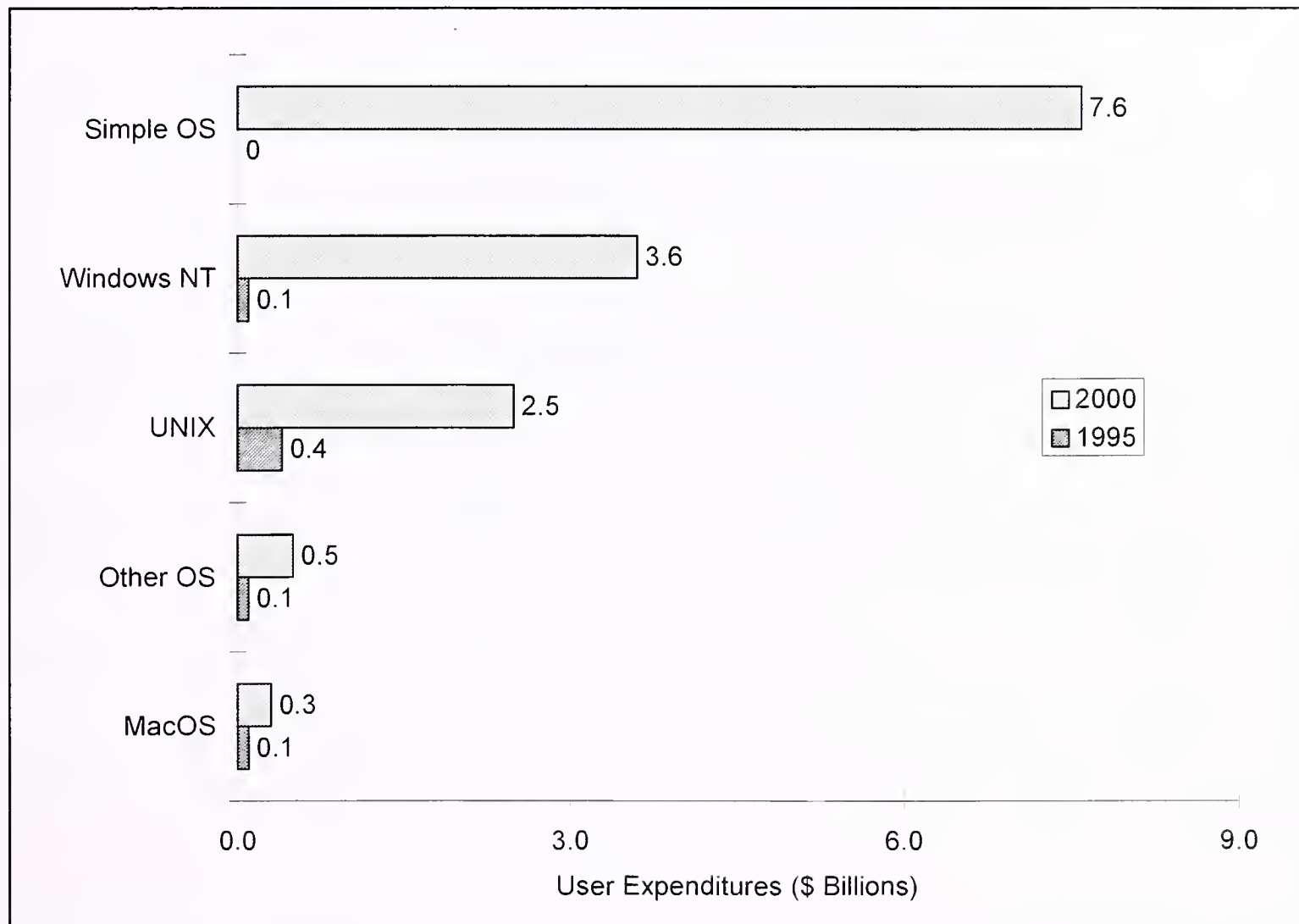
Source: INPUT

Exhibit V-7 shows the worldwide Internet turnkey systems market broken down by category. Internet browsing appliances, the so-called $500 Internet terminals, will grow from $500 million in 1996 to $6.4 billion in 2000. Internet appliance sales will begin to take off around the Christmas season and should be a big seller, reaching nearly 1 million units sold in 1996.

Exhibit V-7

Worldwide Internet Turnkey Systems Market by Category, 1995-2000

Internet Browsing Appliciances: 2000 = 6.4, 1995 = 0

Web Server Systems: 2000 = 4.2, 1995 = 0.3

Other Systems: 2000 = 2.8, 1995 = 0.2

Authoring Systems: 2000 = 1.0, 1995 = 0.1

Legend: □ 2000, ▨ 1995

X-axis: User Expenditures ($ Billions) — 0.0, 3.0, 6.0, 9.0
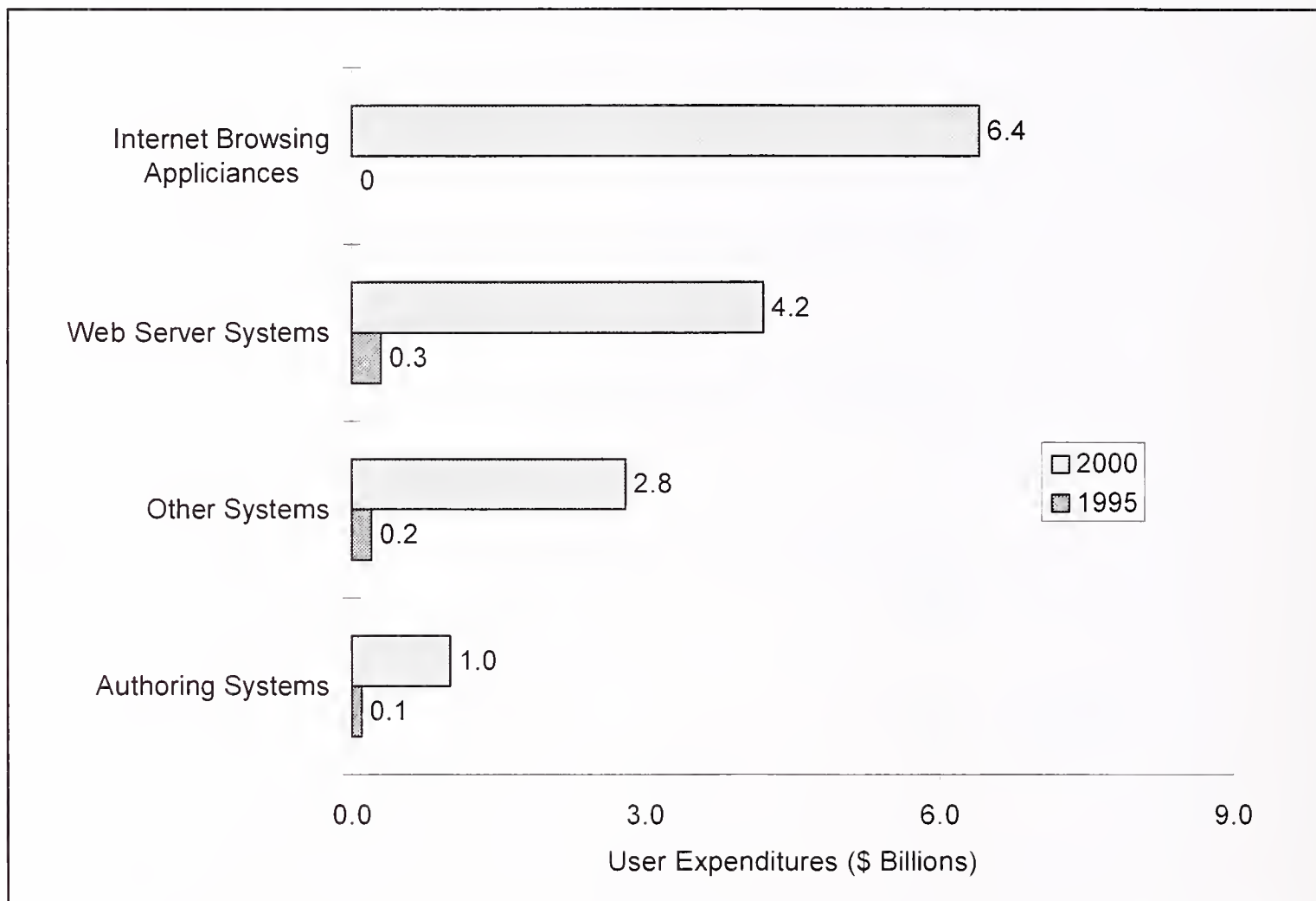
Source: INPUT

E

Professional Services and Systems Integration

The worldwide Internet professional services and systems integration market will grow at a CAGR of 78%, from $3 billion in 1995 to $54 billion in the year 2000.

The worldwide Internet professional services market will grow at a CAGR of 75%, from $2.5 billion in 1995 to $40 billion in the year 2000. Exhibit V-8 shows the worldwide Internet professional services forecast, broken down by category.

