

MAJOR TRENDS IN THE MULTIVALUE MARKETPLACE

**An Executive Summary of the
2003 Multivalue Database and Application Survey**

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and Elliot King**

ABSTRACT

In May 2003, Unisphere Media and Database Trends and Applications Magazine conducted the most comprehensive survey of the multivalued database technology application development and user community ever undertaken. With more than 500 respondents, the survey identified five key trends in the multivalued community, which are reported in this executive summary. Additional findings are available in the complete study. For more information about the complete study, please contact Tom Wilson, president, Unisphere Media at tom@dbta.com or 973-665-1120.

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INTRODUCTION

Multivalued database technology has long commanded the loyalty of a significant community of database application developers and end users, though it is fragmented and lacking widespread general recognition. These developers and end users have been attracted to the low overhead, efficiency, and flexibility of this technology. Over the past several years, there has been some consolidation in the vendor community. At the same time, the growth of technologies such as XML, which shares similar underlying structures with multivalued technology, and Web services, which facilitate the integration of disparate data management technologies in the enterprise, may offer new opportunities to integrate multivalued-based applications into mainstream data management processes.

In May 2003, Database Trends and Applications magazine, the premier industry publication for the multivalued community, and its parent company, Unisphere Media LLC, conducted the first extensive market research study of the multivalued database marketplace. More than 500 multivalued database development managers and executives participated in this study, conducted via e-mail and the Web. Six out of 10 respondents represent end-user companies, about a quarter are value-added resellers of multivalued database products, and the rest are commercial software vendors. Respondents represented a range of industries, with larger concentrations in manufacturing, financial services, and general services. Four out of 10 come from smaller companies with 100 or fewer employees, another quarter comes from larger organizations with more than 1,000 employees.

This executive summary contains the following sections. First, it provides a short history of the development of multivalued technology. Next, it identifies five major trends at play in the multivalued marketplace. It then provides insights into who participated in the survey and finally draws a series of conclusions about this community. The entire report can be purchased from Unisphere Media via the contact information contained at the end of this executive summary.

PART 1: A BRIEF HISTORY OF MULTIVALUED

The early history of multivalued databases centers around one man – the late Richard Pick – who designed the first multivalued database almost 40 years ago. While at TRW, Pick and Don Nelson developed what they called the Generalized Information Retrieval Language Systems (*GIRLS*) on an IBM S/360. The first commercial implementation of what came to be called the Pick Operating System was released by Microdata, which was subsequently purchased by McDonnell-Douglas Information Systems. In the late 1970s, a Microdata VAR separated the database component of the technology from the operating system and marketed it as Prime Information, running on Prime Computers. By the 1990s, the various flavors of Pick databases shed their OS roles and emphasized the database technology, which has been ported to just about every platform in the IT world, including Linux, most flavors of Unix, and Windows. IBM estimates that the multivalued database market is now a \$3 billion annual market.

Multivalued databases differ from relational databases in two ways. First, they are three-dimensional, meaning they support an unlimited number of values in a single field. In a relational database, each entry requires its own field. In addition, multivalued databases support variable field lengths – meaning a short entry, such as ABC Co., will only take up six bytes in the database. In relational databases, a fixed field length is assigned, even if space is blank. Originally, the multivalued approach saved valuable disk space and still has a major impact on performance due to faster disk access to data. Three-dimensional data storage has been the philosophy of multivalued databases since their inception. For example, a customer master record could have one field that could contain a list of invoice numbers that are open for that customer. The single field can support a list for multiple values of pointers to other places in the database. In this design philosophy, if an invoice was made for the customer, that invoice number would be inserted into that field, along with the other invoice numbers for that customer.

For the most part, participants to this survey are sold on the advantages of multivalued database technology over those of relational database systems. “Multivalued and relational databases don’t compare at all,” said one survey respondent, the head of a manufacturing firm. “Most RDBMSs are very restrictive in the format of data and the development environments. To this end, development of a product on a mainstream RDBMS is very time consuming. And this does not even raise the issue of price of the database that needs to be deployed with the application.”

Multivalued database technology is “fast, compact, and easy to maintain,” said another survey participant, a health professional with a large federal government agency. “Our database has 20 years of data online, with 100,000 records containing information on 4,000 persons. All in less than 100 MBs.”

PART 2: KEY TRENDS

This survey unveiled a number of major trends that are shaping the character of the multivalued database market.

