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INP	TUT	Distribution Report		As of 5/20/97 Commercial Unit
Order #	Company Name	Name	Project	Quantity
111303	ANDERSEN CONSULTING	Martha Jameson		
			INB6-CReport	2
3000910	ANDERSEN CONSULTING	Joe Carter		
			INB6-CReport	1
3000739	AT&T	Lidia V. Huk		
			INB6-CReport	2
3001174	BULL AG	Peter Breuer		
			INB6-CReport	
3001174	BULL AG SCHWEIZ	Andre Schaad		
			INB6-CReport	1
3001002	BULL S.A.	Catherine Orsini		
			INB6-CReport	2
3001014	DIGITAL EQUIPMENT CORPORATION	Ellen Gilliam		
			INB6-CReport	2
3000924	DIGITAL EQUIPMENT CORPORATION	Wilfried Girkens		
			INB6-CReport	
3001037	EURIWARE	Didier Rousseau	BID( C. Brent	
			INB6-CReport	
3001119	FUJITSU	Isuyoshi Abe	DIRG C Preset	
			имво-СКероп	2
Commercial	Unit Distribution Report	Page 1 of 4		Confidential - INPUT



INF	TUY	Distribution Report		As of 5/20/97 Commercial Unit
Order #	Company Name	Name	Project	Quantity
3001004	HEWLETT PACKARD	Susan Kitson		
			INB6-CReport	2
3001071	нітасні	Nobuteru Tsuge		
			INB6-CReport	2
111568	IBM CORPORATION	Ilse Ruckert		
			INB6-CReport	2
3001038	IBM DEUTSCHLAND GMBH	Kurt Dengler		
			INB6-CReport	1
3000948	IBM UK LTD	Ian Stevenson		
			INB6-CReport	1
3000746	LEXMARK INTERNATIONAL	Lynn Goy		
			INB6-CReport	2
3000956	LUCENT TECHNOLOGIES INC.	Ruth W. Wolfish		
			INB6-CReport	2
3001045	MICROSOFT CORPORATION	Deborah Robinson		
			INB6-CReport	2
3001174	NTG/XLINK	Bernhard Lommetz		
			INB6-C-Report	1
3001065	NTT	Hiroshi Ymanaka		
			INB6-C-Report	2

**Commercial Unit Distribution Report** 

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Order #	Company Name	Name	Project	Quantity	
112830	SERICS MINISTRY OF INDUSTRY	Patrick Knight			
			INB6-CReport		
3001117	SIEMENS BUSINESS SERVICES GMBH &	CO. OH Alexander Grueter			
			INB6-CReport	1	
3001117	SIEMENS NIXDORF INFO. SYS. AG	Friedrich Froeschl			
			INB6-CReport	1	
3000960	TOSHIBA CORPORATION	Hidekazu Izumi			
			INB6-CReport	2	
3001118	TOYOTA DIGITAL CRUISE, INC.	Shozaburo Tomita			
			INB6-CReport	2	
3001077	Z., INTERNAL - COMMERCIAL	Internal Sales			
			INB6-CReport	4	
111024	ZZ., INTERNAL - COMMERCIAL	Sales Library			
			INB6-CReport	1	
111027	ZZ_INTERNAL - COMMERCIAL	Library			
111027	EL. INTERNAL - COMMINCE	Distaly	INB6-CReport	2	
	77 DITEDNAL EDANCE	Library Sales			
111028	ZZ., INTERNAL - FRANCE	Library - Saids	DIR6 C Report		
111038	ZZ INTERNAL - GERMANY	Library/Stock	DIRECT D		
			INB6-CReport	5	

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INPUT		Distribution Report		As of 5/20/97 Commercial Unit
Order #	Company Name	Name	Project	Quantity
111034	ZZ INTERNAL - JAPAN	Library		
			INB6-CReport	2
111029	ZZ INTERNAL - NEW JERSEY	Office Manager		
			INB6-C-Report	2
111030	ZZ INTERNAL - UK	Library/Stock		
			INB6-CReport	12
111031	ZZ INTERNAL - VIRGINIA	Phantom Sales Person		
			INB6-CReport	2
111063	ZZ INTERNAL REG. OF COPYRIGHT	Dep & Acq Div-LM438C		
			INB6-CReport	2





June, 1997

Dear Colleague:

I would like to thank you for the time you gave our research consultant when you were interviewed regarding your experiences and views on Intranet applications.

As promised, I am sending you a copy of the Executive Overview of the INPUT report, Revolutionary Migration of Applications to the Intranet. It is based, in part, upon information provided by you and other industry professionals. I hope you find the report both useful and informative.

If you are interested in more information about our study or in purchasing the complete report, please contact Mark Drisko at (415) 528-6318 or send e-mail to mark\_drisko@input.com.

Thank you again for giving INPUT the benefit of your knowledge and experience.

Sincerely,

Silut

James Eibisch Manager, Internet Opportunities Program

Enclosure





# EXECUTIVE OVERVIEW

# Revolutionary Migration of Applications to the Intranet

**Internet Opportunities Program** 



#### To Our Clients:

This summary is an excerpt from a full research report, *Revolutionary* Migration of Applications to the Intranet, issued as part of INPUT's Internet Opportunities Program.

If you have questions or comments about this report, please call (415) 961-3300 to contact your INPUT analyst.



### Abstract

The rate at which the Internet has been adopted by business has caught many users and vendors by surprise.

Applications are being enhanced so that they run across Intranets and the Internet — Internet-technology is becoming a new platform for applications.

This report analyses the progress and users' plans for applications to be processed on an Internet technology-based platform instead of on a traditional client/server or mainframe platform.

The study considers the changing portion of the IT budget that is being spent on Internet-related applications, as well as the different approaches being taken to the migration process.

The report analyzes users' plans for sourcing these applications from inhouse, packaged application software products, and external development.

Analysis is provided across all industries surveyed plus industry-specific analysis is available for discrete and process manufacturing and retail and wholesale distribution industries.

Revolutionary Migration of Applications to the Intranet provides forecasts of the information services market related to Intranet and services and software up to 2001.



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### **Executive Summary**

The rate at which the Internet has been adopted by business has caught many users and vendors by surprise.

Intranets and the Internet are being used for more than just transmission of e-mail and hosting of Web sites.

Applications are being enhanced so that they run across Intranets and the Internet—Internet-technology is becoming a new platform for applications.

Vendors of software development tools, applications software products, and application development service and operational services must understand this new market if they are to correctly plan and implement product, sales, and marketing strategies.

#### Market Forecast

Α

Worldwide expenditure on software and services related to Internettechnology will reach \$220 billion by 2001 (see Exhibit II-1).

This represents a 65% compound annual growth rate (CAGR) for user expenditure on information services during the period 1996 to 2001.

Examples of new Internet-related services that will be in this expanded market include:

 Professional Services—The market for Web-site development and implementation services is forecast to be over \$10 billion in 2000. Internet profiling services, allowing analysis of visitors to Web sites and mining of Internet traffic data, will become a key part of sales and marketing activities related to the Internet and will be at least a \$1 billion market in 2001.



