Software Products

SP-1

INPUT

Notes

Software Products Market Forecast

INPUT

Notes

Software Product Environment

- User needs
- Technology
- Business environment
- Complementary services

INPUT

Notes

User-Related Driving Forces

- "Standards"
- Scaleability
- Multi:
  - Vendor
  - Tasking
  - User
- "Transparency"

INPUT

Notes

User Needs

- Application sophistication
- Heterogeneous hardware/environment
- Dynamic connectivity/cooperative processing
- Resource sharing/groupware

INPUT

SP-5a

Notes

User Needs

- Improved user productivity
- Workstation support
- Image processing
- Improved development process

SP-5b

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Notes

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Technology Impacts

- New platforms/devices
  - AS/400, PS/2, parallel processors, supercomputers, RISC
- Networking/LANs

INPUT
MPRE-62a

Notes

Technology Impacts

- Improved resources
  - Memory, storage, MIPS
- On-line transaction processing
- Multimedia
- Image/video

INPUT
MPRE-62b

Notes

Technology Impacts

- Operating systems
  - UNIX, Pick, OS/2, MS/DOS
- Server/client relationships
- Cooperative processing
- Image processing

INPUT

Notes

Software Products Market Trends

- Enterprise-wide data access
- Distributed processing
  - Client/server/cooperative processing
  - Peer-to-peer processing
- Object-oriented technologies
- Focus on interoperability

INPUT
MPRE-63

Notes

Software Products Market Issues

- Hardware and software development moving toward synchronization
- Software vendors promoting a number of "de facto" standards
- Technical, not market, differentiation

INPUT
MPRE-408

Notes

Software Products
Market Issues

- Software complexity increasing
- Development resources decreasing
- Product life cycles
- Capital supply constraints
- Redundant software products

INPUT
MPRE-409

Notes

Vendor-Related Driving Forces

- Computer equipment
  - Link disparate product lines
  - Leverage system software
  - Leverage 3rd party software relationships

INPUT

SP-12a

Notes

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Vendor-Related Driving Forces

- Computer software
  - Leverage software development efforts
  - Maximize equipment vendor relationships

SP-12b

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Notes

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Complementary Services

- Consulting
- Education and training
- Software development
- Systems integration
- Software integration

INPUT

Notes

Leading Software Market Trends

- Standards
- Internationalization
- Company-wide project management software
- Bundled solutions

INPUT

Notes

Leading Software Market Trends

- Mergers/acquisitions
- Alliances
- Open systems architectures
- Products and services markets blurring
- Cooperative processing models

INPUT

Notes

Software Products

Systems Software	Applications Software
• Mainframe	• Mainframe
• Mini	• Mini
• Micro/workstation	• Micro/workstation

INPUT

Notes

Systems Software Products

- Application development tools
- Data center management
- Systems control

SP-17

INPUT

Notes

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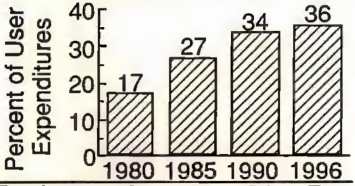
Software Products Portion of Information Services, 1980-1996



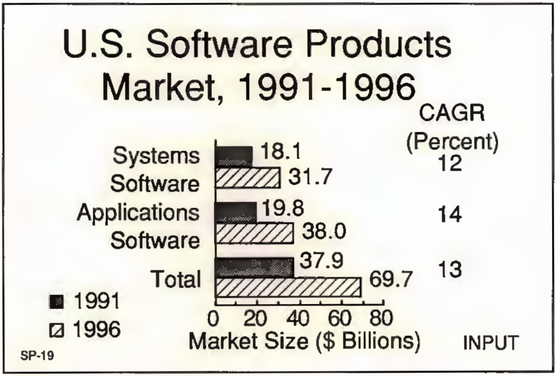
$ Billions	1980	1985	1990	1996
Software Products	3	13	34	70
Total Information Services	17.0	49	100	197

SP-18

INPUT

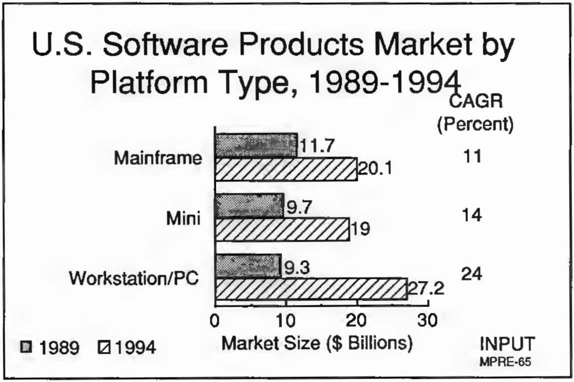
Notes

9/21/91


U.S. Software Products Market, 1991-1996
CAGR (Percent)
Systems Software
18.1
31.7
12
Applications Software
19.8
38.0
14
Total
37.9
69.7
13
1991
1996
0 20 40 60 80
Market Size ($ Billions)
INPUT
SP-19

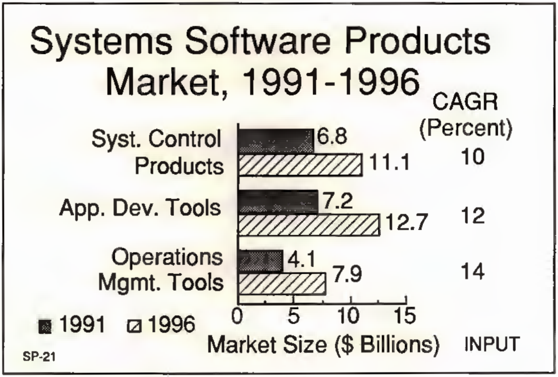
Notes

4/13/92



U.S. Software Products Market by Platform Type, 1989-1994
CAGR (Percent)
Mainframe
11.7
20.1
11
Mini
9.7
19
14
Workstation/PC
9.3
27.2
24
0
10
20
30
Market Size ($ Billions)
1989
1994
INPUT
MPRE-65

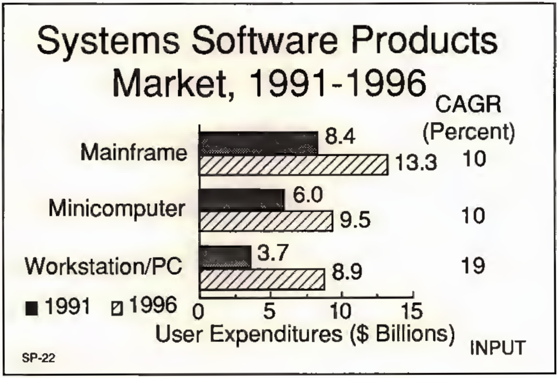
Notes



Systems Software Products
Market, 1991-1996
CAGR
(Percent)
Syst. Control
Products
6.8
11.1
10
App. Dev. Tools
7.2
12.7
12
Operations
Mgmt. Tools
4.1
7.9
14
1991
1996
0
5
10
15
Market Size ($ Billions)
INPUT
SP-21