Trend #1: Multivalued databases serve as the foundation for mission-critical data management applications and processes.

Though not as well known as the major relational database systems, multivalued database technology runs in the mainstream of many organizations' mission-critical systems. A majority of respondents to the survey say their multivalued database applications run a wide range of mission-critical applications, including finance, supply chains, and procurement. In close to half of the cases, business intelligence and analysis tools are being run against these multivalued databases. Thus, they are used for both operational and analytical systems.

Industry experts note that at one time, almost every auto dealer in the U.S. used a multivalued application. More than half of the public libraries in the U.S. use multivalued applications. The best-selling debt collection software uses multivalued technology.

Multivalued databases – with their high-level integration capabilities – also can play a role in enterprise integration projects, as well. “Recently, our parent company acquired another business and began the process of converting the new business to their Oracle application,” said one database manager. “Neither Oracle, nor the business's original platform, was able to properly integrate the data from the old system to the new. As such, they actually purchased a multivalued database license specifically to handle the data conversion, at which point it was uploaded into the Oracle back end. If these two points aren't enough to sway one away from Oracle, and towards a multivalued-based solution, I don't know what is.”

Chart 1 shows the types of applications supported by multivalued databases in our survey. While financial and accounting applications are the most common, multivalued technology is used in the full range of enterprise-level applications, as well as embedded applications such as retail point of sale systems. The range of applications demonstrates the technology's versatility and general applicability.

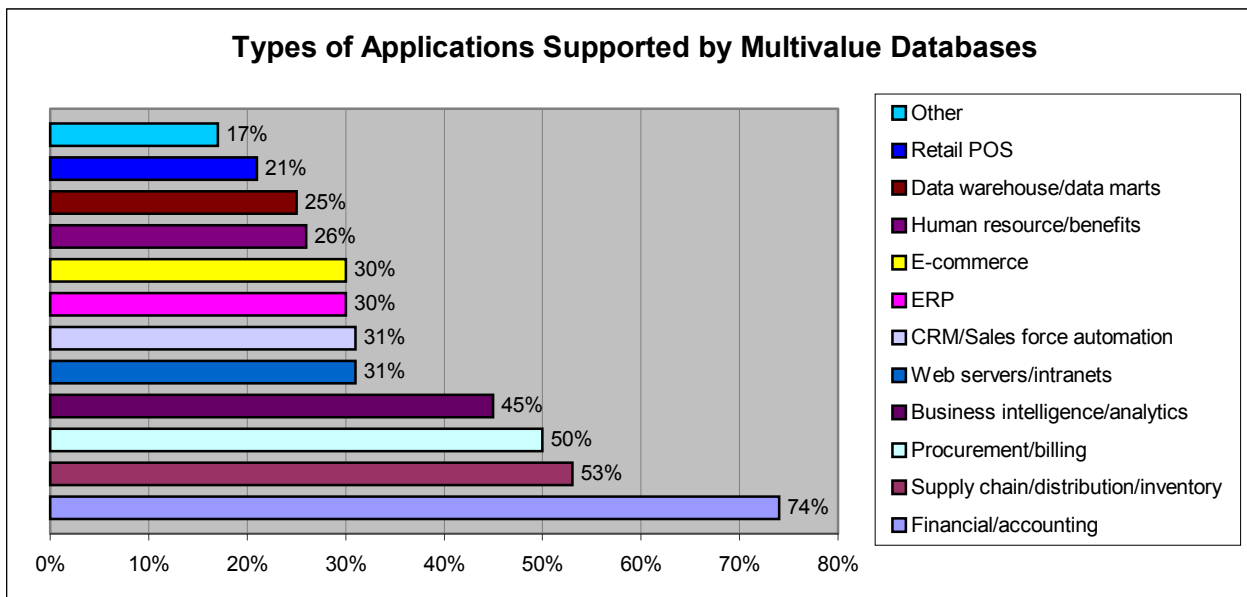


Chart 1

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Trend #2: Multivalue databases are highly customized.

There is really no such thing as packaged, “off-the-shelf” multivalue database application software. Most applications are written right on the premises to address specific business requirements. The survey finds that in seven out of 10 cases, all applications are developed onsite.

In addition, the survey finds ease of development and deployment rank at the top of the list of criteria for database selection.