- Outsourcing—Web hosting services, Internet-related security management, and management of Web page content are new services that will become a \$5 billion market by 2000.
- Processing Services—The market in 2000 for the processing of Internetbased electronic commerce transactions will be over \$5 billion.
- Network Services—On-line gaming services, specialist Internet shopping malls, and object library services are each examples of new Internetbased network services.

Vendors should establish business development groups that are dedicated to the planning, development, and implementation of these new types of services.



Source: INPUT

The migration of applications to the Internet is as fundamental to the success of the Internet technology as an IT platform.



By 2001, all application software products will need to undergo a transformation as users attempt to integrate Internet technology as well as preparing themselves for Y2000.

Software product vendors need to consider how they are positioning their products in terms of:

- Connection—Incorporation of a Web-based front end to an existing application
- Migration—Enhancing or re-writing an application so that it is Webbased
- Innovation—Development of new applications that incorporate functionality that is only available in an Internet environment

The size and growth of expenditure on Internet-related solutions will change the way that application software products are marketed, demonstrated, bought, and maintained.

Electronic software delivery and maintenance has already begun and will become the norm by the turn of the century.

The success of amazon.com in the book selling business will be repeated by an as yet unidentified company obtaining a similar position in software retailing.

#### в

#### **Changes to Application Platforms**

As the platform changes on which applications are developed and processed, the pattern of user expenditure across platforms will change accordingly.

The changing portion of the IT budget spent on Internet applications is shown in Exhibit II-2.





#### Allocation of Application Development Budget Among Platforms

Source: INPUT

It is also a serious threat to vendors who address only the legacy platforms—many who do not prepare for, and embrace, the new platform will go out of business.

This 3-fold increase in the portion of the application development budget allocated to Internet technology-based applications is reflected in the swiftly increasing percentage of users who use the Internet within business.

Exhibit II-3 shows the changing portion of respondents using the Internet.

Exhibit II-2





#### Portion of Respondents Using Internet



Source: INPUT

The migration of applications to the Intranet makes network design and management knowledge as important as database design knowledge for application designers and developers.

This implies a restructuring of developer training curricula and a review of the skills and characteristics sought in applicants for positions of applications designers and developers.

#### С

#### Implications for Network Management

The increased dependence on the Internet and on Internet technology makes network management a critical activity in the IT operation of the future—this presents an excellent opportunity for vendors of Intranet network management services.

A recent INPUT study of Opportunities in Intranet and Internet Management found that for 67% of the respondents (50 users surveyed) there



was a high likelihood of them seeking assistance from vendors for the access to corporate data. Over half of the respondents expect to outsource administrative tasks related to intranet management.

The resource requirements for network management and administration will change as users migrate to Internet-based applications:

- The number of users capable of being managed by a single administrator will increase.
- The number of users requiring management will increase.
- The range of knowledge expected from a network administrator will increase as they have to interact with a broader cross-section of the users.

Respondents were asked how many users they expected a network administrator to be capable of managing in an Internet/Intranet environment compared with a traditional client/server environment. Exhibit II-4 shows the anticipated change in managed population.

#### Exhibit II-4

#### **Potential Administrator Support Requirements**

Application Platform	Users per Administrator
Client/Server	140
Internet/Intranet	350

Source: INPUT



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- Electronic Processes -- How users conduct business
- Enabling Technologies -- What technologies are used to conduct business
- Infrastructure Support -- Which activities support the business
- Market Forecasts
- Vendor Profiles

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- · Competitive analysis
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- · Electronic report delivery

### DATABASES

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- Market Forecasts
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  - Procurement plans (PAR, APR)
  - Market Forecasts
  - Awards (FAIT)

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INPUT provides objective and proprietary analysis of clients' problems and opportunities. Typical projects include:

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- Customer Satisfaction Analysis
  - Competitive Analysis
  - Information Systems Strategy

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# **Revolutionary Migration of Applications to the Intranet**



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replace with about INPUT page



## Abstract

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Applications are being enhanced so that they run across Intranets and the Internet — Internet-technology is becoming a new platform for applications.

This report analyses the progress and users' plans for applications to be processed on an Internet technology-based platform instead of on a traditional client/server or mainframe platform.

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Analysis is provided across all industries surveyed plus industry-specific analysis is available for discrete and process manufacturing and retail and wholesale distribution industries.

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#### **Internet Opportunities Program**

# Revolutionary Migration of Applications to the Intranet

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# Introduction

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

### Purpose Of The Report

This report analyzes users' progress and plans for migrating applications to an Intranet. It focuses on the type of applications that will migrate, the source of these new applications, and the suitability of this new platform for industry-specific applications.

The report answers the questions:

- What industries are the most likely to migrate applications during the next 5 years?
- What are the characteristics of applications that will migrate?
- How will approaches to migration change over the next 5 years?
- Do users plan to extend Intranets to Extranets and encompass business partners?
- What portion of the application development budget will be spent on Intranet/Internet applications?

This report provides insights into the Intranet application migration market for people in roles such as:

- · IS vendor sales and marketing management
- Corporate strategy and planning
- · Software product and services management

1



The forecasts and charts are intended to assist readers in the development of market strategies, business plans, and financial projections. They are also useful for presentations and sales support.

#### в

### Scope of the Report

This study covers migration of applications from traditional platforms to platforms based on Internet technology.

Intranet applications are defined as those using Internet technology and also used within an organization. Internet (Extranet) applications are those which are used by people (customers and suppliers) outside of the organization.

This report includes forecasts of world-wide expenditure on Internet and Intranet services and software products plus forecasts of U.S. Intranet/Internet development services.

### C Methodology

This study is based on primary research.

The source of the information is the analysis of a survey of 102 organizations of varying size in the U.S. in mid-1996.

They were asked to comment on various aspects of migration to Intranets including:

- The migration activities that have and will be performed within their organizations
- · The types of applications they have changed and plan to migrate
- The split of the application development budget across various platforms
- The tools they have used in the migration efforts

The complete questionnaire is shown in Appendix D.



### D Report Structure

The remaining chapters of this report are as follows:

Chapter II is an executive summary of the major findings of the study.

Chapter III is an analysis of user expenditure plans.

Chapter IV examines the types of applications that will migrate to an intranet/Internet.

Chapter V analyses user plans for extending the use of Internet technology to go beyond the organization and to form Extranets.

Chapter VI considers the different approaches to application migration and the tools being used.

Appendix A is a discussion of the evolution of applications. This discussion examines the differences in characteristics between first, second and thirdgeneration applications.

Appendix B provides profiles of the users interviewed for this study.

Appendix C shows INPUT's forecast for user expenditure on services and software related to Internet technology.

Appendix D is the user questionnaire used for this study.

### **Related Reports**

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Other INPUT reports and related material include:

- Use of Internet Appliances in the Corporation, U.S.
- Use of Internet Appliances in the Corporation, Europe
- Worldwide Internet Market, 1995-2000
- Notes' Survival in the Intranet-enabled Corporation
- The Future of Web Software
- Internet Sales and Marketing Directions
- Using the Internet for Business Operations



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REVOLUTIONARY MIGRATION OF APPLICATIONS TO THE INTRANET

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## **Executive Summary**

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Examples of new Internet-related services that will be in this expanded market include:

 Professional Services—The market for Web-site development and implementation services is forecast to be over \$10 billion in 2000. Internet profiling services, allowing analysis of visitors to Web sites and mining of Internet traffic data, will become a key part of sales and marketing activities related to the Internet and will be at least a \$1 billion market in 2001.