Notes

4/13/92


Systems Software Products Market, 1991-1996
CAGR (Percent)
Mainframe
8.4
13.3
10
Minicomputer
6.0
9.5
10
Workstation/PC
3.7
8.9
19
1991
1996
0
5
10
15
User Expenditures ($ Billions)
SP-22
INPUT

Notes

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Systems Software Products Market—Driving Forces

- Cooperative processing
- Image processing
- CASE/4GL
- Standards (SQL/UNIX, others)
- Consolidation

SP-23

INPUT

Notes

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Systems Software Products Market—Driving Forces

- PC development environments
- Staging for new applications software growth
- Data center management tools
- RDBMS
- Expert systems

SP-24

INPUT

Notes

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Systems Software Products Market—Inhibiting Forces

- Computer saturation
- Slowing hardware shipments
- Declining software price per copy
- Delay in standards

INPUT

SP-25

Notes

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New/Hot Software Areas

- Network integration
- AI—rejuvenated
- Data center management
- UNIX
- Image processing
- DSS/EIS

INPUT

SP-26

Notes

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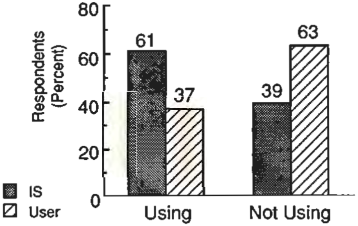
Relational DBMS Application
Who Is Using It?



INPUT
MPRE-13

Notes

Next Generation of DBMSs

- Distributed/networked
- Interconnected
- Relational +
- Information-oriented
- Hardware-assisted

INPUT
MPRE-363

Notes

CASE—Future Directions

- I-CASE
- Professional services companies' critcal role
- CASE support services
- Repository element key
- End-user CASE

INPUT

Notes

Shares of Systems Software Products Market—1990

Company Name	Market Share (Percent)
IBM Corporation	16
Digital Equipment	3

SP-30a

Notes

9/21/91

Shares of Systems Software Products Market—1990

Company Name	Market Share (Percent)
Computer Associates	3
Microsoft	3
Hewlett-Packard	2

SP-30b

Notes

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Shares of Systems Software Products Market—1990

Company Name	Market Share (Percent)
Oracle	2
Novell, Inc.	2
Unisys	1

SP-31

Notes

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Applications Software Products Market—Driving Forces

- CPU population growth
- Standards (evolving)
- Workstation power
- Industry-specific thrusts
- EIS/other emerging niches
- Application complexity

INPUT

Notes

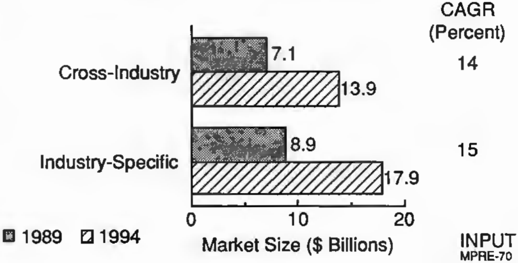
Applications Software Products Market—Inhibiting Forces

- Mainframe saturation
- Declining price per copy
- Product life cycles
- Crowded market niches

INPUT

Notes

U.S. Applications Software Product Market by Submode, 1989-1994



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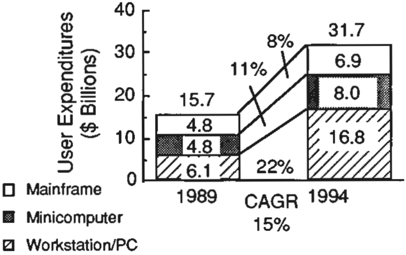
MPRE-70

Notes

SP-34

Applications Software Product Market by Platform Size, 1989-1994



INPUT
MPRE-296

Notes

Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (%)
IBM	930	7
Lotus Development Corp.	400	3
Digital Equipment Corp.	240	2
Computer Associates	190	2

* INPUT Estimates

INPUT

Notes

Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (%)
Dun & Bradstreet Corp.	200	1
Management Science America, Inc.	200	1
Unisys Corp.	190	1

* INPUT Estimates

INPUT

Notes

Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (%)
Hewlett-Packard	150	1
Microsoft	120	1
Word Perfect Corp.	120	1

* INPUT Estimates

INPUT

Notes

Major Vendors' Shares of Applications Software Market—1988

Company Name	1988 US Revenue ($ M)*	Market Share (%)
Wang Laboratories	110	1
Ashton-Tate	110	1

* INPUT Estimates

INPUT

Notes

Barriers to Widespread Acceptance of UNIX

- Lack of personal productivity applications
- Integration of UNIX hardware
- Integration of UNIX software
- Distribution of UNIX software
- Requirements for service and support

INPUT

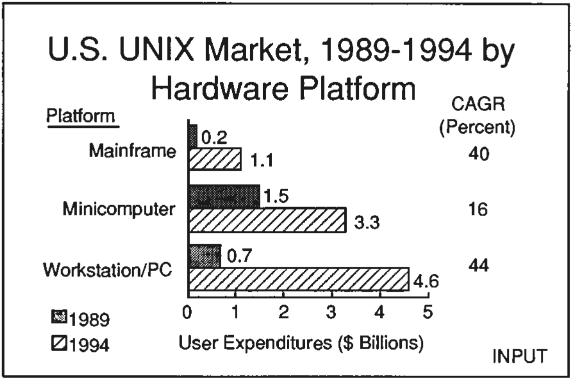
Notes

U.S. UNIX Market, 1989-1994

Sector	User Expenditures ($ Millions)		CAGR 1989-94 (Percent)
	1989	1994	
Systems control	785	3,720	36
Application software			
- Vertical industry	1,150	4,550	32
- Cross-industry	1,335	4,490	27

INPUT

Notes


U.S. UNIX Market, 1989-1994 by Hardware Platform
Platform
Mainframe
Minicomputer
Workstation/PC
0.2
1.1
1.5
3.3
0.7
4.6
CAGR (Percent)
40
16
44
0
1
2
3
4
5
User Expenditures ($ Billions)
1989
1994
INPUT

Notes

UNIX Market by Primary Application

Application	Percent of Annual System Shipment Value 1989	1994
Commercial	21	31
Engineering, Scientific, Technical	79	69
	100	100

INPUT

Notes

Users: How We Selected UNIX

- The future is UNIX
- Manufacturer changed from other operating system to UNIX
- Part of turnkey solution
- Experimental approach

INPUT

Notes

Users: Current Use of UNIX

- Primary
  - Software development
  - Business management
- Secondary
  - Office systems
  - Communications
  - Education and training

INPUT

Notes

Former Users: Why We Dropped UNIX

- Lack of support
- Did not receive application software updates

INPUT

Notes

Non-Users: Why Not UNIX?

