

# **The Information Technology Environment for Greater Omaha Businesses: A Composite View**

A report compiled by the  
Applied Information Management Institute



## The Information Technology Environment for Greater Omaha Businesses: A Composite View

Today, educational institutions - at all levels - buy computer hardware and software, build teaching labs, develop curriculums, and create a learning environment that includes computer use by their students.

Meanwhile, when businesses employ people, either to develop new applications or use computer systems in their work, they like employees that are experienced with their technical environment. Each business has its own computing environment. These environments are as varied as are the companies. Collectively, however, these business users of computers create or define a community's technical platform. To the extent that educators understand the attributes of the community platform, they can then create the learning environment their students are most likely to face in the business world.

As firms completed the survey documents, many of them also expressed great interest in this summary of the community's technical platform as they make their plans and decisions.

The findings in this report are based upon responses from 87 Greater Omaha employers. The respondents reported their current environment in the spring of 1997 and plans for the next three years. Three major dimensions of their technology platforms were reported:

- Operating Environment
- Application Development Environment
- Database Environment

The questionnaire used is shown in Appendix I. The names of participating firms are shown in Appendix II. Academic institutions reported their administrative operations, not their academic/teaching environment.

# I. Operating Environment

Four different operating environments were reported

- Mainframe
- Midrange
- Server
- Client

Figure 1 shows that client and server environments are used by approximately 90% of all respondents. 38% of the respondents had mainframes and 49% had midrange environments. Twenty-three respondents or 26% had some variation of all four of the environments.

Table 1 shows both current and planned changes in employment for specific operating systems within the mainframe, midrange, server, and client environments. Employment in the operating environment will primarily be computer systems programmers, computer operators, network managers, and technical support personnel. Please note, within firms, people may be qualified to work in multiple environments, so these same employees maybe double counted, e.g., can work both IBM/VSE and CICS. Table 1 reveals several major conclusions:

- Most firms have multiple operating systems, particularly the server/client environments.
- For client and server environments, firms expecting increased employment greatly exceed those that plan no change. Growth plans are much less robust for mainframes and midrange.
- Firms planning employment growth greatly outnumber firms planning to decrease employment. In only four areas did more firms plan to decrease employment than those that planned growth:
  - IBM/VSE
  - DEC VAX
  - DOS
  - OS/2
- Current employment levels in the server environment are larger than mainframe.
- Areas in which no firms were planning to decrease employment were:

	Current Employment	Companies Planning Change in Employees
Midrange		
HP	126	12 plan increase/0 plan decrease
Server		
Sun/Solaris	320	12 plan increase/0 plan decrease
Windows NT	483	51 plan increase/0 plan decrease
TCP/IP	592	38 plan increase/0 plan decrease
Client		
Windows NT	499	47 plan increase/0 plan decrease

- Some areas with high employment, but poor growth prospects, reflect previous popular operating environments that are now giving way to other choices:

	Current Employment	Companies Planning Change in Employees
IBM/VSE	220	2 plan increase/6 plan decrease
DOS	320	6 plan increase/22 plan decrease
OS/2	483	5 plan increase/10 plan decrease

- In client and server areas, the Macintosh Operating System (MAC OS) shows relatively low employment, and firms planning to increase employment are about equal to those planning to decrease employment.

## II. Development Environment

Employment in the development environment primarily consists of application programmers and analysts using languages which are usually platform specific. Table 2 documents several platform and employment trends for these various development environments.

- Employment growth is almost universally planned for the client/server development languages.
- The largest number of mainframe employees are those that develop in COBOL and use Job Control Language (JCL).
- The employee base developing in the mainframe environment is nearly three times the number in the client/server environment.
- Those currently employed in development on the midrange is only 3.5 percent of all development employees.
- The presence of 391 Assembler employees bears testimony to the fact that once a computer technology is introduced, it must be supported for a very long time.
- Many firms with mainframe and midrange computers are planning no change in programming employment.
- Of those firms that plan to change mainframe and midrange programming employment, an equal number of firms are planning to increase and decrease employment for COBOL development.

### III. Database Environment

Most vendors that market mainframe database software also have midrange versions of their software. Oracle and Sybase will run in mainframe, midrange, and client/server environments. Twenty-one of the mainframe/midrange respondents indicated they had only one database environment. Nineteen mainframe firms were operating multiple database software.

Current employment in the database environment is nearly equal for the mainframe/midrange and the client/server. In the client/server world, 21 firms had a single database vendor, while 47 had multiple database suppliers. Table 3 summarizes other database employment and trends.