- Outsourcing—Web hosting services, Internet-related security management, and management of Web page content are new services that will become a \$5 billion market by 2000.
- Processing Services—The market in 2000 for the processing of Internetbased electronic commerce transactions will be over \$5 billion.
- Network Services—On-line gaming services, specialist Internet shopping malls, and object library services are each examples of new Internetbased network services.

Vendors should establish business development groups that are dedicated to the planning, development, and implementation of these new types of services.



Worldwide Internet Services and Software Market, 1996-2000



Source: INPUT

The migration of applications to the Internet is as fundamental to the success of the Internet technology as an IT platform.

INPUT



By 2001, all application software products will need to undergo a transformation as users attempt to integrate Internet technology as well as preparing themselves for Y2000.

Software product vendors need to consider how they are positioning their products in terms of:

- Connection—Incorporation of a Web-based front end to an existing application
- Migration—Enhancing or re-writing an application so that it is Webbased
- Innovation—Development of new applications that incorporate functionality that is only available in an Internet environment

The size and growth of expenditure on Internet-related solutions will change the way that application software products are marketed, demonstrated, bought, and maintained.

Electronic software delivery and maintenance has already begun and will become the norm by the turn of the century.

The success of a mazon.com in the book selling business will be repeated by an as yet unidentified company obtaining a similar position in software retailing.

#### в

## **Changes to Application Platforms**

As the platform changes on which applications are developed and processed, the pattern of user expenditure across platforms will change accordingly.

The changing portion of the IT budget spent on Internet applications is shown in Exhibit II-2.







Source: INPUT

It is also a serious threat to vendors who address only the legacy platforms—many who do not prepare for, and embrace, the new platform will go out of business.

This 3-fold increase in the portion of the application development budget allocated to Internet technology-based applications is reflected in the swiftly increasing percentage of users who use the Internet within business.

Exhibit II-3 shows the changing portion of respondents using the Internet.





## Portion of Respondents Using Internet



Source: INPUT

The migration of applications to the Intranet makes network design and management knowledge as important as database design knowledge for application designers and developers.

This implies a restructuring of developer training curricula and a review of the skills and characteristics sought in applicants for positions of applications designers and developers.

#### С

## Implications for Network Management

The increased dependence on the Internet and on Internet technology makes network management a critical activity in the IT operation of the future—this presents an excellent opportunity for vendors of Intranet network management services.



A recent INPUT study of Opportunities in Intranet and Internet Management found that for 67% of the respondents (50 users surveyed) there was a high likelihood of them seeking assistance from vendors for the access to corporate data. Over half of the respondents expect to outsource administrative tasks related to intranet management.

The resource requirements for network management and administration will change as users migrate to Internet-based applications:

- The number of users capable of being managed by a single administrator will increase.
- The number of users requiring management will increase.
- The range of knowledge expected from a network administrator will increase as they have to interact with a broader cross-section of the users.

Respondents were asked how many users they expected a network administrator to be capable of managing in an Internet/Intranet environment compared with a traditional client/server environment. Exhibit II-4 shows the anticipated change in managed population.

Exhibit II-4

Application Platform	Users per Administrator
Client/Server	140
Internet/Intranet	350

Source: INPUT

10





## **User Expenditure Plans**

This chapter analyses the expenditure on application migration and on associated services.

Worldwide and U.S. forecasts across all industries are presented plus a breakdown for discrete manufacturing, process manufacturing, and the retail and wholesale trade industries in the U.S.

## A

## Market Forecast

Exhibit III-1 shows the forecast of worldwide user expenditure on software and services related to Internet technology.

During the period 1996-2001 the market will grow at approximately 70% CAGR. This high growth rate will slow by 2001 although the increase in dollar value will continue to grow on a year-by-year basis.

A combination of migration to Internet technology coupled with preparation for Y2000 will drive the expenditure level upwards.

A detailed breakdown of these forecasts for each delivery mode per year is shown in Appendix C.

The U.S. market will account for almost 75% of the total expenditure in 1996. This portion will fall to 50%-55% by 2001.

Professional services is the area of highest growth with an increase of \$44.5 billion in expenditure.



#### Exhibit III-1

Worldwide Internet Software Product and Services Market, 1996-2001



Source: INPUT

If they are to meet this demand, vendors must ensure that plans are put in place as quickly as possible for education and training in the necessary skills and techniques.

The rapid change in technology in this area makes it imperative for ongoing education programs to be in place so that new products may be incorporated as soon as they are recognized as being applicable and acceptable for the market.

There is a myriad of tools coming to market. The importance of identifying the optimum mix of technologies on which to base services and application



development plans will cause vendors to become more critical in their selection process.

### 1. Internet vs. Intranet Expenditure

Exhibit III-2 shows this forecast split between Intranet and Internet-related expenditure.



# Worldwide Intranet/Internet Software and Services

Source: INPUT

The ratio of Intranet-to-Internet expenditure will change dramatically over the next few years as application development attention moves from internally focused applications to become externally focused. This is analyzed in detail in Chapter V where the implementation of Extranets is considered.

Exhibit III-2



## B Source of Applications

These new applications can come from three primary sources:

- · They may be developed in-house
- · The may be bought as fully developed application software products
- · External vendors may be contracted to develop or enhance applications

Users were asked to identify their main source of applications now and in the future. Their responses are summarized in Exhibit III-3.



Intended Source of Internet/Intranet Applications



Source: INPUT

Based on user responses, the portion of applications sourced as software packages will increase by 50% between 1996 and 2000.



Shortage of available applications during 1996 is a strong contributor to the relatively low percentage of applications coming from this source.

There are, currently, no vendors or products dominating the market for software packages based on Internet technology.

Microsoft's Internet Explorer and Netscape's Navigator are classified as system software and not as applications.

The battle for the Internet technology-based office suite market is only just beginning.

Exhibit III-4 shows the forecast user expenditure on Intranet/Internet applications from each of the potential sources.

#### Exhibit III-4



## Worldwide User Expenditure on Internet/Intranet Applications, 1996-2000

Source: INPUT



The markets for in-house development, packaged software, and external development are forecast to grow at 68%, 92%, and 68% CAGR respectively during 1996 to 2000.

This compares with the CAGR for the U.S. professional services and application software product markets which, are 16% and 17%. respectively.

### 1. Industry Variations

Users' views on the sourcing of Internet applications differ significantly between industries.

Exhibits III-5 to III-7 show the responses for all users surveyed, followed by the responses for discrete manufacturing, process manufacturing and retail and wholesale trade industries.