- Primary: Retraining of unsophisticated users
- Amount of system management effort
- Customer sites using VAX/VMS
- Conversion is too expensive

INPUT

Notes

Software Vendors: Why We Chose UNIX

- Primary
  - Portability
  - Federal government contract requirement
- Secondary
  - Customer requests

INPUT

Notes

PC Vendors' UNIX Development Activity

- Survey group: Vendors developing DOS-based application software
- 41% also now developing under UNIX
- 27% plan to develop under UNIX
- 18% examining UNIX opportunities

Source: INPUT ("PC Software Vendor Survey")

INPUT

Notes

UNIX and Mainframe Hardware Vendors

- Amdahl: UNIX is key differentiator
- IBM
  - Secondary operating system
  - IBM's "real" UNIX: SAA
  - AIX not linked to SAA yet

INPUT

Notes

UNIX and Minicomputer Hardware Vendors

- First-tier vendors (DEC; H-P)
  - Stronger in technical applications
  - Growing in commercial applications
- Second-tier vendors (UNISYS, Nixdorf, Ultimate Corp.)
  - Stronger in commercial applications

INPUT

Notes

UNIX and Workstation/PC Vendors

- Primary role: IBM RT and Sun
- Sun:
  - Proprietary hardware
  - Near-proprietary UNIX, due to "hooks"
  - Bottom line: Creating a separate market
- Secondary role: Apple and IBM PS/2

INPUT

Notes

UNIX and Operating System Vendors

- AT&T likely to add enhancements
  - Transaction processing
  - Fault tolerance
  - Real-time
  - Multiprocessor

INPUT

Notes

UNIX and Operating System Vendors

- The Santa Cruz Operation (SCO)
  - Differentiating from UNIX System V Release 4
  - Leveraging existing vendor alliances

SP-54a INPUT

Notes

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UNIX and Operating System Vendors

- The Santa Cruz Operation (SCO)
  - Creating own market around Intel 80386, using "Open Desktop"
  - Leveraging existing distribution channels

SP-54b

INPUT

Notes

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UNIX Opportunities

- File servers
- Business applications
- Personal productivity software

SP-55a

INPUT

Notes

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UNIX Opportunities

- Turnkey systems
  - Departmental
  - Highest added value: Peripherals
- Professional services
- Systems integration

SP-55b

INPUT

Notes

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Predictions: UNIX Standards

- Operating systems: POSIX compliant
- Languages: C; C++
- Network: TCP/IP
- RDBMS interface: SQL
- Graphical user interface: none (Caveat: Watch "OSF/Motif")

INPUT

Notes

Prediction: UNIX "Winners"

- Consortia: X/open; UI
- System software vendors: AT&T "linkages"
- Application software vendors: Commercial
- High performance systems: Amdahl
- Mid-range systems: HP; DEC; UNISYS
- Workstations/PCs: IBM; Sun; HP/Apollo

INPUT

Notes

Recommendations to Vendors

- Adopt any decent graphical user interface
- Bet on "the" standard
- Develop more commercial UNIX applications

SP-58a

INPUT

Notes

2/4/91

Recommendations to Vendors

- Application software vendors, hedge your bets
- Vendors: No more UNIX "improvements", please
- "Out-Sun" Sun Microsystems

SP-58b

INPUT

Notes

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AI—Revisited and Rejuvenated

- Front-end applications e.g.,
  - ADR's—mindover
  - Verity—text retrieval
  - etc. . .

INPUT

Notes

AI—Revisited and Rejuvenated

- New players
  - Neuron data, natural language
- Old players
  - Teknowledge—withdraws direct marketing
  - Language group—niche oriented
  - Intellicorp—major agreement with IBM

INPUT

Notes

KBS Application Types

- Mostly "diagnosing/classifying" applications
- Over 50%: Data analysis, interpretation (Examples: Insurance underwriting, bank lending)

SP-61a

INPUT

Notes

2/4/91

KBS Application Types

- About 20%: Use advising, procedures (Example: Help desk)
- Others: Controlling, planning, configuration, simulating

SP-61b

INPUT

Notes

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KBS Application Builders

- 95% of sample: No end-user development/modification
  - Almost always: "Knowledge engineers" developers

SP-62a

INPUT

Notes

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KBS Application Builders

- 95% of sample: No end-user development/modification
  - Mostly: Same person builds knowledge base, programs interfaces, and solves DP environment problems

SP-62b

INPUT

Notes

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KBS Application Distinctions

	Survey Response (Percent)	INPUT Trend Forecast
Standalone	43	Decrease
Integrated	57	Increase

INPUT

Notes

KBS User Satisfaction

Generally satisfied with:

1. Range of capabilities
2. Ease of development
3. Integration with other applications
4. Documentation
5. Customer support and hotline

INPUT

Notes

KBS User Satisfaction

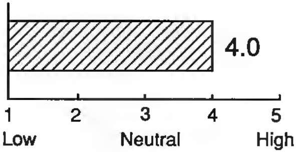
Varying responses

1. Processor resource consumption
2. Response time
3. Maintenance updates

INPUT

Notes

Overall Satisfaction with KBS Product



Future plans: uncertain

INPUT

Notes

IBM Actions
-Major-

- New line of business: applications solutions
- AS/400 midrange system
  - 1st SAA announcement
  - Software announcement
  - Applications

INPUT

Notes

IBM Actions—Major

- OS/2 and OS/2E
- Applications systems division (ASD)
  - Internal and external responsibility for SW
  - 6,000 employees
  - Aggressive third-party program

SP-68a

INPUT

Notes

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IBM Actions—Major

- Applications systems division (ASD)
  - Internal focus
  - CIM
  - Office systems
  - Customer information file

SP-68b

INPUT

Notes

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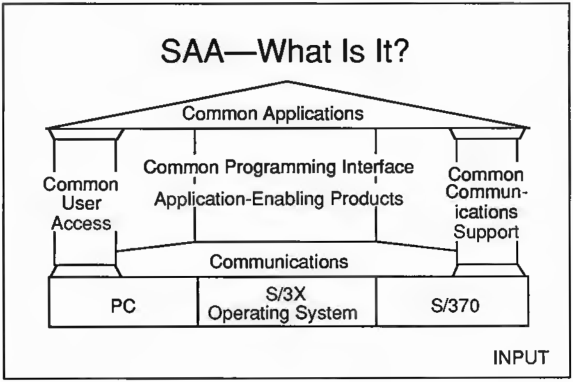
SAA

- Single most important event
- Unfolding in software products market

INPUT

Notes


SAA—What Is It?
Common Applications
Common User Access
Common Programming Interface
Application-Enabling Products
Common Communications Support
Communications
PC
S/3X Operating System
S/370
INPUT

Notes

SAA Shortfall

- Moving target
- All platforms/OS not covered
- All languages not covered
- Networking limitations
- Lack of documentation
- Missing important application-enabling components

INPUT

Notes

SAA—Conclusions

SAA will:

- Drive product consolidation
- Be a user requirement
- Drive new applications/products
- Drive software pricing
- Reshape the software industry

INPUT

Notes

Open Software Foundation

Background

- Sun/AT&T form strategic relationship
- Other UNIX-oriented vendors band together in response

INPUT

Notes

Open Software Foundation
-Formation-

<u>Result</u>

- Not-for-profit group
- Seven original founders
  - Apollo, Groupe-Bull, DEC, HP, IBM, Nixdorf, Siemens
- $13.5M over 3 years for sponsors
- $25K/year for associates