Exhibit V-8

Worldwide Internet Professional Services by Category, 1995-2000

Category	2000	1995
Consulting	10.6	0.6
Web Design and Creation Services	10.6	1.0
Software Development (not Web page creation)	8.8	0.5
Education and Training	7.1	0.3
Other	1.9	0.05
Internet Profiling Services	1.2	0.001

User Expenditures ($ Billions)
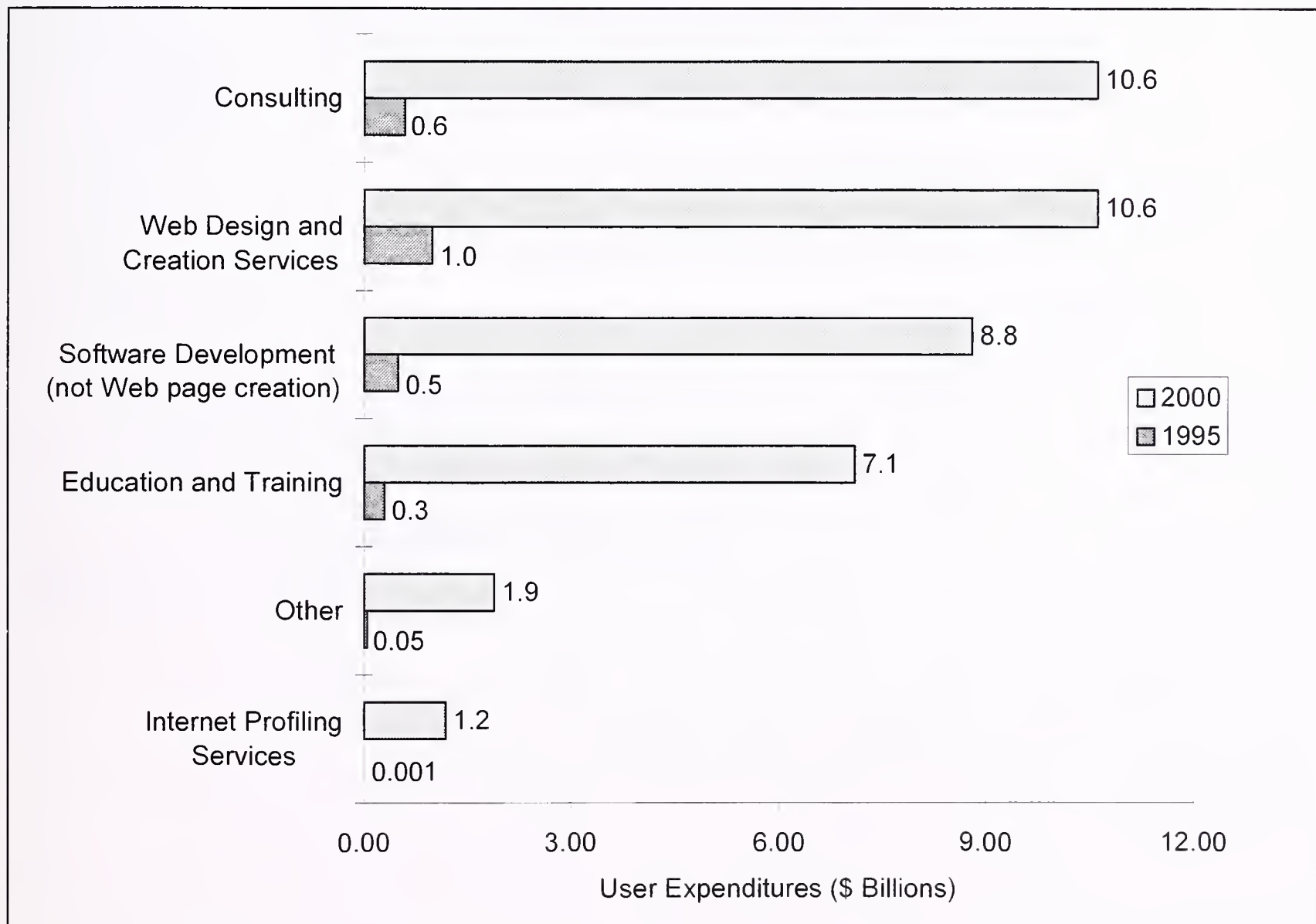
Source: INPUT

The worldwide Internet systems integration market will grow at a CAGR of 88% from $574 million in 1995 to $13.6 billion in the year 2000. Exhibit V-9 shows the worldwide Internet systems integration forecast, broken down by category.

Exhibit V-9

Worldwide Internet Systems Integration Market by Category, 1995-2000

Professional Services: 6.1 (2000), 0.3 (1995)
Equipment: 6.0 (2000), 0.3 (1995)
Software Products: 1.1 (2000), 0.05 (1995)
Other: 0.4 (2000), 0.02 (1995)

User Expenditures ($ Billions)

Legend: ☐ 2000 ▨ 1995
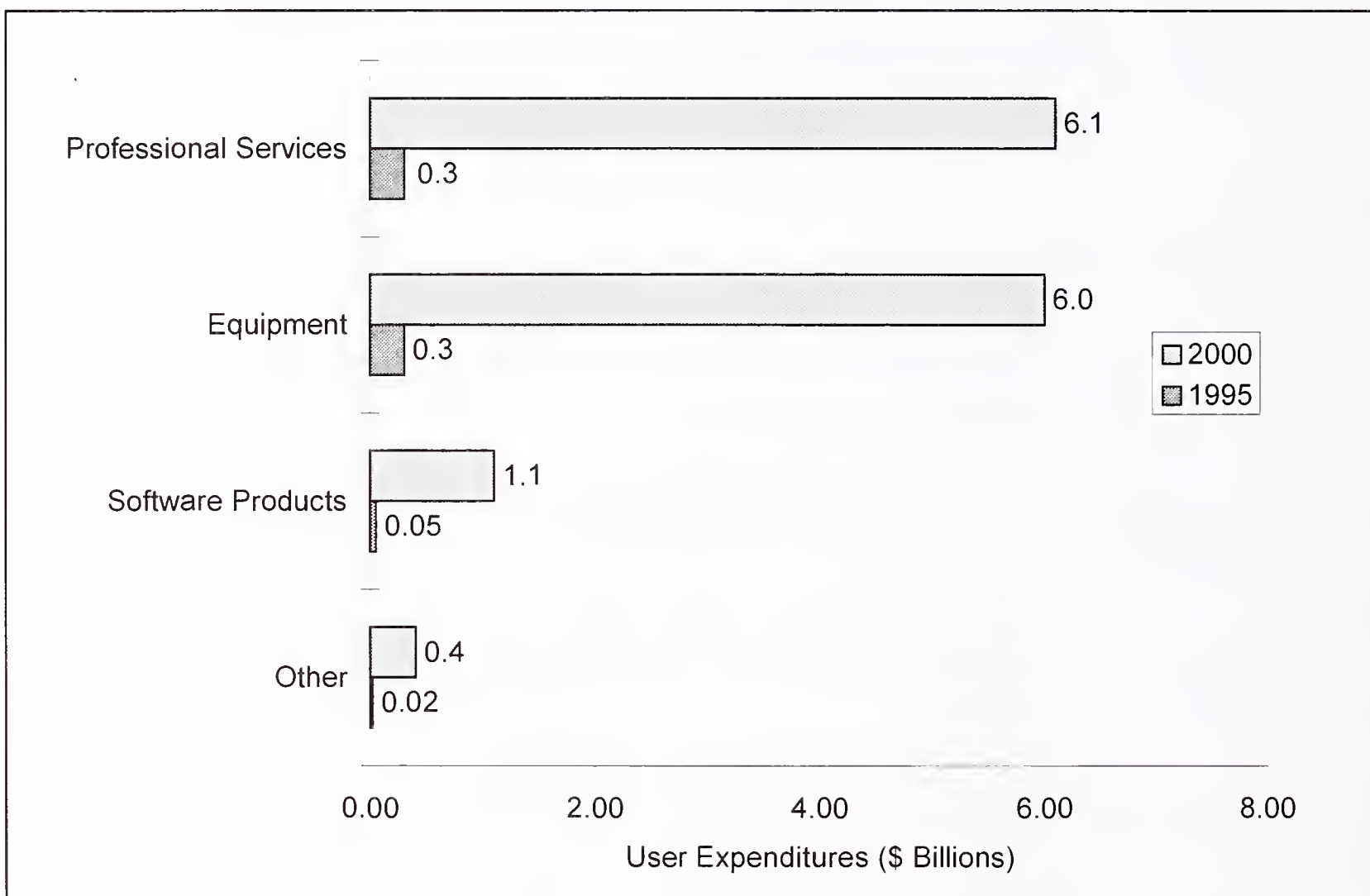
Source: INPUT

F

Network Services

The worldwide Internet network services market will grow at a CAGR of 58%, from $1.7 billion in 1995 to $17 billion in the year 2000. Network services include Internet access services in addition to Internet presence services, provided by companies such as InfoMarket and Best Communications, and directory and search services, provided by companies such as Infoseek and Yahoo. Exhibit V-10 shows the worldwide Internet access services market broken down by provider type.