Intended Source of Internet/Intranet Applications— Discrete Manufacturing

Source: INPUT

Exhibit III-5



Based on this sample, the process manufacturing market appears to be more attractive to professional services companies than discrete manufacturing, as a higher portion of applications will be developed externally. However, in the U.S. Discrete Manufacturing industry, the professional services market is forecast to be \$9.4 billion in 1997 compared with \$4.8 billion for professional services in Process Manufacturing.



Intended Source of Internet/Intranet Applications-

Exhibit III-6



The most significant difference is between the combined responses of the Retail and Wholesale Trade industries and the other industries.

The high proportion of in-house development in Retail and Wholesale Trade indicates that these are industries with excellent potential for software development tool vendors, yet of relatively low appeal to professional services vendors.



Education and training services vendors should target users in the Retail and Wholesale Trade industries with services to enhance the in-house development capabilities.

#### Exhibit III-7



Intended Source of Internet/Intranet Applications— Retail and Wholesale Trade

Source: INPUT





# Types of Internet/Intranet Applications

This chapter analyzes users' views of the type of applications that will migrate to be based on Internet technology.

## **Factors Affecting Migration**

#### 1. Application Characteristics

Vendors of Internet development and migration tools and services should establish a profile of Internet application characteristics as an aid to targeting the sales and marketing of their products.

Users were asked for their views regarding characteristics of applications that might make the Internet an appropriate operating platform. These characteristics are rated in Exhibit IV-1.

The "large, geographically distributed user base" scored high by our surveyed users. About 75% rated this characteristic at 4 and above; with 50% rating it as very important (5 rating).

A wide geographic spread of users should be one of the key determinants when considering whether or not to move an application to the Internet.

"Interaction with Customers/Suppliers" was another highly rated characteristic with 78% of respondents rating it at 4 or 5.



INPUT

Exhibit IV-1



## Appropriate Application Characteristics for Internet Usage

The rating for how appropriate is transaction-oriented functions was low across all vertical markets and independent of the year in which Internet usage was expected to start.

Transaction oriented functions are more likely to be a part of Internet or Extranet applications between two companies (customer and supplier).

Although there is much media attention to electronic commerce over the Internet, INPUT estimates that the total expenditure on Intranet-based applications is currently four times as great as the Internet-related expenditure.

The user survey for this study found that there is variation among industries regarding the appropriate characteristics of applications based on Internet technology.

Source: INPUT



Exhibit IV-2 shows the rating of users in the discrete manufacturing industry regarding the characteristics of Internet technology-based applications.

Out of 14 respondents from the discrete manufacturing industry, 10 rated the diverse number of client devices as an extremely appropriate characteristic (5 on a 1-5 scale). This highlights the great potential of this industry as a large market for network computers/Internet appliances.

#### Exhibit IV-2

## Appropriate Application Characteristics for Internet Usage in Discrete Manufacturing



Source: INPUT

Internet application software product and services vendors need to map the features of their products against the desired characteristics of the targeted industries and should not assume a common profile across all industries.



#### 2. Cross-Industry Applications

Exhibit IV-3 shows user rating of suitability of using an Internet platform for a variety of cross-industry applications.

Accounting and finance is the type of cross-industry application that is expected to have the greatest increase in suitability for migration to Internet-based platforms between 1996 and 2000.





## User Rating of Internet Platform Suitability for Cross Industry Applications

Source: INPUT

The increase in user rating of suitability of accounting and finance applications is 1.1 (on a 1 to 5 scale) across all users surveyed. This is the largest increase for all the cross-industry application types.

Despite having this increase in rating of suitability, accounting and finance remains the cross-industry application rated as least suitable for use with an Internet platform.



This result is consistent across the total surveyed population as well as within each of the 3 industry groupings of discrete manufacturing, process manufacturing and retail and wholesale trade.

Vendors should note that for all types of cross-industry application, users give a relatively low rating for the current suitability these applications being based on Internet technology-based platforms.

The ability to demonstrate successful implementations at reference sites is essential in this stage of the development of the Intranet/Internet marketplace.

#### 3. Industry Suitability

Exhibit IV-4 shows the industries receiving the highest rating for Internet platform suitability in 2000 plus the corresponding rating for 1996.



Highest User Ratings of Suitability of Internet Platform for Vertical Market Applications

Source: INPUT

INB6

Exhibit IV-4


Exhibit IV-5



### Lowest User Ratings of Suitability of Internet Platform for Vertical Market Applications

Source: INPUT

The manufacturing industries (discrete and process) received the lowest ratings of suitability for 1996 and for 2000.

Users within an industry do not rate the suitability of their own industry significantly different from users in other industries.

The only exception to this was found in the discrete manufacturing industry where users within the industry increased their combined rating from 2.3 to 3.7 but other respondents had a corresponding increase from 2.4 for 1996 to 3.3 in 2000.

The change in responses from the discrete manufacturing industry users is shown in Exhibit IV-6.



Exhibit IV-6

Rating of Internet Platform Suitability in Discrete Manufacturing by Users in the Industry



Source: INPUT

In all cases, the respondents increased their rating indicating they think Internet technology will be more suitable in 2000 within the discrete manufacturing industry.

### 4. Probability of Migration

Users were asked to rate the likelihood that applications currently running on certain platforms would migrate to an Internet platform. A summary of the responses is shown in Exhibit V-7.

The least likely source of migrating applications is the mainframe. 50% of respondents thought that mainframe application are unlikely to migrate to use an Internet platform i.e. they gave a rating of 1 or 2 on a scale of 1 to 5.

However, 70% of respondents expect client/server applications to migrate.



Exhibit IV-7



Source: INPUT

### 5. Type of Applications Using Internet Technology

Intranet/Internet-based solutions will be implemented across departmental and enterprise application areas at different speeds.

Exhibit IV-8 and Exhibit IV-9 depict the responses given by users who said they are or will use Internet/Intranet applications and the areas in which they will be implemented.

These charts show the changing mix of pilot applications, departmental applications, and enterprise-wide applications. They provide insight into the rate of deployment of live applications over the next 4 years.



Exhibit IV-8



### Where Internet Technology Is and Will Be Used (By Type of Application)

No. of responses: 1996 - 65, 1998 - 88, 2000 - 88

Source: INPUT

INPLIT

Exhibit IV-8 presents the data according to the type of application.

The areas of significant change over the next 4 years are the percentage of pilot applications and the percentage of enterprise applications that will use Internet technology.

The portion of pilot applications in 2000 will be only a sixth of the 1996 level indicating a rapid move to implementation of live systems during that time.

The portion of enterprise applications using Internet technology will double in the same time period.

Exhibit IV-9 shows the same data but groups the 3 types of applications together for each year.



Exhibit IV-9



# Where Internet Technology Is and Will Be Used (By Year)

No. of responses: 1996 - 65, 1998 - 88, 2000 - 88



Exhibits IV-10, IV-11, and IV-12 show the corresponding data for respondents from discrete manufacturing, process manufacturing, and retail and wholesale trade industries.

Discrete manufacturing is moving far more quickly than other industries to embrace Internet technology as a platform for applications.



Exhibit IV-10



### Type of Internet-Technology Usage— Discrete Manufacturing

Source: INPUT

Enterprise applications will implement Internet technology faster in discrete manufacturing than in other industries. This is consistent with the rapid increase in suitability of the Internet for this industry, as identified in Exhibit IV-6.