INPUT

Notes

Alliances

- CASE vendors
  - Front-end/back-end
- Relational Technology/Computer Task Group/Westinghouse
- Cullinet/SHL Systemhouse

INPUT

Notes

Alliances

- CAI/Unisys
- Ashton-Tate/Microsoft/Sybase
- DEC/Apple

INPUT

Notes

Software Vendor Profile for Success

- Large installed base
- Heterogeneous hardware support
- Applications/systems product basket
- Hardware independence
- Strong financial resources

INPUT

Notes

Executive Information Systems (EIS)

SP-78

INPUT

Notes

12/18/90

EIS Study Research Methodology

- Mail Survey - 126 POSPP Members
- Telephone Interviews - 20 EIS Users
- Telephone Interviews - 16 EIS Vendors

SP-79

INPUT

Notes

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EIS Technical Foundation

1. Fourth-generation language use by end users
2. Decision support systems
3. Personal computers
4. Relational data base management systems

SP-80

INPUT

Notes

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Breaking New Ground with EIS

1. New category of user
2. Relational data base management systems
3. Information versus data
4. Graphical user interface
5. Integration of personal productivity tools
6. Cooperative processing

INPUT

SP-61

Notes

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Stages of EIS Evolution

Stage	Timing	Description
1. Before EIS Products	Before 1985	DSS through conventional software tools
2. First EIS Products	1985	Arrival of Command Center & Commander/EIS

INPUT

SP-82

Notes

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Stages of EIS Evolution

Stage	Timing	Description
3. Graphical User Interface	1987	Power of PC captured Ease of use a reality
4. Alternative Platforms	1988	LANs, minis, and PCs

INPUT

SP-83

Notes

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Stages of EIS Evolution

Stage	Timing	Description
5. Many Vendors in Market	1989-1990	Many technical approaches become available
6. Information Pipeline	1991	Direct access to operational data bases

INPUT

SP-84

Notes

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Stages of EIS Evolution

Stage	Timing	Description
7. Everyone's IS	1992-1995	EIS user interface spreads to traditional applications

INPUT

SP-85

Notes

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EIS Definition—Tool Kit Components

Component	Original	Current	Future
Relational Data Bases	X	X	X
Character User Interface	X		
Graphical User Interface	X	X	X
Personal Use Tools		X	X
CASE-like Development Tools	X	X	

INPUT

SP-86

Notes

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EIS Definition—Tool Kit Components

Component	Original	Current	Future
Direct Data Pipeline—Import & Export		X	X
Decision Support Tools			X
Text Management			X
Image Processing			X

SP-87

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Notes

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EIS Impacts on Applications Development

- Greater requirement for business knowledge
- User more/less capable of specifying requirements

SP-88

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Notes

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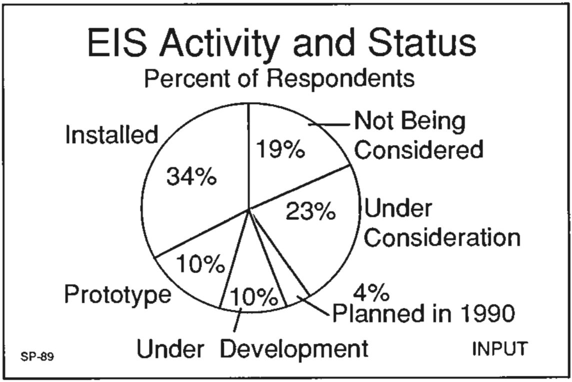

Notes

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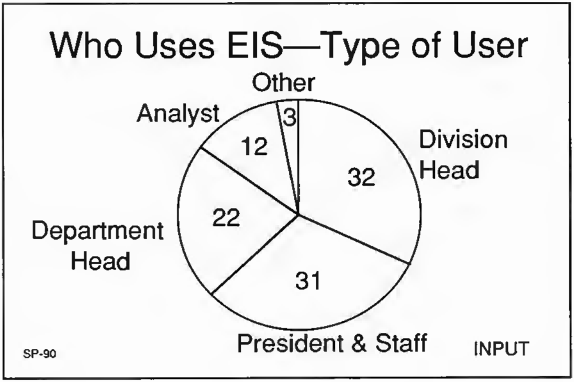

Notes

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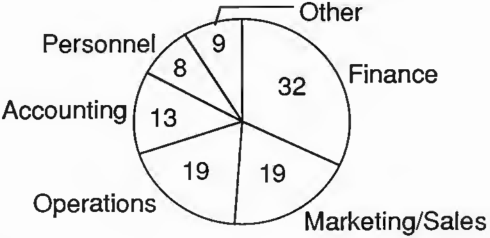
Who Uses EIS
Functional Area of User



SP-91

INPUT

Notes

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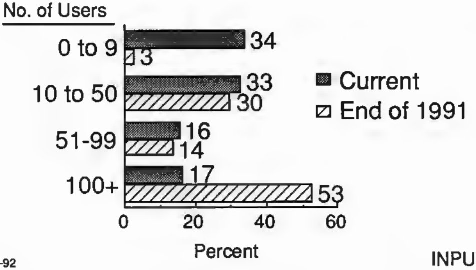
Size of EIS User Population



SP-92

INPUT

Notes

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EIS Sub-Applications Active and Planned

Application	% Act. 1990	% to be Act.—1991
Board Material	23	49
Monthly Reports	58	90
Weekly Reports	38	77
Daily Reports	35	72

SP-93

INPUT

Notes

12/18/90

EIS Sub-Applications Active and Planned

Application	% Act. 1990	% to be Act.—1991
E-Mail	38	70
Calendar	27	58
Note, To-Do Lists	17	47
External News Svc.	35	65

INPUT

SP-94

Notes

12/18/90

EIS Data Categories Active and Planned

Application	% Act. 1990	% to be Act.—1991
Financial	55	97
Accounting	33	65
Marketing/Sales	45	84

SP-95

INPUT

Notes

12/18/90

EIS Data Categories Active and Planned

Application	% Act. 1990	% to be Act.—1991
Operating	41	76
Personnel	26	56
Engineering	4	8

SP-96

INPUT

Notes

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EIS—Ranking of Sponsor's Goals

Goal	Percent
Timeliness	20
Quality of Data	16
Mgmt Process	13
Use of Technology	11

SP-97

INPUT

Notes

12/18/90

EIS—Ranking of Sponsor's Goals

Goal	Percent
Reduce Paper Flow	11
Flexible Data Access	11
Same Information to All	8
Other	10

SP-98

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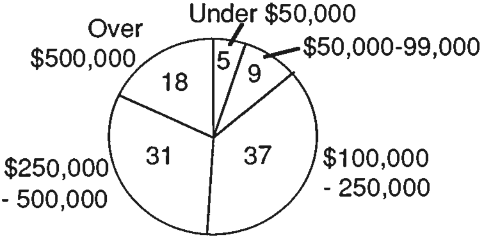
Notes

12/18/90

Cost of EIS—Initial Investment



SP-99

INPUT

Notes

12/18/90

EIS
The Vendor View

SP-100

INPUT

Notes

12/18/90

EIS Market Structure Services Strategy Comparison

Solution Vendors	Product Vendor
Comshare	American Information Systems
Execucom	Decision Technologies
IBM	Holistic Systems