Exhibit V-10

Worldwide Internet Access Services Market by Provider, 1995-2000
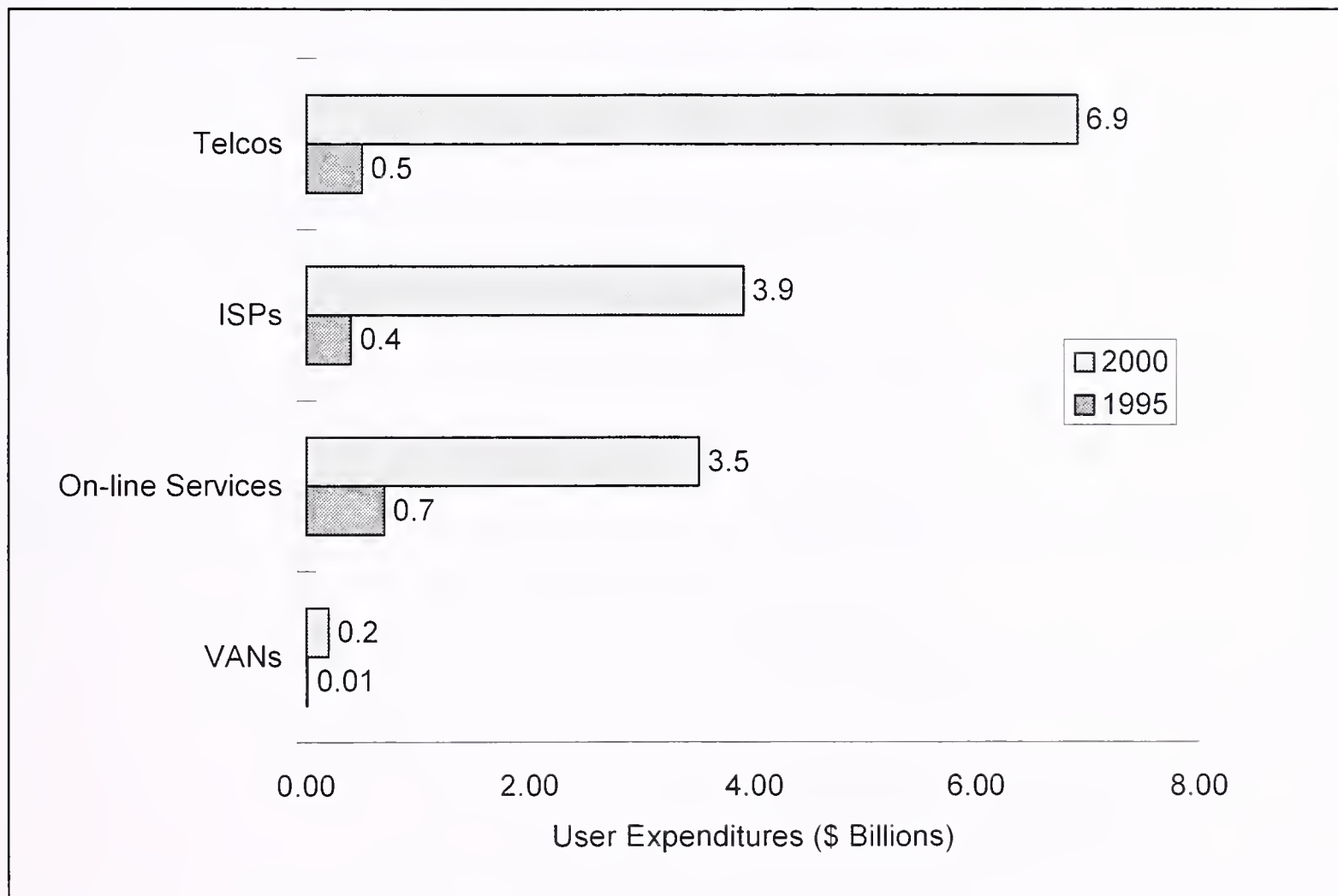
Source: INPUT

G

Processing Services and Outsourcing Services

The worldwide Internet processing services market will grow at a CAGR of 176% from $38 million in 1995 to $6 billion in the year 2000.

The worldwide Internet outsourcing services market will grow at a CAGR of 122%, from $280 million in 1995 to $15 billion in the year 2000. Exhibit V-11 shows the worldwide Internet outsourcing services forecast, broken down by category.

Exhibit V-11

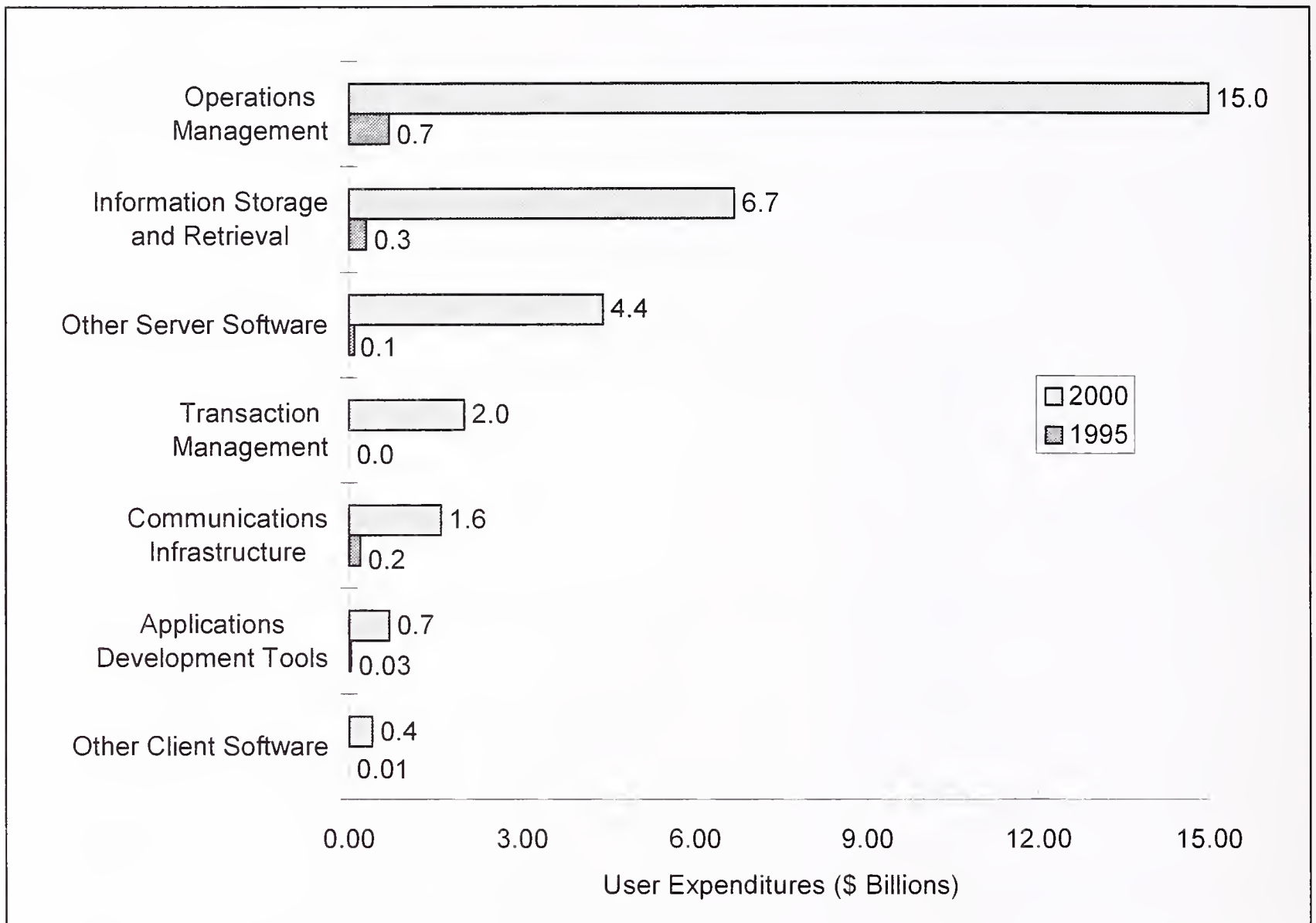## Worldwide Internet Outsourcing Services Market by Category, 1995-2000
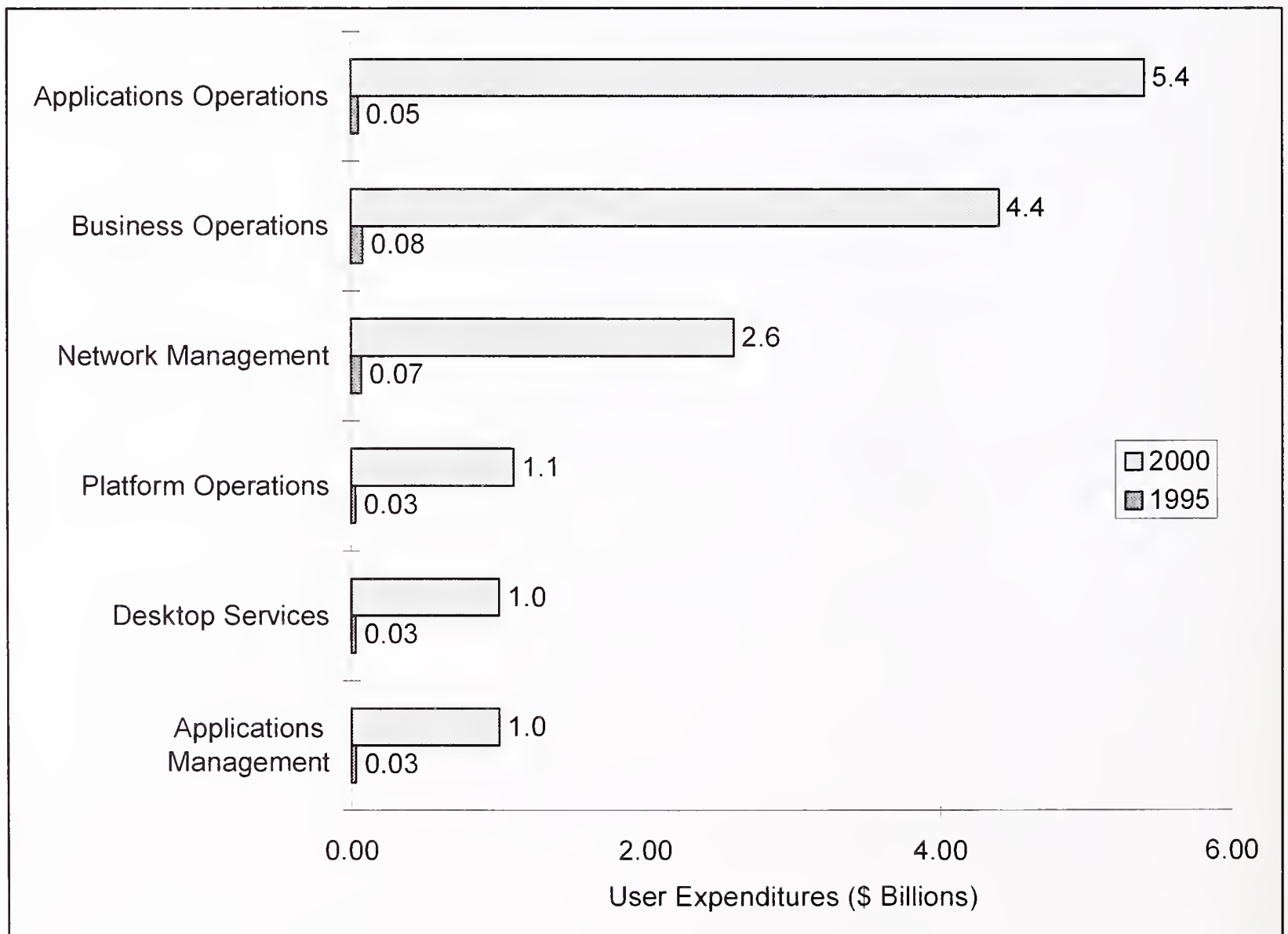
Source: INPUT