Vendors must be prepared for shorter pilot implementations and rapid rollout in this industry.



Exhibit IV-11



### Type of Internet-Technology Usage— Process Manufacturing

Source: INPUT

In the process manufacturing industry there are a relatively greater number of pilot sites than in discrete manufacturing and retail and wholesale trade in 1996 but, by 2000, few pilot site will exist — they will have moved to full implementation.



Exhibit IV-12



### Type of Internet-Technology Usage— Retail and Wholesale Trade

Source: INPUT

Retail and wholesale trade is the only area to indicate a changing proportion of departmental solutions. The manufacturing industries maintain a constant portion of departmental applications (approximately 25%-30%), but the percentage for retail and wholesale trade drops by two thirds by 2000.

In this industry, the use of Internet is more to enable improved customer and supplier interaction rather than internal departmental solutions. 100% of respondents from retail and wholesale trade responded that they would be implementing an Extranet in the future.

31



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# Plans for Extending Intranets to Extranets

The uniqueness of the Internet encourages managers to look outside the corporation for utilizing applications.

Extending a company's applications beyond the boundaries of the corporation and interacting with suppliers and customers provides opportunities to vendors for consulting, development, implementation, and operation management services as well as for product vendors.

### А

### Use of Internet for Trade

Usage of the Internet by business has moved at a furious pace over the last two to three years. However, use of this new medium for the purchase of goods and services is still immature.

The changes taking place within this market are studied within INPUT's Electronic Commerce program. As part of this program forecasts have been established of the value of goods and services traded electronically. The forecast of the portion of these goods and service traded via the Internet is shown in Exhibit V-1.



### Exhibit V-1

### Worldwide Value of Goods and Services Traded via Internet, 1996-2001

	1996	2001
EDI	\$50 Million	\$140 Billion
Non-EDI Business-to-Business	\$200 Million	\$160 Billion
Business-to-Consumer	\$250 Million	\$53 Billion

Source: INPUT

### в

### User Plans for Extranet Implementation

Users were asked if they have implemented an Extranet, if they plan to implement one in the next two years or if they no plans in this area.

Although the combined responses indicate that 16% of respondents already have an Extranet in place and a further 79% plan an Extranet in the future, there is considerable difference between the various industries (see Exhibits  $V_2$  and  $V_2$ ).

The most extreme set of responses came from the Retail and Wholesale Trade industry respondents. Although none of these respondents currently have an Extranet in operation, all of them plan to do so within the next 2 years.



Exhibit V-2

# <section-header>

Source: INPUT



Exhibit V-3



### Note: Numbers have been rounded

Source: INPUT

If these plans are to be achieved then external assistance will be required.

Opportunities are available to vendors who differentiate themselves with easy to install and integrated packaged software as well as to consulting, development and implementation service vendors.

Exhibit V-5 shows the forecast user expenditure on software and services split between Intranet applications (i.e. internal to a company) and Internet applications (i.e. software and services that go beyond the boundary of the corporation).

This is an area of dramatic growth with the compound annual growth rates of expenditure on Intranet and Internet software and services being 56% and 70%, respectively for the period 1996 to 2001.





### Exhibit V-4 U.S. Intranet/Internet Application Development Services Market,

Source: INPUT

INPUT

Expenditure on Intranet development services will grow at 36% CAGR compared with the 70% CAGR for Internet-based application development.

The primary reason for this difference in growth rates is that over the next two to three years the focus of application development will change from internally-focused applications to externally-focused (electronic commerce) applications.



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## **Application Development Activity**

### Α

### Types of Migration Activity

There are three principal types of application development activity when moving towards an Internet-based environment:

- Connection: linking back-office systems and existing applications to the Web
- *Migration*: porting or rewriting existing applications for the Internet platform
- · Innovation: developing entirely new applications to your Intranet

Exhibit V1-1 indicates users views of the change in the mix of these activities over the next few years.

39





Exhibit VI-1

Note: Numbers have been rounded

Source: INPUT

This chart indicates that a high proportion (37%) of users are already looking beyond just migrating existing applications and are developing completely new applications.

The current interest in connecting existing applications to the Internet will rapidly diminish in importance.

This should serve as a warning to vendors of applications software products who hope to satisfy the demand for Internet-related features by adding a Web-based front end—this is only a short term solution. Users expect these products to become Internet-based, not just Internet-linked.

Vendors of software products that assist in connectivity should consider this to be a short-term market. Users indicated that their focus on this area will have reduced by almost two-thirds by 2000.



The most dramatic change in application focus is in the Retail and Wholesale Trade industries. Exhibit VI-2 shows the intentions of the users surveyed from the Retail and Wholesale Distribution industries.

### Exhibit VI-2



# Focus of Application Development Activity in Retail and Wholesale Distribution

Note: Numbers have been rounded

Source: INPUT

Year by year the reduced attention being paid to the area of connectivity will be compensated for by the increase in development of new applications.

This is a critical area for software product developers, professional services and systems integration vendors as they must be prepared for these changes and in the changing set of skills and tools required.

Users were asked what Internet-based language did they use or were they planning to use to develop their Internet applications.

INPUT


Exhibit VI-3



### Development Languages Used for Internet-based Applications

Source: INPUT

INPUT

The Java Internet platform consists of the Java programming language and interpreter, a set of APIs enabling developers, to create applications that are interoperable with existing non-Java-based applications.

Tools are being developed to support three-tier implementations of Java allowing users to partition application logic into parts that run on the browser and application (Web/Java) server.

The high proportion of users identifying that they use Java does not imply that they are satisfied with the maturity of the Java tools as can be seen in Exhibit VI-4.





## User Views on Java Tool Readiness



Source: INPUT

This pattern of response does not change significantly even the sample is restricted to those who use Java in their Internet application development.

This indicates that many users are will to try new development tools even though they do not consider the tools mature—this state of affairs is expected to last no more than 2 years. By 1999, users will become more selective and critical in their choice of intranet and Internet development tools.

## B Application Leasing

Users' views on the potential for the leasing of Internet applications differ significantly between industries.



Exhibits VI-5 shows the responses for all users surveyed.

There was little difference in the responses when analyzed industry-byindustry.

The question asked to the survey was whether they expected to "leasing" applications from vendors over the Internet in the future



# Likelihood of Users Leasing Software

Source: INPUT

Users are expecting to see sharing of centrally stored applications as part of the Internet environment. This approach complements the introduction of network computers.

This new environment will result in reduced cost of software upgrades and version management. Some users may rethink plans for outsourcing this aspect of desktop services.

Exhibit VI-5





# The Evolution of Applications

This appendix discusses evolution of applications from legacy to client/server and now to the Internet. It discusses the costs of client/server applications and the incentives for moving applications to the Internet platform.

In the past, software vendors have struggled to build cost-effective, manageable, and scaleable applications. Applications originated as hostcentric, and continue to evolve through generations of client/server as summarized in Exhibit A-1.