SP-101

INPUT

Notes

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EIS Market Structure Services Strategy Comparison

Solution Vendors	Product Vendor
Information Resources	Information Builders
Pilot	Interactive Images
	Media Works
	SAS Institute

SP-102

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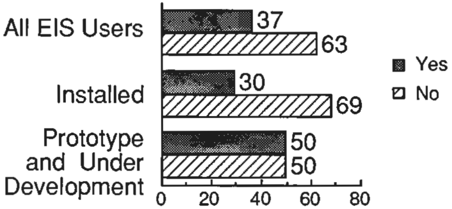
Notes

12/18/90

Professional Services Involvement in EIS Using Professional Services



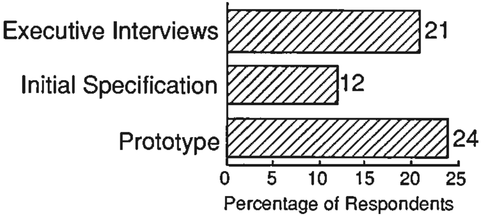
SP-103

INPUT

Notes

3/1/91

Professional Services Involvement in EIS Performing Development Tasks

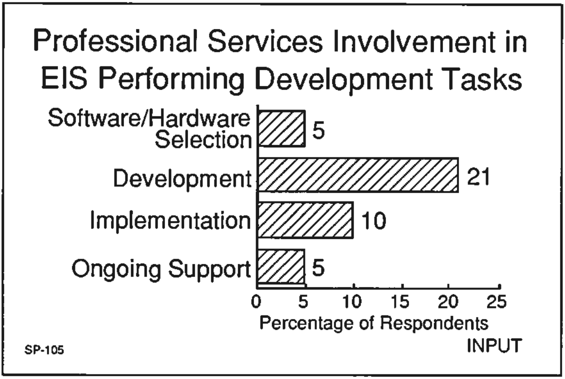


SP-104

INPUT

Notes

12/18/90



Notes

12/18/90

EIS Technology Trends

- Expanding platforms and the LAN alternative
- Presentation versus analysis capabilities
- Direct data access
- Text and image processing capabilities
- Object-oriented computing

SP-106

INPUT

Notes

12/18/90

EIS Vendor Competitive Issues

- Technical flexibility
- Data access capabilities
- Decision support systems link
- Object orientation

SP-107

INPUT

Notes

12/18/90

EIS Vendor Competitive Issues

- Fitting into the internal IS network
- Broadening the EIS audience
- User-specific applications (e.g., human resources)

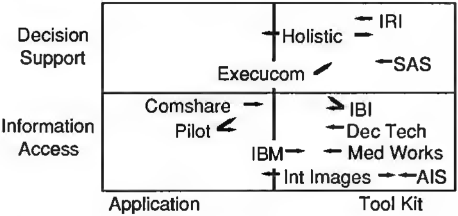
SP-108

INPUT

Notes

12/18/90

EIS Software Vendors Classification and Direction



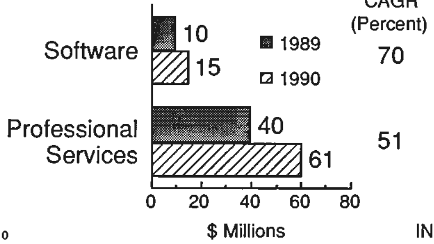
INPUT

SP-109

Notes

12/18/90

EIS Market Growth 1989-1990



SP-110

INPUT

Notes

3/1/91

EIS Market Forecast
Key Factors

- Expanding vendor community
- Growing penetration within user community
- Decreasing entry price

SP-111

INPUT

Notes

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EIS Market Forecast Key Factors

- Expansion beyond the executive user market
- Expansion into medium-sized firms
- Blurring of the EIS identity

SP-112

INPUT

Notes

12/18/90

EIS Conclusions

- An example for cooperative processing
- A tool kit, not an application
- An ideal user of LANs
- Differs from traditional development
- Creates strong link between user and IS
- Build EIS a piece at a time

INPUT

SP-113

Notes

12/18/90

EIS Impacts on Applications Development

- Prototype a must, may be the real system
- Success means constant modification
- Supporting systems will also change
- Be ready for the politics

INPUT

SP-114

Notes

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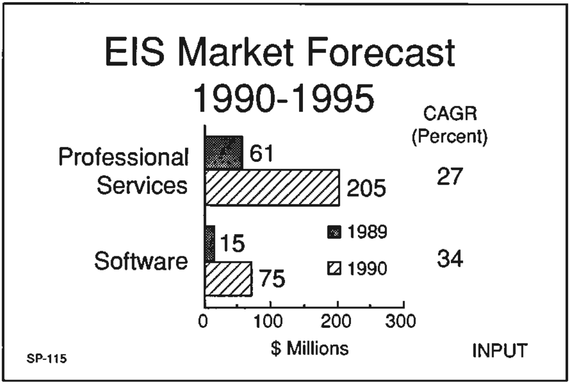

EIS Market Forecast
1990-1995
CAGR
(Percent)
Professional Services
61
205
27
Software
15
75
34
1989
1990
0
100
200
300
$ Millions
SP-115
INPUT

Notes

3/1/91

Applications Software Products

SP-116

Notes

Applications Software Products

Driving Forces

- New technologies
- New products
- Customer emphasis on productivity improvements
- Pent-up demand for new products

SP-117

Notes

Applications Software Products

Growth Inhibitors

- Maturity of traditional products
- Slowdown in hardware sales
- New products still being developed
- Customer confusion

SP-118

Notes

9/21/91

Applications Software Products

Shifting Technology Foundation

- Standards
- Downsizing and client/server
- Networking and integration
- Distributed data

SP-119a

Notes

9/21/91

Applications Software Products

Shifting Technology Foundation

- Graphical user interface
- Imaging
- Engineered/re-engineering software

SP-119b

Notes

9/21/91

Applications Software Products

Vendor Issues

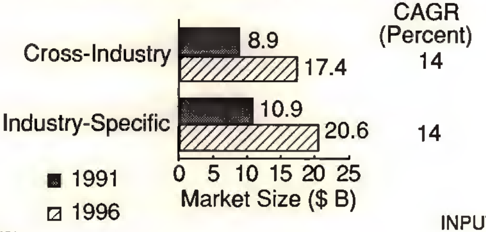
- More power to the customer
- Choosing product directions
- How to get new products to market fast
- Product migration strategies
- New pricing strategies

SP-120

Notes

9/21/91

U.S. Applications Software Products Market, 1991-1996



SP-121

INPUT

Notes

4/13/92

Shifting Technology Foundation

- UNIX, open systems and portability
- OS/2 workstation-based applications
- Object-oriented software development

INPUT

SP-123

Notes

4/5/91

Application Software Products Changing Buying Patterns

- Make versus buy decisions
- Solutions versus products
- A more strategic purchase
- End-user involvement and role of operating executives

INPUT

SP-124

Notes

3/1/91

Application Software Products Changing Distribution Channels

- SI and SO
- Applications software versus turnkey
- Turnkey/VAR versus systems integration