H

Internet Hardware

The worldwide Internet hardware market will grow at a CAGR of 56% from $3.3 billion in 1995 to $30 billion in the year 2000. Exhibit V-12 shows the worldwide Internet outsourcing services forecast, broken down by category.

Exhibit V-12

Worldwide Internet Hardware Market by Category, 1995-2000

Source: INPUT

I
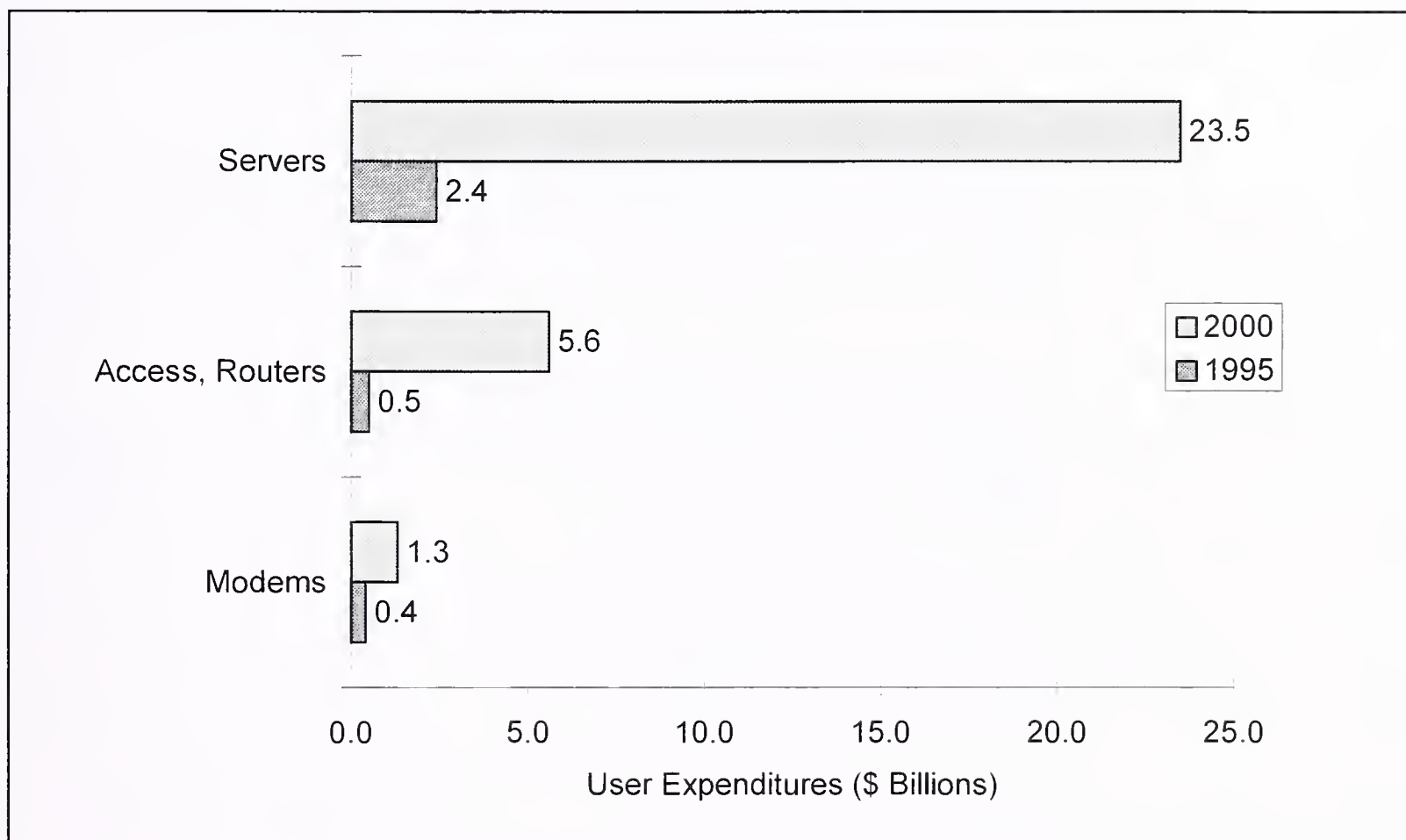
Product Support Services

The worldwide Internet product support services market will grow at a CAGR of 77%, from $795 million in 1995 to $14 billion in the year 2000. Exhibit V-13 shows the worldwide Internet product support services forecast broken down by category.

Exhibit V-13

Worldwide Internet Product Support Services Market, 1995-2000
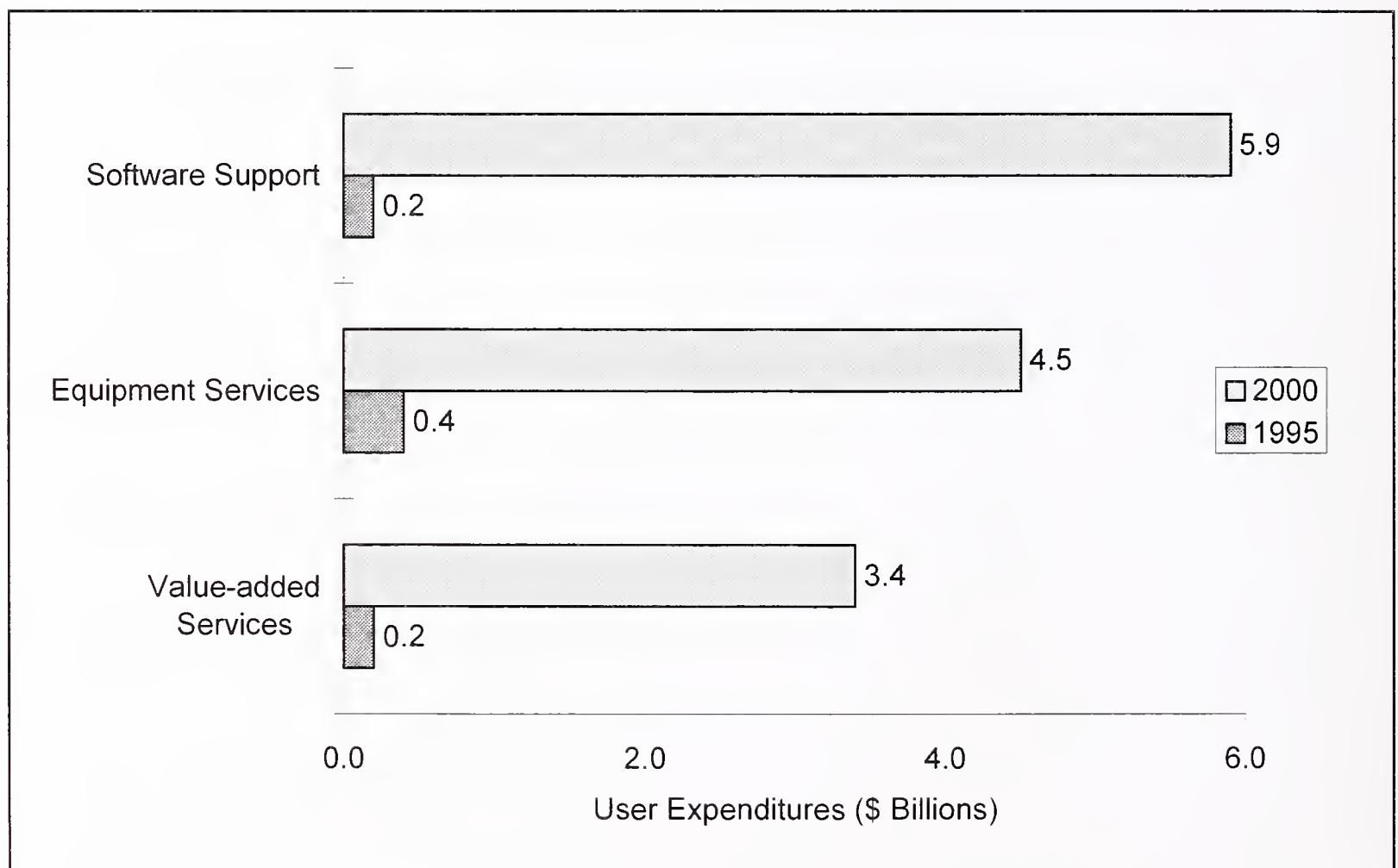
Source: INPUT
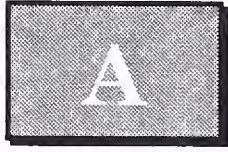
Definitions

This appendix provides definitions of vocabulary used in the report.