Mainframe-based, or host-centric, information systems were designed to maximize processing efficiency, but not necessarily usability. Data and logic, though centralized, was often tied to a single vendor solution.





Application Evolution



Source: INPUT

The original impetus in organizations moving to first generation client/server was to move CPU cycles to more economical platforms, such as minicomputers and PCs.

In the 1980's, billions of dollars were invested in desktop hardware and software, with graphical interfaces that were easier to learn and use, and a desktop configuration that was inherently individual.

Client/server systems improved user interfaces, but ultimately introduced new complexities in system configuration and maintenance. In fact, the problem got worse.

Second generation client/server systems introduced a middle tier to improve logic reuse and allow users to mix and match different databases. But some logic and data remained on the clients, requiring users to deploy, update, and maintain platform-specific, client-side software.

The new generation of client/server systems brings the computing world back to the days of mainframe maintenance by eliminating stored client-side software yet continue the advances in user interface and mix-and-match client options.

These applications are developed on a platform which fuses the ease of use and deployment of the Internet with the performance and extensibility of



today's client/server technologies. As Object Request Broker (ORB) technology is integrated into Web browsers, next generation applications based on components, such as Java, will begin to replace traditional client/server applications.

A number of large software vendors have object-oriented versions of their client/server enterprise applications in development. These next generation client/server applications promise to lower maintenance and training costs, and support a wider range of distributed clients and servers.

Not only do these applications allow companies to extend their reach to customers, suppliers, and business partners, but also allow applications to link and interact with other applications and services across corporate boundaries.

## B Benefits of Next Generation Applications

The client/server era emerged as a means of addressing the issue of managing desktop systems in an enterprise environment. Traditional client/server systems rely on proprietary network protocols, whereas thirdgeneration client/server systems use the open, Internet protocol. Architectural differences of client/server systems are summarized in Exhibit A-2.

#### Exhibit A-2

## Architectural Characteristics of Client/Server Systems

Need	1 <sup>st</sup> Generation 2 <sup>nd</sup> Generation		3 <sup>rd</sup> Generation	
Scope	2-tier	2-tier 3-tier		
Network protocol	Proprietary	Proprietary	Open (TCP/IP)	
Client-side software	Platform-specific	Platform-specific	Platform-independent	
User interface	GUI	GUI	Visual objects	
Middleware	Stored procedures	ORBs over Proprietary Networks	ORBs over Internet (IIOP)	
Re-use of business logic	No	Yes	Yes	

Source: INPUT

The Internet has brought about a revolution in computing and will offer many benefits to users of next generation client/server applications.

Key among these are application flexibility and re-configurability, open application interaction, continuous application enhancement, lower IT costs, and applications that extend beyond the boundaries of the enterprise.



# C Flexibility

The crucial piece of distributed object computing which drives both flexibility and scalability is messaging.

Through encapsulation the application is shielded from the operating environment and separate discrete business processes from one another. Each of these processes can run on the same or different platforms and is invoked via a message. Each discrete business process or event can be a client requesting information, a server supplying information, or both to another event.

Flexibility characteristics of the client/server systems are summarized in Exhibit A-3.

#### Exhibit A-3

## Flexibility Characteristics of Client/Server Systems

Need	1 <sup>st</sup> Generation	2 <sup>nd</sup> Generation	3 <sup>rd</sup> Generation	
Scalability	Departmental	Intra-Enterprise	Inter-Enterprise	
Number of servers	One	1-3 Thousand		
Load balancing	2-tier	3-tier	n-tier	
Number of client devices	Less than 50	Less than 500	Millions	
Use of Internet appliances	No	No	Yes	
Ability to mix database types	No	Yes	Yes	
Modify system to meet specific customer needs	Difficult	Difficult	Easy	
Modify software to meet changing needs of enterprise	Difficult	Difficult	Easy	
Implementation when combined with BPR	Difficult	Difficult Manageabl		

Source: INPUT

#### 1. Scaleable

Applications servers built on a distributed and scaleable architecture can scale from three-tiered environment to an n-tier environment, capable of handling loads required by distributed applications and of optimizing application processing.



Third-generation client/server applications also introduce a middle tier, similar to second generation applications, which allow users to use any type or combination of standard database solutions.

#### 2. Hardware Advantages

It is impossible in developing and designing third-generation systems to predict the range of clients or servers likely to be supported over the life of a system. Clients need to be separated from servers.

Hence, Internet servers and browsers from companies like Netscape and Open Market are increasingly being used as platforms for third-generation applications.

#### a. Server

Next generation applications utilize distributed servers, upon which reside business applications or objects to be accessed by clients across the Internet. The servers represent a range of price/performance points to be tailored to specific applications, but they share the common features of interfacing with legacy code and databases and delivering application services to client devices. "Application server" is a logical distinction and may be combined with Web or object servers.

#### b. Client

Because applications are independent of the underlying target client device, the same application is dynamically downloadable, without modification, to a broad range of client devices including "smart" telephones with displays, point-of-sale devices, PC's, workstations, Internet appliances, set-top boxes, and more.

As discussed in INPUT's report Use of Appliances in the Corporation, U.S., over 34% of the client devices purchased by corporations will be Internet appliances, or network computers, by the year 2000. This will ensure the widest possible audience for these next generation applications.

Next generation applications will allow companies to select the client-side device with the best price/performance for each particular user.

Next generation architecture are resilient to changes in underlying hardware and network technologies.

With next generation client/server applications, object browsers and crossplatform, architecture-neutral components replace platform-specific, clientside software. Applications are built from components that assemble in realtime at the client device.



It is important to differentiate between "connecting" an application to the Internet and migrating the application to the Internet.

Today, a number of software vendors have introduced products that simply connect the existing application to a Web front-end. These connections, however, do not maintain state, nor do they manage sessions, because they use the HTTP protocol.

#### 3. Open Application Interaction

Next generation applications developed on open infrastructures assemble as components in real-time. These applications allow for the interaction with clients, other next generation applications and objects, and other Internet services.

#### a. Managed Interaction with Clients

Although the HTTP protocol is efficient for downloading static HTML pages, it is not well suited for deploying interactive applications over the Internet.

Next generation applications maintain information about the session with the client and about the client's current state by employing the IIOP over the Internet.

They also have a mechanism for managing the client sessions so that transactions can be completed or rolled back if a client should lose a connection with a server in the middle of a transaction.

Next generation applications allow remote branches and external organizations to connect into mainstream corporate environments. They enhance the ability to further extend their reach to "casual" and traditional end-users in and outside of an enterprise.

#### b. Interaction with Other Applications

With third-generation applications, leading-edge users are able to accelerate processes the most by linking systems across enterprise boundaries.

Traditional C/S technology based on stored procedures and remote procedure calls is not general enough for many inter-enterprise applications, so companies are turning to object technology for their system connectivity.

As applications are developed using object technology and accessed by object browsers, they will be able to interoperate with other CORBA-compliant applications, and even cross the boundaries of the enterprise.



- This flexibility allows the enterprise to adapt its application architecture to meet changing business or computing requirements.
- These applications will allow for greater interaction with customers, suppliers, and external Internet services.
- Applications developed on open platforms also allow companies to easily integrate their systems with those of newly acquired businesses.