INPUT

SP-125

Notes

3/1/91

Application Software Products Changing Distribution Channels

- National versus regional VARs
- Importance of alliances
- Channel conflict

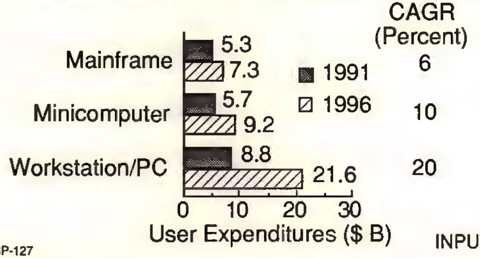
INPUT

SP-126

Notes

3/1/91

Applications Software Products Market, 1991-1996



SP-127

INPUT

Notes

4/13/92

Applications Software Products

Major Vendors, 1990

Company Name	Market Share (%)
IBM	4
Dun & Bradstreet Corp.	2
Lotus Development Corp.	2
Microsoft	2

SP-128

Notes

9/21/91

Applications Software Products

Major Vendors, 1990

Company Name	Market Share (%)
WordPerfect	2
Computer Associates	1
Groupe Bull	1

SP-129

Notes

9/21/91

Major Vendors' UNIX Commitment

	Before 1990	After 1990
NCR	High	Full
DEC	Low	High
Computer Assoc.	Low	High

SP-130

Notes

9/21/91

Major Vendors' UNIX Commitment

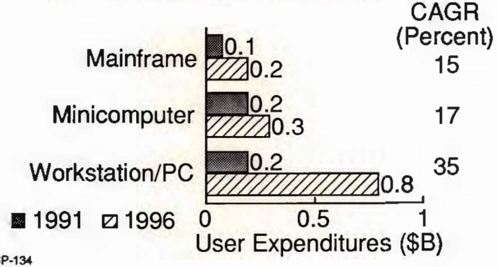
	Before 1990	After 1990
Microsoft	Low	Medium
Unisys	Low	Medium

SP-131

Notes

9/21/91

U.S. UNIX Operating Systems Forecast by Platform Size



SP-134

Notes

1/2/92

UNIX Market Drivers

- UNIX advantages
- Level of vendor endorsement and product availability
- User demand for UNIX

INPUT

SP-135

Notes

Level of Vendor Endorsement and Product Activity

- Applications software products needed
- Distribution and support infrastructure needed

SP-138

INPUT

Notes

6/14/91

User Demand for UNIX

- Increasing development complexity/backlog
- Inefficient islands of technology
- Unmet needs/“upsizing”
- Knowledge about UNIX

SP-139

INPUT

Notes

6/14/91

Users: Successes with UNIX

- Applications development efforts
- Easily portable
- Support of remote sites

SP-141

INPUT

Notes

6/14/91

Advantages of Current Operating System Over UNIX

- Support current software selections
- Runs on existing hardware
- Everyone knows it
- Straightforward operating system

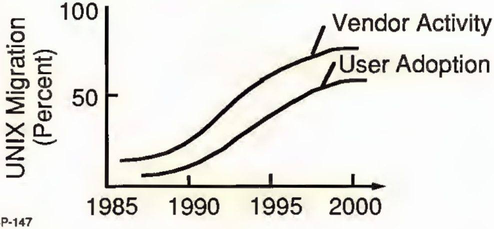
INPUT

SP-144

Notes

6/14/91

UNIX Vendor Activity and User Adoption



SP-147

Notes

9/21/91

UNIX Vendor Recommendations

- Operations management products needed
- Prepare direct sales forces for UNIX

SP-150

INPUT

Notes

6/14/91

UNIX Vendor Recommendations

- Systems integration and professional services needed
- Specialized UNIX vendors prepare for the long haul

SP-151

INPUT

Notes

6/14/91

Systems Software Products Key Issues

- Growing need to share data and applications
- Need to combine new and existing technologies

INPUT

SP-152

Notes

7/30/91

Systems Software Products Key Issues

- Need to improve productivity of software development
- Growing complexity of managing enterprisewide systems

INPUT

SP-153

Notes

7/30/91

Systems Software Products Key Trends

- Cooperative/distributed processing evolution
- Slow migration to standards
- New growth for network management and data center automation

INPUT

SP-154

Notes

7/30/91

Systems Software Products
Key Trends

- Slow adoption of CASE
- RDBMS in infancy, from user standpoint
- Graphical user interfaces just beginning to take off

INPUT

SP-155

Notes

7/30/91

Systems Software Products
Key Trends

- Widespread use of object-oriented programming and expert systems a long way off
- Emergence of voice processing
- Initial acceptance of image processing

SP-156

INPUT

Notes

7/30/91

Systems Software Products

SP-157

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Notes

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Systems Software Products
Driving Forces

- Slowed economy
- Downsizing and client-server
- UNIX and software frameworks
- Integration/interoperability efforts
- Emphasis on solutions

SP-158

INPUT

Notes

9/21/91

Systems Software Products Key User Issues

- Enterprise-wide computing
- Data accessibility
- More operations management products
- More useful applications development products
- Provision of support and education

SP-159

INPUT

Notes

9/21/91

Information Systems Environment
Systems Software Findings

- Data center infrastructure intact
- LAN integration a high priority
- "Wait and see" on client-server
- Expenditures on systems control products the highest

SP-160a

INPUT

Notes

9/21/91

Information Systems Environment Systems Software Findings

- Mainframes still prevail
- 78% of budget for maintenance
- More operations management tools needed
- More support needed

SP-160b

INPUT

Notes

9/21/91

Applications Software Products

User Survey

- 24% budget increase for 1992
- Mainframe-based spending declining; workstation/PC-based spending increasing
- More cross-industry spending

INPUT

SP-165a

Notes

9/21/91

Applications Software Products

User Survey

- Low level of interest in customization
- Large applications development efforts persist
- UNIX a low priority

SP-165b

Notes

9/21/91

Applications Software Products

User Survey

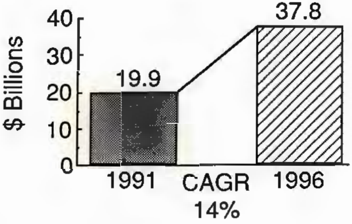
- More functionality and features desired
- A variety of vendors preferred
- A variety of technology goals and approaches

SP-165c

Notes

9/21/91

Applications Software Products Market, 1991-1996



INPUT

SP-168

Notes

9/30/91

U.S. Applications Software Products

Vertical Sectors

Largest	Fastest Growing
Banking and Fin.	Telecommunications
Discrete Mfg.	Retail
Medical	Federal Gov't.
Insurance	Business Services
Education	

INPUT

SP-170

Notes

9/30/91

U.S. Applications Software Products

Cross-Industry Sectors

Largest	Fastest Growing
Office Systems	Educ. and Training
Planning and Anal.	Eng. and Scientific
Accounting	

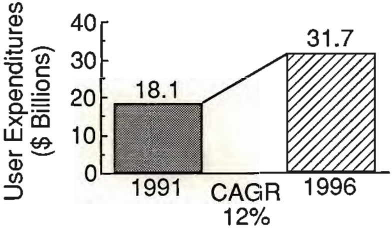
SP-171

INPUT

Notes

9/30/91

Systems Software Products Market, 1991-1996



SP-173

INPUT

Notes

9/30/91

Systems Software Products

Client/Server in Infancy

- Lack of a common definition
- Lack of product models
- Rewrites of current applications required
- Lack of distributed RDBMS standards

INPUT

SP-175

Notes

Systems Software Products

Vendor Frameworks

- SAA
- NAS
- CA90s

SP-176

INPUT

Notes

9/30/91

Systems Software Products

Vendor Issues

- Technology challenges
- Standards vs. differentiation
- New pricing strategies
- Declining hardware sales
- Slowed software growth
- Acquisition vs. alliance

INPUT

SP-177

Notes

9/30/91

Software Changing from a Product to a Service

SP-178

INPUT

Notes

10/11/91

Support?
or
Services?
or
Support Services?