A
Glossary

More definitions can be found in INPUT's *Definition of Terms.*

Agent	An agent is a set of instructions that can carry out tasks automatically. It is usually written in a high-level language script and may run across a network to send messages or find information.
API	Application programming interface—this provides specifications for programmers.
Applet	A small application that may be embedded in another application; for example, Microsoft's MS Graph is a graph program used in the MS Excel spreadsheet and the MS Powerpoint presentation package.
Client	When used in client/server it refers to the computer platform accessed by a user, such as a PC, workstation or PDA.
Component	Component refers to a software component, a piece of software with documented interfaces that a programmer can use to build an application.
CORBA	Common Object Request Broker Architecture.

Departmental server	A server priced as the minicomputers in INPUT's *Definition of Terms*. Examples are a high-end PC or an SMP UNIX server.
Development Environment	Set of software used by programmers for developing applications that typically consists of compilers, debuggers, visual editors, profilers and performance optimizers.
Development Tools	Short for "application development tools."
Distributed System	A system that runs across multiple computers.
Enterprise Server	A server priced as a mainframe in INPUT's *Definition of Terms*. Examples are an IBM-compatible mainframe or a large SMP server of comparable price. These machines are often clustered.
Firewalls	Hardware and/or software solutions that prevent data from entering or leaving a network. They are most commonly used to protect corporate LANs from the Internet. They protect what may leave a corporate network and also what may enter it.
Framework	A specification or implementation of software that can be used to build an application. It may consist of classes and methods. Motif and the Common Object Request Broker Architecture (CORBA) are examples of frameworks.
Gateway	Software that connects one environment to another. It often translates formats and routes code from one application to another.
GUI	Graphical User Interface—a windowing system such as Microsoft Windows or X-Windows with Motif that displays graphical objects on a display.
HTML	HyperText Markup Language—a language for document formats; a dialect of SGML.
HTTP	High Transport Transmission Protocol—a protocol to move information between a Web server and a client on the Internet.

Internet	A publicly available network based on TCP/IP protocols that supports electronic mail, Web sites and other communications solutions.
Intranet	A private network that uses Internet technology, for example an internal TCP/IP network with browsers and Web servers.
LAN	Local-area network.
MacOS	The operating system for the Apple Macintosh.
Messaging	A general term that describes communication that stores and forwards information. It may also support queues of objects waiting for an event in a network. An example of messaging software is electronic mail or software that supports on-line information services.
Microkernel	An OS architecture in which the system is built around a core set of software known as the microkernel. The microkernel need not necessarily be small. The Mach kernel used by NeXT is an example of a microkernel-based OS, as is Apple's Copland.
Middleware	In this report, middleware is connectivity software that links clients and servers. It is systems software. Further information can be found in INPUT's report, *Middleware: Is DCE the Answer?* Some companies include databases and visual development tools as middleware; these are not included in INPUT's definition of middleware.
On-line services	Services that provide users with on-line access to information, like America Online, CompuServe, Minitel, NiftyServe, Dialog, Lexis/Nexis.
OODBMS	Object-oriented database management system.
Open systems	In this report it describes systems that can run on multiple UNIX and/or Windows operating systems, rather than proprietary environments like VMS (even Open VMS) or MVS (even with POSIX compatibility).

OpenDoc	A component software standard managed by Component Integration Labs that was originally established by Apple, IBM and Novell.
Operating environment	Modern term for an operating system plus its application development tools.
OS	Operating system.
PDA	Personal Digital Assistant—a handheld small computer with personal address lists, organizer information, etc. An example is Apple's Newton.
Platform	This is the software or hardware on which an application program runs.
Port	Verb as in *to port* or *porting*. To move software from one platform to another; for example, if Windows NT is moved to run on Digital's Alpha-based computers, it is ported to run on the Alpha environment.
Program	The term is meant to include a wide range of possible constructs, including scripts, loadable modules, etc., in addition to the traditional definition of an application or utility.
Reseller	An individual or company that resells a product. The reseller may or may not change the product to add value. See VAR.
ROM	Read only memory—used to store information that needs to be readily accessible in a computer. In a PDA it may contain the entire OS.
SGML	Standard Generalized Markup Language—a language defined by IBM and others for document formats, it is used by the government and manufacturing organizations as part of the CALS standards.
Suites	Sets of applications or packages. Office suites typically consist of a word processor, a spreadsheet, and a database or electronic mail package.

Three-tier	A C/S architecture consisting of three logical parts of the system: a client, an application logic server and a data/information server. This may be distributed across three computers, or the application logic and data may reside on the same machine, but be logically separate. This model enables data sources and databases to be swapped in and out of the system more easily than in the two-tier model, where the data and application logic may both be stored in the same database.
Two-tier	A C/S architecture in which there is a client and a server. Business logic resides either in the client portion of the application software or in the server.
URL	Universal Resource Locator—a string that describes an entity on the Internet. For example, "http://www.input.com" describes the URL for INPUT's Web site.
VAR	Value-added reseller—a reseller that adds value to software or hardware by customizing it, adapting it for a specific market segment, integrating it, porting it to a new environment, or adding software to it.
Videoconferencing	Communications between two sites in which each site sees and hears information from the other. The information may be captured from a computer screen or a camera. It may use videoconferencing equipment or a camera on a PC. Communications may be via high-speed phone lines or private networks.
Visual Development Tool	This is the software needed to build an application. It may include a visual editor, a forms designer, a report writer, a compiler, an interpreter, a debugger or a source code control system that enables programmers to share coding tasks.
WAN	Wide-area network.
Web	The World Wide Web.

Windows	Used in this report to refer to Microsoft's Windows if it starts with a capital letter. If it starts with a small letter, then it may refer to any software that controls the windows on a computer screen. A window may also be the window seen on a computer screen.
Workgroup	A networked group of computers or people that share information. Typical sizes range from a few individuals to about 100 people.
WWW	The World Wide Web.

B
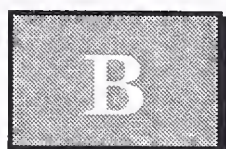
Vendor Names and Addresses

This chapter provides names and addresses of vendors and organizations mentioned in the report.

A

Vendors and Organizations

Exhibit B-1 provides names and addresses of vendors mentioned in this report.

Exhibit B-1

Names and Addresses of Vendors

Company	Notes
America Online 8619 Westwood Center Vienna, VA 22182 Tel: 703-448-8700 Fax: 703-435-0275 info@aol.com http://www.aol.com	Offers Internet access. Leading on-line service with both business and consumer information. Vendors may consider AOL to host their technical support. They may also consider information sources on AOL as part of their products or services.
Andersen Consulting 100 South Wacker Drive Chicago, IL 60606 Tel: 312-507-2900 Fax: 312-307-7965	Strong proponent of object technology for systems integration in diverse markets, especially manufacturing. Promoting demand chain management solutions using the Internet, SAP and other leading applications.
Apple Computer 20525 Mariani Avenue Cupertino, CA 95014 Tel: 408-996-1010 Fax: 408-996-0275	Focusing on client workstations for education, publishing, the Internet and multimedia solutions.

Exhibit B-1 (CONT.)

Company	Notes
AT&T Global Information Solutions (was NCR) 1700 S. Patterson Boulevard Dayton, OH 45479 Tel: 513-445-5000 Fax: 513-445-4184	AT&T GIS is a leader in C/S high-end transaction processing systems, with a strong presence in retail and financial markets. It will spin off from parent AT&T in 1996.
Borland International 100 Borland Way Scotts Valley, CA 95066 Tel: 408-431-1000 Fax: 408-431-4123 http://www.borland.com	Leading provider of application development tools. Announced Latte as a development environment for the Internet. Delphi is a C/S development tool. Also markets Paradox and dBase databases.
Compaq Computer Corporation 20555 State Hwy 249 PO Box 692000 Houston, TX 77269 Tel: 713-374-0484 Fax: 713-374-1740 http://www.compaq.com	Leading vendor of Windows NT server machines that can be rack-mounted and run in multiprocessor configurations. Also markets systems management software.
CompuServe 5000 Arlington Center Rd Columbus, OH 43220 Tel: 614-457-8600 Fax: 614-457-0348 http://www.compuserve.com	Leading on-line service provider with high-quality technical support forums that some C/S vendors use to support their products. Also offers an Internet browser and server that supports Microsoft Exchange.
Computer Associates International 1 Computer Associates Plaza Islandia, NY 11788 Tel: 516-342-5224 Fax: 516-342-5329 http://www.cai.com	Leader in systems management tools and services. CA-Unicenter is its flagship C/S product. Some Windows NT software is licensed from ICL. Also licenses OODBMS from Fujitsu.
Digital Equipment Corporation 110 Spitbrook Road Nashua, NH 03062 Tel: 603-881-1894 Fax: 603-881-2790 http://www.digital.com	Digital bridges the UNIX, Windows NT, PC and proprietary Open VMS architectures with its enterprise platforms. It is strong in connectivity and messaging technologies.
GE Information Services (GEIS) 410 North Washington Street Rockville, MD 20850 Tel: 301-340-4000 Fax: 301-340-4240 http://www.geis.com	On-line service provider for electronic commerce. Offers a wide range of services, such as news feeds. Also provides private-labeled networks.