Third-generation client/server applications will provide "plug and play" capabilities with other next generation enterprise systems, or application objects. These applications enable transactions to cross enterprise boundaries and interact with more than one business application, even if they use different underlying object programming languages. For example, potential applications enable transactions that synchronize purchase orders and invoices between different companies through the use of open object technology.

It is important to note that any application that is not based on the object model is less likely to achieve this level of sophistication, because they lack the true scalability provided by messaging. For example, SQL alone does not permit the distribution of function across multiple platforms. This approach in an application would limit its technological evolution.

Traditional application architectures are difficult to integrate with other services and applications and must rely on proprietary APIs to enable applications to interact. For example, SAP announced the Business Application Programming Interface (BAPI), sponsored by SAP and Microsoft, which allows independent R/3 systems to create business-to-business matching.

Although these APIs allow for interaction between independent SAP systems, they are not flexible enough to cooperate with existing applications from different vendors. Common object-oriented standards, such as those proposed by the Open Application Group (OAG), better serve the needs of IS managers.

Next generation applications break the enterprise software monopoly model and allow companies to select best-of-breed components to build enterprise solutions. For example, an HR application developed by one vendor with third-generation architectures could interact with a financial application developed by another vendor which uses third-generation architectures.



#### 4. Continuous Application Enhancement

Multi-tiered, object-oriented applications allow for fast incremental improvement of software. They are architected to accommodate change and facilitate the changing model of business. Next generation applications which utilize object technologies and platform-independent programming infrastructures can more easily handle the evolution of a company's business model than first and second generation applications.

Applications will exist as a set of objects, business rules, and data models in an object repository. These objects, business rules, and data models are independent of any specific platform, database, or execution environment. With repositories, users will be able to take advantage of improvements in computing technology without having to re-engineer the application.

Since next generation applications are programmed using objects, re-use is promoted, which, in turn, increase, reliability. Java promotes good software engineering practices with clear separation of interfaces and implementations and easy exception handling.

Applications which use the CORBA framework also allow support from thirdparty vendors to develop additional business logic stored in object repositories.

Software vendors developing third-generation solutions will be able to publish objects allowing third-party vendors to build complementary applications integrate easily. Users will benefit because they will be able to choose best-of-breed solutions that are easy to integrate and manage.

Traditional applications that do not support open standards cannot be easily expanded.

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# **Cost Characteristics of Client/Server Systems**

Traditional client/server applications are inevitably limited in the number of client-side applications due to the cost of development, distribution, installation, and maintenance. With all of the business logic located on the client device, making changes to applications requires re-deployment of software to every client device. This effort is both costly and timeconsuming. Exhibit A-4 summarizes the cost differences of client/server systems.



Exhibit A-4

## **Cost Considerations of Client/Server Systems**

Need	2 <sup>nd</sup> Generation	3 <sup>rd</sup> Generation	
Client software platforms	Many	One	
Software deployment	Difficult & costly	Instant & inexpensive	
Software updates	Difficult & costly	Instant & inexpensive	
System Management	Difficult	Moderate	
Movement of desktop files when person changes location	Yes	No	
Hardware maintenance	Difficult & costly	Very little & inexpensive	
Training	Moderate	Low	

Source: INPUT

#### 1. Reduced Maintenance Requirement

The motivation to move to ORB-based applications is to provide interoperability across a network. Traditional systems architectures are too complex. They do not mask network complexities from the programmer. Some observers estimate that 80% of IS budgets is for maintenance.

Next generation applications significantly reduce the cost model for client/server because they deploy a zero installation/administration client.

Client software management is greatly reduced with next generation applications.

All code, data, and configuration information is stored and managed centrally. Use of other Internet services such as directory, naming, and security decreases IT administration costs because individual application preferences are stored centrally. Policies specifying which applications and services can be accessed are set centrally.

Since there is no permanent client code, there is no client state to manage. Agent-based architectures reduce the deployment and administration effort for distributed applications by automatically launching objects, tracking their state and adapting to their changing resource requirements.

Another advantage of next generation applications is that there is no need to move desktop computer files when a person is moved. In fact, users may log on anywhere they can access an intranet and have full access to the application, even if they are working at home.

INB6



All permanent state information is maintained in the application server, not on the desktop.

Companies are able to swap components in and out of a system to support new hardware, failed client devices, and make business changes.

According to Sun Microsystems, the projected cost of data-less thin clients with all applications and data files stored on servers and generally executed on clients that include a hard disk for virtual memory is less than \$2,500 per seat per year. This estimate is based upon an analysis and extension of the cost elements of a homogeneous data-less environment that has already been implemented by Sun internally.

#### 2. Less Training

An incentive for customers moving to Java and object browsers is to provide more flexible user interfaces. Just as Windows and the MacOS had a profound impact on the look of applications, Java and ActiveX promise new user interfaces. For example, one can display a compound document that shows embedded buttons and a moving ticker tape of stock prices using Java.

Animated applications and games will be beneficiaries of component software on the desktop.

Applications that are simply "connected" to a Web front-end do not benefit as greatly as those which are re-architected for the Internet platform. Next generation applications are those that lend themselves to the "Web experience" and run in familiar browser interfaces and are governed by "point and click".

New, third-generation client/server applications are designed with the Web browsers in mind. Applications that are simply connected to a Web browser do not lend themselves to the Web experience. Applications which fall under this category are re-architected in order to retain the Web format to which users have become accustomed. The familiar Web interface leads to reduced training costs.

They present data in a meaningful, intuitive manner. Users of next generation applications require less training than those using traditional user interfaces.



# F Conclusions

Next generation applications can provide substantial improvements in enterprise-wide software maintenance and re-usability.

Internet technology will dominate the future of software services and applications development.

Next generation enterprise software will have to be implemented using object technology because current procedural methods and tools cannot support the complexity of the operating system and network management needed to control the infrastructure.



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# **User Survey Demographics**

Exhibit B-1 shows the breakdown of survey respondents by industry. Ninety nine (99) respondents were surveyed for this study.

#### Exhibit B-1

Industry	Respondents in Industry
Banking and Finance	6
Business Services	9
Discrete Manufacturing	16
Insurance	8
Government - Federal	2
Health Services	3
Process Manufacturing	22
Retail and Wholesale Trade	17
Transportation	7
Telecommunications	1
Utilities	8
99 Respondents	Source: INPUT User Survey

Survey Respondents by Industry

Source: INPUT User Survey

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 $\operatorname{Exhibit}$  B-2 shows the distribution of respondents' company size by annual revenues.