SP-179

INPUT

Notes

10/11/91

Support

- Maintenance
- Training (multilevel)
- Documentation
- Clarification (hotline)

SP-180

INPUT

Notes

10/11/91

Services

- Education
- Enhancement
- Logistics
- Optimization
- Consulting
- Customization
- Installation/conversion
- Customer interaction

INPUT

SP-181

Notes

10/11/91

Characteristics of Service

- Recurring revenues
- Continuous use
- Pay by use

SP-182

INPUT

Notes

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U.S. Software Market Trends

- Targets
  - 1970s, products
  - 1980s, support
  - 1990s, services/solutions

INPUT

SP-183

Notes

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U.S. Software Market Trends

- Away from standard
  - Towards uniqueness
- Supported by standards

SP-184

INPUT

Notes

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Worldwide Software Products Markets

	1990	1995
Total	60	125

Market Size ($ Billion)

INPUT

SP-185

Notes

10/11/91

U.S. Software Products Markets

	1990	1995
Applications	18	35
Systems	16	31

Market Size ($ Billion)

SP-186

INPUT

Notes

10/11/91

Software Support Markets Europe

	1989	1994
Systems Products	13	20
Applications Products	12	16

Proportion of Market (Percent)

INPUT

SP-187

Notes

10/11/91

Software Support Markets U.S.

	1989	1994
Systems Products	23	25
Applications Products	15	20

Proportion of Market (Percent)

INPUT

SP-188

Notes

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Problem Identification

- 63% "no problems"
- Response time
- Repair and fix times
- Software performance and functionality

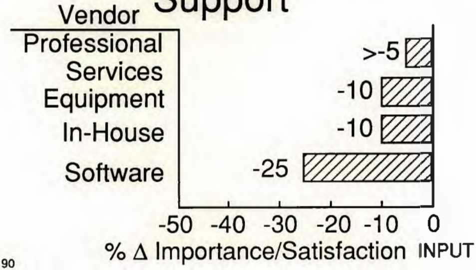
INPUT

SP-189

Notes

10/11/91

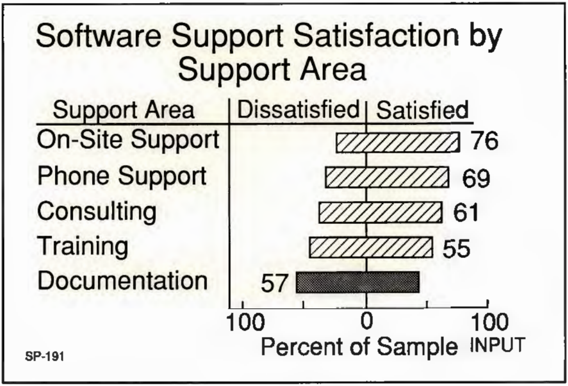
User Perception Application Support



SP-190

Notes

10/11/91



Notes

10/11/91

Software Support Ratings

Offering	User Rating *	Vendor Rating *
Centralized support	3.1	4.5
Free training	2.6	4.2
Purchased training	2.0	3.9
Custom software	2.1	4.2

* 1 = Least Value; 5 = Greatest Value

INPUT

SP-192

Notes

10/11/91

Software Support Ratings

Offering	User Rating *	Vendor Rating *
Consulting	2.7	3.8
S/W fixes	3.3	4.6
Upgrades	3.6	4.5

* 1 = Least Value; 5 = Greatest Value

INPUT

SP-193

Notes

10/11/91

User Training Requirements

- Increase
  - 47% of respondents
  - Software complexity/sophistication
  - Lack of in-house time or skills
  - Introduce new users

SP-194

INPUT

Notes

10/11/91

User Training Requirements

- Remain the same
  - 36% of respondents
  - In-house support supplement
  - Third-party providers

SP-195

INPUT

Notes

10/11/91

User Training Requirements

- Decrease
  - 17% of respondents
  - Better documentation
  - Software user-friendly qualities
  - Market training products
  - Third-party providers

SP-196

INPUT

Notes

10/11/91

Services and Product Markets Blurring

- Professional services use of
  - CASE
  - Kernels

SP-197

INPUT

Notes

10/11/91

Technology Application to Software Support/Services

- Networks
- Parallel view
- Expert systems
- Embedded documentation
- Embedded training
- Data/information bases

INPUT

SP-198

Notes

10/11/91

Technology Application to Software Support/Services

- Embedded software
- Voice services
  - 800 numbers
  - 900 numbers
- Image/fax services
- Remote printing

SP-199

INPUT

Notes

10/11/91

Contact Trends

- Bulletin boards
- Newsletters (electronic and paper)
- User meetings (electronic and physical)

SP-200

INPUT

Notes

10/11/91

Support Pricing

- 'Bundling' with licenses
- 'Bundling' with systems maintenance

INPUT

SP-201

Notes

10/11/91

Keys to Success

- Use of technology
- Pricing
- Customer sensitivity
- Services (solution) orientation
- Standards

SP-202

INPUT

Notes

10/11/91

Customer Satisfaction

- Proactive not reactive
- Timely (event driven)
- Objective

SP-203

INPUT

Notes

Proactive vs Reactive

SP-204

INPUT

Notes

10/11/91

Futures

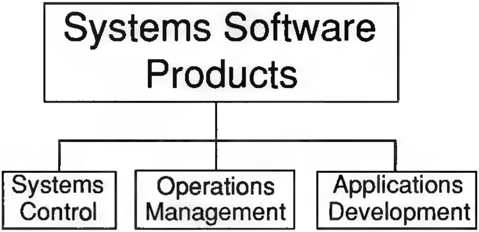
- Embedded diagnostics
- Problem/use data bases
- Expert system resolution
- CBT