- IMS and DB2 had the greatest employment. Most firms are planning to increase DB2 employment in the next three years.
- Eighteen firms were using Oracle in the mainframe/midrange environments, second only to 21 using DB2. Fourteen of the eighteen firms said they planned to increase Oracle employment, suggesting relatively fast growth for this software product.
- In the client/server world, firms using Oracle, MS Access, and SQL Server
  - had the highest employment.
  - had the most firms using the database software.
  - plan to increase or leave employment unchanged greatly outnumbering those planning to decrease employment.

## IV. Conclusions

The technology platform of Greater Omaha reflects the diverse roots of the mainframe, PC, and communications industries. Growth rates for employees working in client/server and Internet will likely exceed mainframe growth rates in the future—particularly after the year 2000. However, the legacy environment of the mainframe world, plus continually emerging applications that rely on all platforms, will cause a strong demand for professional skills on all platforms.

A similar study three to five years from now would reveal substantial changes in the operating systems, development languages and databases. It would be foolhardy to predict which of those listed on this study would even make a future list. There will be new products that have not yet been invented and announced.

The message to educators and schools is to understand the broad general trends.

- Mainframes will continue.
- Legacy Systems must be supported
- Midrange platforms will continually be challenged by client/server technologies.
- Client/server will increasingly become the platform for major, companywide applications.
- Internet will grow rapidly, bringing new application challenges/opportunities.
- The development tools will be most volatile and changing.
- Consider teaching the operating system(s), network(s), database(s), and development language(s) that have a large installed base with more firms planning to increase employment than those planning to decrease employment.

One final conclusion, the above analysis of the Greater Omaha technical platform is driven by a few names, particularly at the hardware and operating system level.

- Mainframe  
IBM
- Client Server  
Intel  
Microsoft  
Plus a variety of specific “shrink wrap” vendors

This will certainly change, but no one in Omaha will drive or cause that change. Academic institutions may want to install labs, buy software and teach solutions that best prepare students for the environments most generally used by employers.

A comment should be made about non-urban areas in Nebraska. The findings and conclusions about the client/server environments will apply across the state. Mainframe technologies will generally be found in the largest firms located in the Lincoln/Omaha corridor.

The client/server and Internet worlds, however, are spreading across the entire business and social landscape. These technologies are as relevant for the local main street firms, churches, farm operators, and schools as they are for multi-national corporations.

Many citizens across the state fall into one of two major groups:

- Users of applications and networks
- Application developers/network managers/systems integrators/systems builders

Increasingly, all citizens are being included in one of these groups. Educational requirements for each are substantially different. Academic programs that target one group, at the expense of the other, will do a disservice to both the students and community that will employ their students.

# Appendix I

## Number of Firms Using Each Development Environment

	Now Using	Current Employment	Change in the Next 3 Years			Number of Firms with	
			No Change	Number Increase	Number Decrease		Net Change
<b>Mainframe</b>							
COBOL	36	2,263	17	10	9	1	Multiple Mainframes: 28 One Mainframe: 11 Mainframes: 39
Assembler	21	391	10	5	6	-1	
JCL	27	2,641	13	9	5	4	
	Sum	5,364					
<b>Midrange</b>							
RPG	18	150	12	5	1	4	Multiple Midranges: 7 One Midrange: 21 Midranges: 28
BASIC	12	60	7	3	2	1	
Other	6	51	4	2	0	2	
	Sum	261					
<b>Client/Server</b>							
C/C++	43	531	9	33	1	32	Multiple Client/Servers: 28 One Client/Server: 11 Client/Servers: 11
Visual Basic	38	566	6	31	1	30	
Powerbuilder	16	144	2	14	0	14	
Delphi	11	45	3	8	0	8	
Visual FoxPro	11	57	6	3	2	1	
HTML	44	251	3	41	0	41	
Java	32	155	0	40	0	40	
Other	9	51	2	7	0	7	
	Sum	1,800					

13 firms use at least one development environment in all three areas.

## Number of Firms Using Each Database

	Now Using	Current Employment	Change in the Next 3 Years			Number of Firms with	
			No Change	Number Increase	Number Decrease		Net Change
<b>Mainframe/Midrange</b>							
IMS	15	561	4	5	6	-1	Multiple Mainframes/ Midrange: 19 One Mainframe/ Midrange: 21 Mainframes/Midranges: 40
DB2	21	608	7	11	3	8	
Oracle	18	220	1	14	3	11	
Sybase	11	151	2	7	2	5	
Other	14	113	9	3	2	1	
	Sum	1,653					
<b>Client/Server</b>							
Oracle	24	494	0	24	1	23	Multiple Client/Servers: 47 One Client/Server: 21 Client/Servers: 68
Sybase	12	131	0	7	5	2	
MS Access	48	335	15	32	1	31	
Paradox	14	101	9	2	3	-1	
FoxPro	17	75	13	1	3	-2	
SQL Server	32	401	6	25	1	24	
Informix	9	27	4	4	1	3	
Other	8	60	3	5	0	5	
	Sum	1,624					

35 firms use at least one database in both areas.