#### Exhibit B-2

# Survey Respondents by Annual Revenues

Annual Revenue (Assets for Banks)	Number in Sample
Over \$5 Billion	33
\$1Billion - \$5 Billion	46
\$500 Million- \$1 Billion	14
Under \$500 Million	2
Not Known	4

99 Respondents

Source: INPUT User Survey





# **Internet Market Forecasts**

Exhibit C-1

# Worldwide Intranet/Internet Market, 1996-2001

	1996		1997		1998	
Delivery Mode	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)
Professional Services	4	1.5	7	3	11	6
System Software Products	3	1	7	2	12	3
Application Software Products	2	1	6	2	9	4
Network Services	0.5	2.5	1	5	2	8
Outsourcing	1	0	1.5	0.5	2.5	1.5
Turnkey Systems	1.5	0.5	2.5	0.5	3.5	1.5
Systems Integration	1	0	2.5	0.5	3.5	2
Processing Services	0	0.5	0	1	0	3
Total Worldwide Forecasts	13	7	27.5	14.5	43.5	29

	1999		2000		2001	
Delivery Mode	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)
Professional Services	17	12	22	18.0	25	25
System Software Products	15	4	25	6.0	32	8
Application Software Products	13	6	19	9.0	24	12
Network Services	2.5	11.5	3	14.0	4	17
Outsourcing	5	3	8	8.0	11	11
Turnkey Systems	6	3	10	5.0	13	7
Systems Integration	5	4	8	6.0	10	8
Processing Services	0.5	6	1	8.0	1	12
Total Worldwide Forecasts	64	49.5	96	74.0	120	100

Source: INPUT


## Exhibit C-2

## U.S. Intranet/Internet Market, 1996-2001

	19	96	19	97	19	98
Delivery Mode	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)
Professional Services	2.9	1.1	4.9	2.2	7.4	4.2
System Software Products	2.2	0.8	4.9	1.5	8.0	2.1
Application Software Products	1.5	0.8	4.2	1.5	6.0	2.8
Network Services	0.4	1.9	0.7	3.7	1.3	5.6
Outsourcing	0.7	0.0	1.1	0.4	1.7	1.1
Turnkey Systems	1.1	0.4	1.8	0.4	2.3	1.1
Systems Integration	0.7	0.0	1.8	0.4	2.3	1.4
Processing Services	0.0	0.4	0.0	0.7	0.0	2.1
Total US Forecasts	9.5	5.3	19.3	10.6	29.1	20.3

	19	99	20	000	20	01
Delivery Mode	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)	Intranet (\$B)	Internet (\$B)
Professional Services	10.2	8.0	12.1	10.8	12.5	13.8
System Software Products	9.0	2.7	13.8	3.6	16.0	4.4
Application Software Products	7.8	4.0	10.5	5.4	12.0	6.6
Network Services	1.5	7.7	1.7	8.4	2.0	9.4
Outsourcing	3.0	2.0	4.4	4.8	5.5	6.1
Turnkey Systems	3.6	2.0	5.5	3.0	6.5	3.9
Systems Integration	3.0	2.7	4.4	3.6	5.0	4.4
Processing Services	0.3	4.0	0.6	4.8	0.5	6.6
Total US Forecasts	38.4	33.2	52.8	44.4	60.0	55.0

Source: INPUT





## **User Questionnaire**



## **Enterprise Application User Questionnaire**

This survey is to determine your perceptions of applications developed on various platforms such as legacy, client/server and Internet, and to understand your plans in this area over the next four years.

<u>Internet applications</u> are defined as those developed using an object-oriented language, such as Java or ActiveX, and accessed using a standard Web browser, such as Netscape Navigator.

1. Are you using the Internet for applications in 1996? 1998? and will you be using it in 2000?

Would you describe for me the percent that are departmental applications, pilot applications, or enterprise-wide applications?

Use of Internet Applications	1996	1998	2000
% NO USE			
% PILOT			
% DEPARTMENTAL			
% ENTERPRISE			



2. On a scale of 1 - 5, how would you rate the following characteristics in terms of their appropriateness for programming for the Internet platform?

- \_\_\_\_ Large, geographically distributed user base
- \_\_\_\_ Timeliness of application access
- \_\_\_\_ High frequency of user and business function interaction
- \_\_\_\_ Transaction-oriented business functions
- \_\_\_\_ Multiple database access
- \_\_\_\_ Diverse number of client-side devices
- \_\_\_\_ Interaction between the application and customers/suppliers

3. On a scale of 1 - 5, how well suited do you think the Internet platform is for the following <u>cross-industry</u> applications (1=not suitable, 5=very suitable),now and in the year 2000?

	1996	2000
Accounting & Finance		
Engineering & Scientific		
Human Resources		
Office Automation		
Planning & Analysis		



4. On the same scale of 1 - 5, how well suited do you think the Internet platform is for the following <u>vertical industry</u> applications (1=not suitable, 5=very suitable), now and in the year 2000?

	1996	2000
Banking & Finance		
Business Services		
Education		
Government		
Health Services		
Insurance		
Manufacturing, Discrete		
Manufacturing, Process		
Retail & Wholesale		
Media & Entertainment		
Transportation		
Utilities		

5. On a scale of 1 - 5, how likely do you think the following types of applications will migrate to the Internet platform? (1=not likely, 5=very likely)

Mainframe (COBOL, etc.)	
Mini	
Client/Server	
Desktop (Windows, Macintosh)	



6. Where do you plan to focus resources on developing applications for your Internet [percent]? Will you focus on connection to the Internet, migration of applications to the Internet or developing entirely new applications for the Internet?

Focus	% 1996	% 1998	% 2000
<b>CONNECTION</b> - Linking back-office systems & existing applications to the Web			
MIGRATION - Porting or rewriting existing applications in Java or ActiveX to the Internet platform			
INNOVATION - Developing entirely new applications on your Intranet			
OTHER			

7. Do you plan to extend your company's applications beyond the boundaries of the corporation and interact with suppliers and/or customers? (such as already extended, will extend applications in the next two years, or no plans)

8. Does the time and costs involved with the distribution and installation of client-side software in multiple locations on multiple platforms keep you from releasing (or deploying) (initial or more) <u>client/server</u> applications?



9. Do you feel Internet applications eliminate much of the time and cost associated with the release (or deployment) of client/server applications?

10. Approximately how many users do you think can be supported per administrator for applications developed for the various platforms?

	Users/Administrator
Client/Server	
Internet/Intranet	

11. How much of your total IT budget will be allocated for <u>developing</u> <u>applications</u> for the Internet platform (Java, ActiveX) as compared to other platforms such as Client/server and legacy platforms?

	1996 (%)	1998 (%)	2000 (%)
INTERNET			
CLIENT/SERVER			
LEGACY			



	1996 (%)	1998 (%)	2000 (%)
IN-HOUSE DEVELOPED			
CUSTOM / EXTERNAL DEVELOPED			
OFF-THE-SHELF APPLICATIONS			

12. What will be your main source of Internet applications, now and in the future?

13. What Internet-based language do you already use or plan to use to develop your Internet applications?

	% Internet Applications
Java	
ActiveX	
C/C++	
Other	
None	



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14. What are your thoughts on the maturity of Java development tools for application deployment? (check one)

NOT READY	
WILL BE READY IN NEXT YEAR	
WILL BE READY IN TWO YEARS	
NOT SURE	

15. As applications migrate to the Internet platform, do you think you will someday "lease" applications from vendors over the Internet (service bureau concept) to run various aspects of your business?

16. Do you have any other thoughts on the migration of applications to the Internet?

Thank you very much for your time and consideration.