Exhibit B-1 (CONT.)

Company	Notes
General Magic 420 North Mary Avenue Sunnyvale, CA 94086 Tel: 408-774-4000 Fax: 408-774-4010 http://www.genmagic.com	Developer of the MagicCap object-oriented operating system and the Telescript distributed object language.
Gupta Corporation (now Centura Software) 1060 Marsh Road Menlo Park, CA 94025 Tel: 415-321-9500 Fax: 415-321-5471 http://www.gupta.com	Focusing on increasing capabilities of its application development tools to make them more scalable to larger environments. Also supports remote and mobile users.
Hewlett-Packard 19310 Pruneridge Avenue Cupertino, CA 95014 Tel: 408-447-4042 Fax: 408-447-5809 http://www.hp.com	HP has a complete line of C/S systems and services, from PCs to workstations to enterprise servers. It is particularly strong in third-party software relationships and systems management. It is also strong in development tools and objects.
Hitachi Computer Products (America) 437 Madison Ave. 21st Floor New York, NY 10022 Tel: 212-751-6302 Fax: 212-751-6368 http://www.hitachi.com	This division of leading technology supplier, Hitachi, has begun to market its OT capability with a concentration on its application in OLTP.
Hyperion Software (was IMRS) 777 Long Ridge Road Stamford, CT 06902 Fax: 203-322-3904 http://www.hysoft.com	Best-of-breed solutions vendor for C/S financial analysis and accounting software.
IBM Corporation 1 Old Orchard Rd. Armonk, NY 10504 Tel: 914-765-1900 Fax: 914-765-4190 http://www.ibm.com	Leading C/S enterprise systems vendor. IBM was an early leader in object technology implemented into the OS/400 operating software. SOM debuted with OS/2 and has been or is being ported to all IBM operating environments.
Illustra Information Technologies 1111 Broadway 20th Floor Oakland, CA 94607 Tel: 510-652-8000 http://www.illustra.com	Successfully transitioned from being a technology vendor of ORDBMS technology to being an Internet solutions supplier with an innovative database for storing multimedia, hyperlinked documents.

Exhibit B-1 (CONT.)

Company	Notes
Informix Software 4100 Bohannon Drive Menlo Park, CA 94025 Tel: 415-926-6300 Fax: 415-926-6593 http://www.informix.com	Leading database vendor, strong in parallel servers and UNIX markets. Strong VAR program.
Intel Corporation PO Box 58119 Santa Clara, CA 95052 Tel: 408-765-8080 Fax: 408-765-1821 http://www.intel.com	Leading microprocessor vendor. Also markets PC boards and supercomputers.
Intuit 155 Linfield Drive Menlo Park, CA 94025 Tel: 415-322-0573 Fax: 415-852-0155 http://www.intuit.com	Developing on-line transaction service to pay bills on line. Targeting personal and small business markets. Example of a small business vendor with a simple solution.
Lotus Development Corporation 55 Cambridge Parkway, Cambridge, MA 02142 Tel: 617-577-8500 Fax: 617-225-1213 http://www.lotus.com	Acquired by IBM for Notes and distributed messaging architecture.
MCI 780 Johnson's Ferry Rd Atlanta, GA 30342 Tel: 404-250-5500 Fax: 404-250-5591 http://www.mci.com	Providing on-line services for the Internet. Also acquired SHL Systemhouse, a leading systems integrator and outsourcing vendor of C/S solutions.
Microsoft Corporation 1 Microsoft Way Redmond, WA 98052 Tel: 206-882-8080 Fax: 206-936-7329	Leader of the desktop environment with Windows and the OLE 2 standard for interconnecting applications. Extending its technology into the enterprise server arena is Microsoft's challenge.
Microware 1900 N.W. 114th Street Des Moines, IA 50325-7077 Phone: 515 224-1929 Fax: 515 224-1352 Internet: info@microware.com http://www.microware.com	Develops the OS/9 and David operating environments. Possible candidate for operating environment for Internet appliances.

Exhibit B-1 (CONT.)

Company	Notes
Netscape 501 E. Middlefield Rd. Mountain View, CA 94043 Tel: 415-254-1900 Fax: 415-528-4124 http://www.netscape.com	Leading supplier of Web browser and server software. May challenge established database vendors with Web servers. Challenges development tool vendors with Internet-compatible solutions.
NeXT Computer Inc. 900 Chesapeake Dr. Redwood City, CA 94063 Tel: 415-366-0900 Fax: 415-780-3714 http://www.next.com	NeXT offers its Portable Distributed Objects (PDO) object model and the Enterprise Objects Frameworks products under the banner of NEXTSTEP, a cross-platform development and run-time system for three-tiered applications.
Novell 122 E 1700 South Provo, UT 84606 Tel: 801-429-7000 Fax: 801-377-9353 http://www.novell.com	Novell aims to be a leader in network services such as directories, addressing, transaction management and network administration.
Open Market 245 First Street Cambridge, MA 02139 Tel: 617-621-9500 Fax: 617-621-1703 http://www.openmarket.com	Provides secure Web server; Netscape is a competitor. Also provides electronic commerce services.
Oracle Corporation 500 Oracle Parkway Redwood Shores, CA 94065 Tel: 415-506-7000 Fax: 415-506-7151 http://www.oracle.com	Leading database vendor with Developer/2000 development tools and various object-oriented solutions, including Power Objects. Oracle will increase its presence in vertical C/S applications. It also aims to reduce systems integration effort by packaging solutions for branch offices and workgroups.
ParcPlace-Digitalk 999 E. Arques Ave. Sunnyvale, CA 94086 Tel: 408-481-9090 Fax: 408-481-9095 http://www.parcplace.com	The August 1995 merger of ParcPlace and Digitalk combines two companies with synergistic OT product capabilities on UNIX and Windows systems, respectively. Visual SmallTalk from Digitalk and Visual Works from ParcPlace are application development tools for SmallTalk environments and C/S programming.
PeopleSoft 1331 N California Blvd. Walnut Creek, CA 94596 Tel: 510-946-9460 Fax: 510-946-9461 http://www.peoplesoft.com	Leader in C/S HR software that has led to accounting and manufacturing C/S solutions.

Exhibit B-1 (CONT.)

Company	Notes
Platinum Technology 1815 S. Meyers Rd Oakbrook Terrace, IL 60181 Tel: 708-620-5000 Fax: 708-691-0707 http://www.platinum.com	Many tools to support databases, including DB2 and other common platforms. Entering the data warehouse and business reporting tools area.
Powersoft 561 Virginia Road Concord, MA 01742 Tel: 617-229-2200 Fax: 617-272-9076 http://www.powersoft.com	A Sybase subsidiary. Developing more scalable versions of its PowerBuilder and PowerMaker application development tools. Also markets Watcom database. Vulnerable to new products from Spider Technologies for the Internet, but agile enough to react positively.
Prodigy Interactive Services Corp. 445 Hamilton Avenue White Plains, NY 10601 Tel: 914-448-8000 Fax: 914-448-8083 http://www.prodigy.com	Prodigy is a leading interactive services corporation. Recently it has increased its marketing efforts to the business community, where it has lost out to CompuServe and America Online.
RSA Data Security 100 Marine Parkway Redwood City, CA 94065 Tel: 415-595-8782 Fax: 415-595-1873	Leader in public key cryptography. Technology is incorporated in other products.
The Santa Cruz Operation (SCO) 400 Encinal Street Santa Cruz, CA 95060 Tel: 408-425-7222 Fax: 408-458-4227 http://www.sco.com	Leading independent vendor of UNIX operating systems and UNIX software products. Provides an affordable platform for branch offices and small organizations.
SAP America, Inc. 300 Stevens Drive Philadelphia, PA 19113 Tel: 610-521-4500 Fax: 610-521-4500 http://www.sap.com	SAP's R/3 is a leading integrated enterprise C/S application, with success in multinational and smaller firms. SAP is particularly strong in high-technology manufacturing markets and oil and gas.
Silicon Graphics (SGI) 2011 N Shoreline Blvd Mountain View, CA 94043 Tel: 415-960-1980 Fax: 415-961-0595 http://www.sgi.com	Leader in 3-D workstations and high-performance servers. Servers are used for WWW and supercomputing as well as databases and 3-D support. Entering data mining market.

Exhibit B-1 (CONT.)