## Number of Firms Using Each Operating Environment

	Now Using	Current Employment	Change in the Next 3 Years			Number of Firms with	
			No Change	Number Increase	Number Decrease		Net Change
<b>Mainframe</b>							
IMB/MVS	26	1,749	11	10	5	5	Multiple Mainframes: 28 One Mainframe: 5 Mainframes: 33
IBM/VSE	16	220	8	2	6	-4	
CICS	28	786	16	8	4	4	
Other	7	186	2	3	2	1	
	Sum	2,941					
<b>Midrange</b>							
AS400	21	135	9	10	2	8	Multiple Midranges: 19 One Midrange: 24 Midranges: 43
DEC VAX	16	72	10	2	4	-2	
Tandem	5	86	3	1	1	0	
HP	18	126	6	12	0	12	
Other	13	75	7	5	1	4	
	Sum	494					
<b>Server</b>							
Sun/Solaris	16	320	4	12	0	12	Multiple Servers: 72 One Server: 9 Servers: 81
UNIX Family	42	411	13	26	3	23	
Windows 3.x/95	61	693	22	36	3	33	
Windows NT	58	483	7	51	0	51	
Mac OS	12	84	4	4	4	0	
IBM LAN Server	14	149	6	4	4	0	
Novell	57	386	29	21	7	14	
TCP/IP	51	592	13	38	0	38	
Other	3	56	1	2	0	2	
	Sum	3,174					
<b>Client</b>							
DOS	49	410	21	6	22	-16	Multiple Clients: 69 One Client: 9 Clients: 78
OS/2	24	143	9	5	10	-5	
Windows 3.x/95	76	941	29	42	5	37	
Windows NT	51	499	4	47	0	47	
Mac OS	19	105	8	6	5	1	
Other	3	21	1	1	1	0	
	Sum	2,119					

23 firms use at least one operating environment in all four areas.

## Appendix I I

### Greater Omaha Business Information Technology Skill Inventory 87 Firms

Company Name	Number of IT Employees	Company Name	Number of IT Employees
AB Consulting Co., Inc.	4	Imaging Services Corp.	10
Accent Service Co.	13	Jim Beatty	2
Alegent Health	75	Kelly Klosure Systems	3
Aliant	110	Masek Distribution	40
AMCI	25	McCallie and Associates	51
Applications Design and Development	150	Micro Computer Solutions	9
Automation, Inc	35	Midwest MicroSystems	5
Bass & Associates	60	Mutual of Omaha	750
Bellevue University	20	Mutual Protective	21
Berkshire Hathaway	25	Nebraska Economic Development	2
Blue Cross and Blue Shield	80	Nebraska Furniture Mart	30
Brumko Magnetics	20	No Name Given	28
Cap Gemini	65	No Name Given	100
Carol Wright Gifts	25	No Name Given	-
Carwell, Inc.	4	Omaha Chamber of Commerce	2
Central States of Omaha	60	Omaha Public Library	5
Chadron State College	7	Omaha Public Power District	120
Chief Industries, Inc.	20	Omaha Public Schools	20
CIT Networking	8	Oriental Trading Co.	45
City of North Platte	2	Packers Bank Omaha	2
CommGraphics	3	Panorama Inc.	0
Continental General Insurance	7	Priority One Inc.	1
Coyote Software	8	Probe Technology	7
Creighton	40	R. G. 1/2 Price	30
CSG Systems, Inc.	370	Redstone Communications	1
CTI	25	Reed Telemarketing	3
Cushman, Inc.	20	SAIC	125
Data Technologies	8	Seim, Johnson, Sestak & Quist	2
Data Transmission Network	80	Service Data Corporation	5
Delasco	4	Software Engineering Services	12
Department of Correctional Services	4	Software Solutions	5
DMSI	30	St. Joseph	22
Duncan Aviation	10	Studio 23	2
Educational Software Institute	22	The Hogan Group	35
Enterprise Sank, NA.	0	TMR, Inc.	1
Farm Credit Services	20	US West Communications	900
First Data Resources	1,300	Union Pacific Railroad	1,098
First National Bank of Omaha	300	V.T.I. Corporation	60
Fremont Area Medical Center	11	Valmont	30
Futureware	10	Vanguard Research	25
Guarantee Life	80	Westin Inc	35
HDR, Inc.	75	Westside Community Schools	9
Huntel Systems	110	World Insurance	25
IBP	165		