INPUT

SP-205

Notes

10/11/91

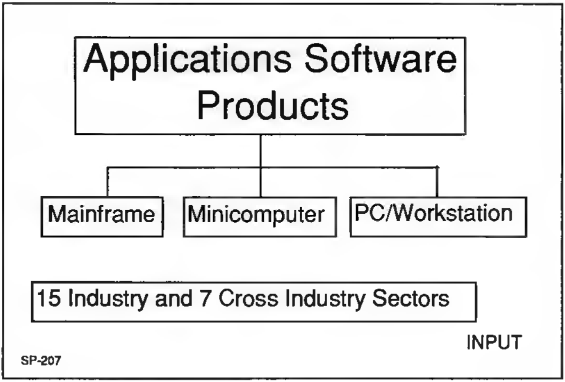


INPUT

SP-206

Notes

10/21/91


Applications Software Products
Mainframe
Minicomputer
PC/Workstation
15 Industry and 7 Cross Industry Sectors
INPUT
SP-207

Notes

1/14/92

UNIX

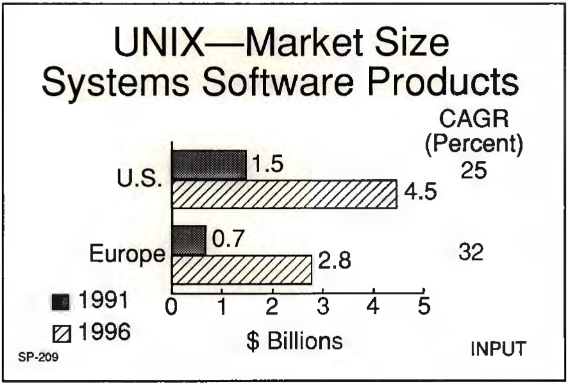
Market Status

SP-208

INPUT

Notes

4/13/92


UNIX—Market Size
Systems Software Products
CAGR
(Percent)
U.S.
1.5
4.5
25
Europe
0.7
2.8
32
1991
1996
0
1
2
3
4
5
$ Billions
SP-209
INPUT

Notes

4/13/92

UNIX—Market Growth
Systems Software Products

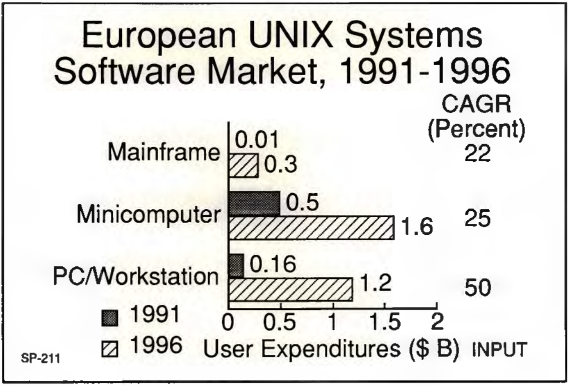
	91-96 CAGR (%)		% of Market	
	Total	UNIX	1991	1996
U.S.	12	25	8	14
Europe	11	32	6	13

INPUT

SP-210

Notes

4/13/92


European UNIX Systems Software Market, 1991-1996
CAGR (Percent)
Mainframe
0.01
0.3
22
Minicomputer
0.5
1.6
25
PC/Workstation
0.16
1.2
50
1991
1996
0 0.5 1 1.5 2
User Expenditures ($ B)
INPUT
SP-211

Notes

4/13/92

UNIX Market Shapers
User Demands

User Demands vs.		Vendor Responses
• Better value	=	More competition
• Protection	=	More portability
• Productivity	=	Tools and skills pool
• Flexibility	=	Federated solutions
• Packages	=	Scalable choices

INPUT

SP-212

Notes

4/13/92

UNIX Disadvantages

- No single vender owns UNIX
- Incomplete—many add-ons required
- Interconnectivity with proprietary environments

SP-213

INPUT

Notes

4/13/92

Client/Server

INPUT

SP-214

Notes

4/13/92

Client/Server

Driving Forces

- Consistent with new IS goals
- Responds to change in business structure
- Facilitates re-engineering
- Apparent cost and control advantages

INPUT

SP-215

Notes

4/13/92

Client/Server

Growth Inhibitors

- Immature technology
- New IT learning curve
- Uncertainty about cost savings
- Natural resistance to change
- Investment in current systems

INPUT

SP-216

Notes

4/13/92

Client/Server

Software Products Vendors Product Strategy

Client	Server
Application Functionality	
PeopleSoft	D&B
Fourth Shift	Sybase
	ASK/Ingres

SP-217

INPUT

Notes

4/13/92

Client/Server

U.S. Market Size
Likely Scenario

Component	1992	1997	CAGR (%)
Computer Equipment	9.2	26.0	40
Software Products	2.8	14.5	40
Information Services	1.4	7.5	23
Total	13.4	48.0	30

INPUT

SP-218

Notes

4/13/92

Client/Server

Growth Outlook Comparison

Component	Client/Serv. CAGR (%)	Total Market CAGR (%)
Computer Equipment	40	2
Software Products	40	12
Information Services	23	13
Total	30	9

SP-219

INPUT

Notes

4/13/92

Client/Server

Application Examples

Organization	Application
Food processor	Warehouse automation
Shipping firm	Financial accounting
Aircraft manufacturer	Semiconductor testing

INPUT

SP-220

Notes

4/13/92

Client/Server

Application Examples

Organization	Application
City school system	Student records system
Bank-capital markets	Financial inst. mgmt.
Oil & gas exploration	Reservoir simulation
Chemical processor	Prod. quality mgmt.

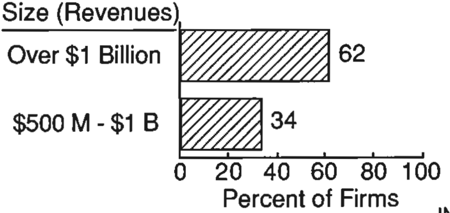
INPUT

SP-221

Notes

4/13/92

User Departments with More Applications Decision Making Than IS

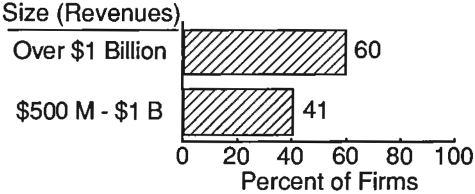


SP-222 Source: Interviews with 67 IS departments INPUT

Notes

10/16/92

Technology Change Accelerating Applications Replacement



Source: Interviews with 67 IS departments

INPUT

SP-223

Notes

10/16/92

Sources of C/S Applications

- Packages: Nonexistent/fragile
- Internal development
- Professional services/SI: Quasi-methodologies, experience
- Outsourcing/applications support

SP-227

INPUT

Notes

10/16/92

Client/Server Platforms

- Contenders (alphabetic order)

Apple	UNIX
NT	Windows
OS/2	

- Converging functionality
- Consolidation slowed by distributed buying points?

SP-229

INPUT

Notes

10/16/92

Data Base Interface (Server)

- Many choices, e.g.,
  - DB2
  - HP
  - Informix
  - Ingres
  - Oracle
  - Rdb
  - SQL Server
  - Sybase
- Mini retrofits
- No obvious dominance

SP-230

INPUT

Notes

10/16/92

Small Is Beautiful, but Dangerous

- Lower quality applications
  - PC cowboys
  - Controls, maintainability
- Decay of corporate systems infrastructure
- Software engineering support extremely limited

INPUT

SP-238

Notes

10/16/92