Company	Notes
Spider Technologies 1054 Elwell Court Palo Alto, CA 94003 Tel: 415-969-6665 Fax: 415-969-6883 http://www.3wspider.com	Emerging supplier of development tools for Internet applications.
Sprint International 12490 Sunrise Valley Drive Reston, VA 22096 Tel: 703-689-6000 Fax: 703-689-5176 http://www.sprint.com	Leading telecommunications vendor supplying Internet access and connectivity for virtual LANs.
Spyglass Naperville Corporate Center 1230 Diehl Road, #304 Naperville, IL 60563 Tel: 708-505-1010 Fax: 708-505-4944 http://www.spyglass.com	Internet software vendor. Also provides data analysis tools.
Sterling Software 4600 Lakehurst Court Dublin, OH 43017 Tel: 614-973-7000 Fax: 614-793-7092 http://www.sterling.com	Provides electronic commerce software and services. Also has other divisions providing mainframe software for systems management, storage and applications development.
Sun Microsystems 2550 Garcia Avenue Mountain View, CA 94043-1100 Tel: 415-960-1300 Fax: 415-969-9131 http://www.sun.com	Scalable computing systems from workstations (including notebooks) to servers based on SPARC microprocessor and Solaris OS.
SunSoft 2550 Garcia Avenue Mountain View, CA 94043-1100 Tel: 415-960-3200 Fax: 415-336-0362 http://www.sun.com/sunsoft	SunSoft has a leading position in distributed UNIX computing that it can leverage. NEO is Sun's distributed object environment and toolset that uses NeXT's OpenStep software. SunSoft also provides the Solaris operating system for Intel platforms, as well as SPARC, and Solstice systems management software, as well as application development tools.
Sybase 6475 Christie Avenue Emeryville, CA 94608 Tel: 800-879-2273 Fax: 510-658-9441 http://www.sybase.com	Application development tools, middleware and databases are Sybase's main products. Sybase has several subsidiaries, including Micro Decisionware and Powersoft. The Sybase 11 database is emerging, which should improve scalability and performance.

Exhibit B-1 (CONT.)

Company	Notes
Symantec Corporation 10201 Torre Avenue Cupertino, CA 95014 Tel: 408-253-9600 Fax: 408-253-4092 http://www.symantec.com	Developer of application development tools and compilers, as well as systems management tools, such as Norton Utilities. Also sells ACT sales and marketing software. Entering workgroup C/S market.
Verity 1550 Plymouth Street Mountain View, CA 94043 Tel: 415-960-7600 Fax: 415-960-7698 http://www.verity.com	Provides a Web server for full-text documents. Provides search and retrieval software.

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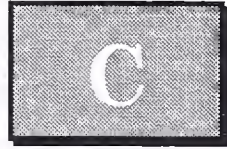
Forecast Details

This section provides other INPUT forecasts here for comparison; because the detailed tables are in the report, they are not repeated here.

A

INPUT Total Internet Forecasts

Exhibit C-1 shows INPUT's forecasts and growth rates for the worldwide Internet market.

Exhibit C-1

Internet Market Forecast, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
TOTAL	3,000	300%	12,000	27,000	56,000	94,000	145,000	210,000	77%
Systems Software	300	333%	1,300	3,900	8,500	15,100	22,400	31,000	88%
Applications Software	7	10324%	780	3,100	7,500	12,700	19,300	28,000	105%
Turnkey Systems	0	na	610	2,000	3,300	5,300	9,300	15,000	90%
Hardware	818	304%	3,300	5,600	11,800	16,100	20,400	30,000	55%
Professional Services and Systems Integration	1,200	150%	3,000	6,300	12,700	22,300	38,000	54,000	78%
Network Services	583	192%	1,700	3,200	5,900	9,800	14,100	17,000	58%
Processing Services	0	na	38	460	980	2,110	4,000	6,000	175%
Outsourcing	0	na	280	830	1,660	4,000	8,100	15,000	122%
Product Support Services			795	1,944	4,134	6,543	9,497	14,000	77%

Source: INPUT

Exhibit C-2 shows INPUT's worldwide forecast for systems software.

Exhibit C-2

Internet Systems Software Market, by Category, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET SYSTEMS SOFTWARE TOTAL	300	333%	1,300	3,900	8,500	15,100	22,400	30,900	88%
Client Software	6	2251%	130	500	1,400	2,600	3,900	4,300	101%
Server Software	320	275%	1.200	3,400	7,100	12,500	18,500	26,600	86%
INTERNET SYSTEMS SOFTWARE TOTAL	300	333%	1,300	3,900	8,500	15,100	22,400	30,900	88%
Communications Infrastructure	31	550%	200	400	800	1,300	1,600	1,600	52%
Client software	0	na	75	200	500	900	1.300	1.300	77%
Client browsing software	0	na	73	200	400	700	1,000	900	65%
Client add-on utilities	0	na	2	28	78	173	306	443	183%
Server software	31	265%	112	244	338	361	304	304	22%
Middleware, protocol stacks, OS enhancements	25	300%	100	225	200	188	125	125	5%
Broadcast, audio, video support	0	na	0	0	100	125	125	125	na
Communications and mail gateways	6	113%	12	19	38	48	54	54	35%
Operations Management	259	174%	709	1,667	3,268	6,373	10,371	15,025	84%
Client software	0	na	0	70	186	441	637	812	na
Client workstation security software	0	na	0	56	137	321	382	443	na
Other operations management client software	0	na	0	14	49	120	255	369	na
Server software	259	174%	709	1.597	3.082	5.932	9.734	14.213	82%
Security	240	168%	644	1,355	2,544	3,849	5,874	8,387	67%
Firewalls	140	103%	284	635	1,344	2,349	3.624	5.387	80%
Other security software	100	260%	360	720	1,200	1,500	2,250	3.000	53%
Directory management software	14	159%	36	132	212	857	1,308	1,446	109%
Network and systems management software	5	478%	29	109	327	1.226	2,552	4,379	172%
Applications Development Tools	5	432%	27	102	200	335	513	705	92%
Client software	5	432%	27	102	200	335	513	705	92%
Web authoring and conversion tools	5	191%	15	48	106	181	309	469	100%
Compilers and software libraries for programmers	0	na	12	54	94	154	204	236	81%
Information Storage and Retrieval	26	1005%	290	1,311	2,877	4,172	5,493	6,711	87%
Client software	0	na	12	126	392	674	1.071	1,107	147%
Client search and retrieval software	0	na	12	126	392	674	1,071	1,107	147%
Server software	26	959%	278	1.185	2.485	3.498	4.422	5.603	82%
Web servers	0	na	103	581	1,230	1,336	1,656	1,591	73%
Mail, name and similar servers			30	146	286	476	377	216	49%
Search engines and their interfaces	20	387%	97	324	534	603	1,037	1,094	62%
Bulletin board interfaces to the Internet	6	-20%	5	4	3	3	3	3	-13%
Databases and their interfaces	0	na	43	130	432	1.080	1,350	2,700	129%
Transaction Management			8	90	426	776	1,617	2,007	206%
Server software									
Commerce-enabling Web server software	0	na	8	90	426	776	1,617	2,007	206%
Other Client Software	0.5	2170%	11	50	128	235	352	392	103%
Other Server Software	5	1628%	86	252	804	1,935	2,408	4,430	129%

Source: INPUT

Exhibit C-3 shows INPUT's worldwide forecast for applications software products by cross-industry and vertical markets.

Exhibit C-3

Internet Applications Software Market, by Category, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET APPLICATIONS SOFTWARE TOTAL	7	10324%	778	3,103	7,483	12,652	19,331	28,288	105%
Cross-Industry Software	1	24012%	301	1,368	4,125	7,074	10,334	15,942	121%
Vertical Market Software	6	7571%	477	1,735	3,358	5,579	8,997	12,346	92%
INTERNET APPLICATIONS SOFTWARE TOTAL	7	10324%	778	3,103	7,483	12,652	19,331	28,288	105%
Cross-Industry Software	1	24012%	301	1,368	4,125	7,074	10,334	15,942	121%
Accounting and Finance (incl. Procurement, Inventory and Billing Software)	1	9538%	96	568	1,984	3,692	5,470	8,834	147%
Engineering and Scientific	0	na	21	58	131	147	166	187	56%
Human Resources	0	na	13	78	231	362	622	656	119%
Office Automation (incl. Workflow, Telecom Support)	0	na	39	82	154	269	452	738	80%
Planning and Analysis	0	na	0	68	200	468	658	898	na
Sales and Marketing	0	na	72	240	600	720	900	1,440	82%
Other Cross-Industry	0	24012%	60	274	825	1,415	2,067	3,188	121%
Vertical Market Software	6	7571%	477	1,735	3,358	5,579	8,997	12,346	92%
Banking and Finance	0	na	200	600	1,001	1,122	1,504	1,806	55%
Business Services	0	na	1	9	68	301	883	1,232	288%
Education	5	400%	25	352	655	1,083	1,596	2,297	146%
Government	0	na	0	32	79	119	158	316	na
Federal Government	*0*	*na*	*0*	*24*	*60*	*90*	*120*	*240*	*na*
State and+A151 Local Government	*0*	*na*	*0*	*8*	*19*	*29*	*38*	*76*	*na*
Health Services	0	na	0	2	9	41	53	68	na
Insurance	0	4900%	0	3	7	15	19	23	172%
Manufacturing	0	na	96	250	500	1,000	1,560	2,600	93%
Discrete	*0*	*na*	*80*	*200*	*400*	*800*	*1,200*	*2,000*	*90%*
Process	*0*	*na*	*16*	*50*	*100*	*200*	*360*	*600*	*106%*
Misc. Industries	0	na	0	20	40	80	140	200	na
Retail and Wholesale Trade	0	na	50	170	370	550	730	900	78%
Telecommunications, Media and Entertainment	1	4580%	54	168	348	778	1,604	1,954	105%
Transportation	0	na	30	60	160	320	500	600	82%
Utilities	0	na	20	70	120	170	250	350	77%

Source: INPUT

Exhibit C-4 shows INPUT's worldwide forecast for Internet turnkey systems.

Exhibit C-4

Internet Turnkey Systems Market, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET TURNKEY SYSTEMS TOTAL	0	na	614	2,006	3,259	5,341	9,271	14,531	88%
UNIX-Based	0	na	386	733	1,102	1,524	2,044	2,485	45%
Windows NT-Based	0	na	110	535	1,039	2,030	2,791	3,628	101%
Simple OSs	0	na	0	500	800	1,320	3,800	7,600	na
MacOS-Based	0	na	63	107	136	207	279	343	40%
Other OSs	0	na	54	131	183	259	357	476	54%
								_21,000_	
INTERNET TURNKEY SYSTEMS TOTAL	0	na	614	2,006	3,259	5,341	9,271	14,531	88%
Authoring Systems	0	na	146	294	408	570	770	1,043	48%
Web Server Systems	0	na	268	693	1,171	1,971	3,061	4,248	74%
Internet Browsing Appliances	0	na	0	500	800	1,200	3,200	6,400	na
Other Systems	0	na	200	520	880	1,600	2,240	2,840	70%

PS in Turnkey   _150 500 800 1300 2250   3750 4.9_

Source: INPUT

Exhibit C-5 shows INPUT's worldwide forecast for Internet professional services and systems integration.

Exhibit C-5

Internet Professional Services and Systems Integration Market, by Category, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET PROFESSIONAL SERVICES AND SYSTEMS INTEGRATION TOTAL	1,200	150%	3,000	6,300	12,700	22,300	38,000	53,800	78%
Professional Services	1,023	141%	2,467	5,048	9,955	17,131	28,756	40,177	75%
Consulting	218	173%	594	1,184	2,554	4,536	7,515	10,615	78%
Education and Training	109	190%	315	688	1,566	2,780	5,010	7,077	86%
Software Development (not Web page creation)	177	168%	473	974	2,060	3,658	6,263	8,846	80%
Web Design and Creation Services	510	103%	1,036	2,045	3,346	5,158	8,013	10,596	59%
Internet Profiling Services	0	na	1	10	48	193	615	1,186	296%
Other	10	377%	48	147	381	807	1,340	1,857	107%
Systems Integration	212	171%	574	1,234	2,779	5,153	9,213	13,589	88%
Equipment	96	170%	258	555	1,223	2,267	4,010	5,979	87%
Software Products	16	186%	46	99	222	412	711	1,087	88%
Professional Services	92	173%	252	543	1,251	2,319	4,173	6,115	89%
Other	8	129%	17	37	83	155	319	408	88%

Source: INPUT

Exhibit C-6 shows INPUT's worldwide forecast for Internet network services.

Exhibit C-6

Internet Network Services Market, by Category, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET NETWORK SERVICES		na	1,705	3,189	5,923	9,781	14,058	16,589	58%
Access Services			1,560	2,890	5,357	8,823	12,643	14,621	56%
Internet Access Providers - PSI, UUNet, Netcom	242	53%	370	773	1,159	1,739	2,608	3,912	60%
Internet On-line Services - CompuServe, AOL			700	1,300	1,820	2,366	2,958	3,549	38%
Telecomm Internet Services			480	768	2,304	4,608	6,912	6,912	70%
VANs - GEIS, IBM			10	49	74	110	165	248	90%
Internet Presence Services - InfoMarket, BEST	143		105	220	316	458	664	968	56%
Directory and search services - Infoseek, Yahoo	0	na	40	80	250	500	750	1,000	90%

Source: INPUT

Exhibit C-7 shows INPUT's worldwide forecast for Internet processing services and outsourcing.

Exhibit C-7

Internet Processing Services and Outsourcing Market, by Category, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET PROCESSING SERVICES & OUTSOURCING		na	318	1,288	2,635	6,057	12,058	21,599	132%
Processing Services		na	38	455	977	2,105	3,968	6,122	176%
Outsourcing Services		na	280	832	1,658	3,952	8,090	15,477	123%
Network Management			75	195	430	749	1,435	2,553	103%
Platform Operations			30	70	180	298	637	1,121	106%
Application Operations			45	111	295	857	2,327	5,411	161%
Business Operations			80	356	553	1,548	2,691	4,392	123%
- Content			50	100	200	500	1,000	2,000	109%
- Security Management			30	256	353	1,048	1,691	2,392	140%
Applications Management			25	50	100	250	500	1,000	109%
Desktop			25	50	100	250	500	1,000	109%

Source: INPUT

Exhibit C-8 shows INPUT's worldwide forecast for Internet hardware.

Exhibit C-8

Internet Hardware Market, by Category, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET HARDWARE		na	3,288	5,606	11,839	16,100	20,403	30,435	56%
Servers			2,383	4,087	8,967	12,174	15,487	23,549	58%
Access, Routers, Switches			530	956	2,028	2,829	3,709	5,559	60%
Modems			375	563	844	1,097	1,207	1,327	29%

Source: INPUT

Exhibit C-9 shows INPUT's worldwide forecast for Internet product support services.

Exhibit C-9

Internet Product Support Services Market, by Category, Worldwide, 1995-2000

Product/Service Categories	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
INTERNET HARDWARE	53	14	795	1,944	4,134	6,543	9,497	13,852	77%
Software Support	40		208	700	1,598	2,775	4,173	5,919	95%
Equipment Services	0		390	761	1,510	2,144	2,967	4,497	63%
Value-added Services	13		197	482	1,026	1,623	2,356	3,437	77%

Source: INPUT

Exhibit C-10 shows INPUT's worldwide forecast for Internet Web server software by server type.

Exhibit C-10

Internet Web Server Software Market Details, Worldwide 1995-2000

Software Products	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-2000 (%)
			111	669	1,659	2,081	3,292	3,590	
Web servers	0		110	671	1,657	2,112	3,273	3,598	101%
Enterprise Server	0		10	60	210	356	649	724	136%
- IBM compatible mainframe	0		0	10	20	40	80	88	
- Digital open VMS/VMS	0		0	5	15	30	48	58	
- UNIX Enterprise	0		10	40	160	256	461	507	119%
- Other Enterprise	0		0	5	15	30	60	72	
Departmental Server	0		45	331	931	1,228	2,066	2,259	119%
- AS/400	0		0	5	15	30	48	58	
- Other proprietary minicomputer	0		0	5	15	30	48	58	
- UNIX Departmental	0		20	88	264	317	507	532	93%
- Windows NT Departmental	0		5	200	600	810	1,418	1,559	215%
- Novell/Banyan/LAN	0		5	15	15	15	15	15	25%
- Other Departmental/LAN	0		15	18	22	26	31	37	20%
Client Workstation/PC	0		45	220	336	313	299	304	46%
- Windows NT Workstation	0		0	0	0	0	0	0	
- Windows 95	0		5	60	78	78	78	78	73%
- Windows 3.1	0		5	50	100	50	0	0	
- DOS	0		0	0	0	0	0	0	
- OS/2	0		15	30	42	46	51	56	30%
- Mac OS	0		20	40	56	78	110	110	41%
- Other	0			40	60	60	60	60	
Cross-Platform	0		10	60	180	216	259	311	99%
			97	324	534	603	1,037	1,094	
Full-text storage tools	255	18%	300	328	449	597	933	1,308	34%
Enterprise Server	125	12%	140	157	177	238	329	412	24%
- IBM compatible mainframe	30	0%	30	29	27	26	24	23	-5%
- Digital open VMS/VMS	20	0%	20	20	20	20	20	20	0%
- UNIX Enterprise	70	20%	84	101	121	181	272	354	33%
- Other Enterprise	5	20%	6	7	9	10	12	15	20%
Departmental Server	40	16%	47	55	83	141	276	497	61%
- AS/400	5	20%	6	7	9	10	12	15	20%
- Other proprietary minicomputer	10	20%	12	14	17	21	25	30	20%
- UNIX Departmental	5	20%	6	7	9	10	12	15	20%
- Windows NT Departmental	5	50%	8	11	34	84	211	422	124%
- Novell/Banyan/LAN	10	0%	10	10	10	10	10	10	0%
- Other Departmental/LAN	5	0%	5	5	5	5	5	5	0%
Client Workstation/PC	70	25%	88	80	138	148	235	279	26%
- Windows NT Workstation									
- Windows 95	15	100%	30	42	59	82	115	161	40%
- Windows 3.1	20	0%	20	28	39	55	77	108	40%
- DOS	10	0%	10	10	10	10	10	10	0%
- OS/2	10	10%	11	0	12	0	13	0	-59%
- Mac OS	10	10%	11	0	12	0	13	0	-59%
- Other	5	10%	6	0	6	0	7	0	-52%
Cross-Platform	20	30%	26	36	51	71	93	121	36%

Source: INPUT