A factor contributing to this high rate of custom development is that it is simpler for programmers to build robust business applications on top of multivalue databases that model business rules than on relational databases. Industry experts concur that it is easier to develop new applications and code or change existing code on a multivalue system. On most relational databases, the schema is tightly organized and has to be absolutely correct to make changes.

Cost, performance, and the speed of development also separate multivalue databases from relational systems. A small VAR shop of two to three people can manage dozens of companies that don’t have the internal staff to develop systems. For example, a typical VAR shop may support up to 40 to 50 customers’ database operations. “I have a staff of only five people, developing and supporting our multivalue database applications,” said the database manager with a large southeastern retailer. “Our parent company has an IT staff of over 300 people who develop and support Oracle. Our application exceeds theirs in performance, functionality, speed--just about everything, except scale.”

Chart 2 shows the amount of multivalue application development that takes place at the respondents’ premises. Clearly, multivalue technology appeals to professionals who wish to customize their applications.

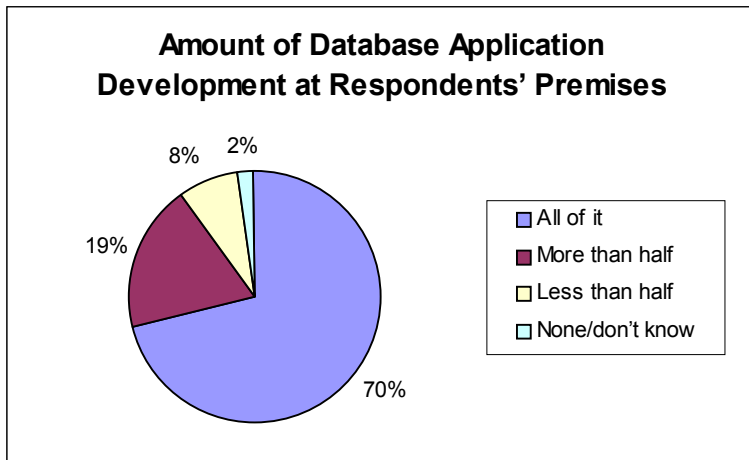


Chart 2

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Chart 3 shows how multivalue applications make their way into the organization. Once again, multivalue technology is used most often for in-house custom applications.

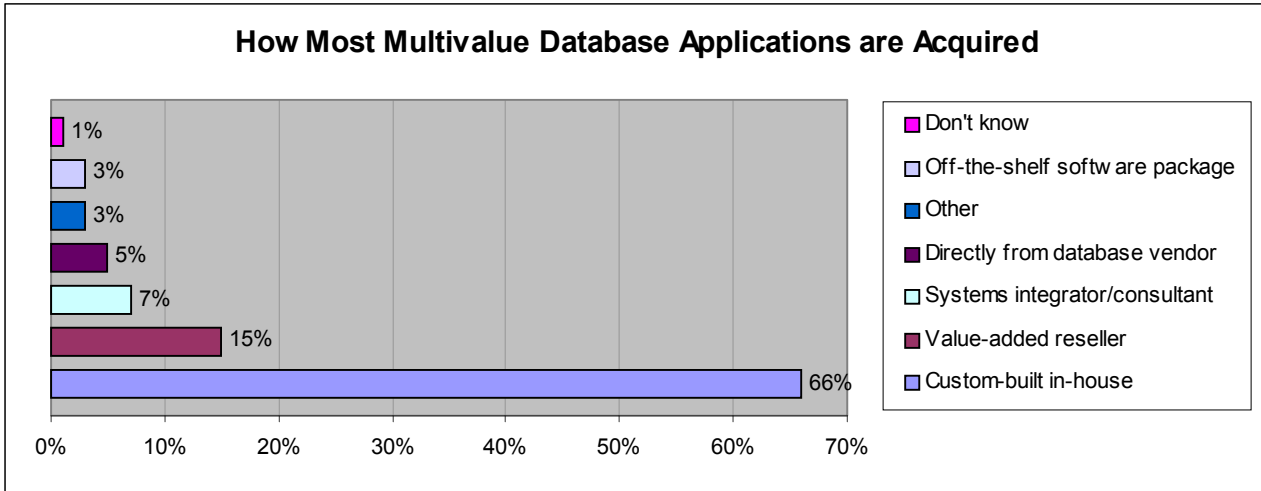


Chart 3

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Chart 4 reveals the criteria multivalue database application developers apply in their selection process. Ease of use and deployment, and ease of development top the list.

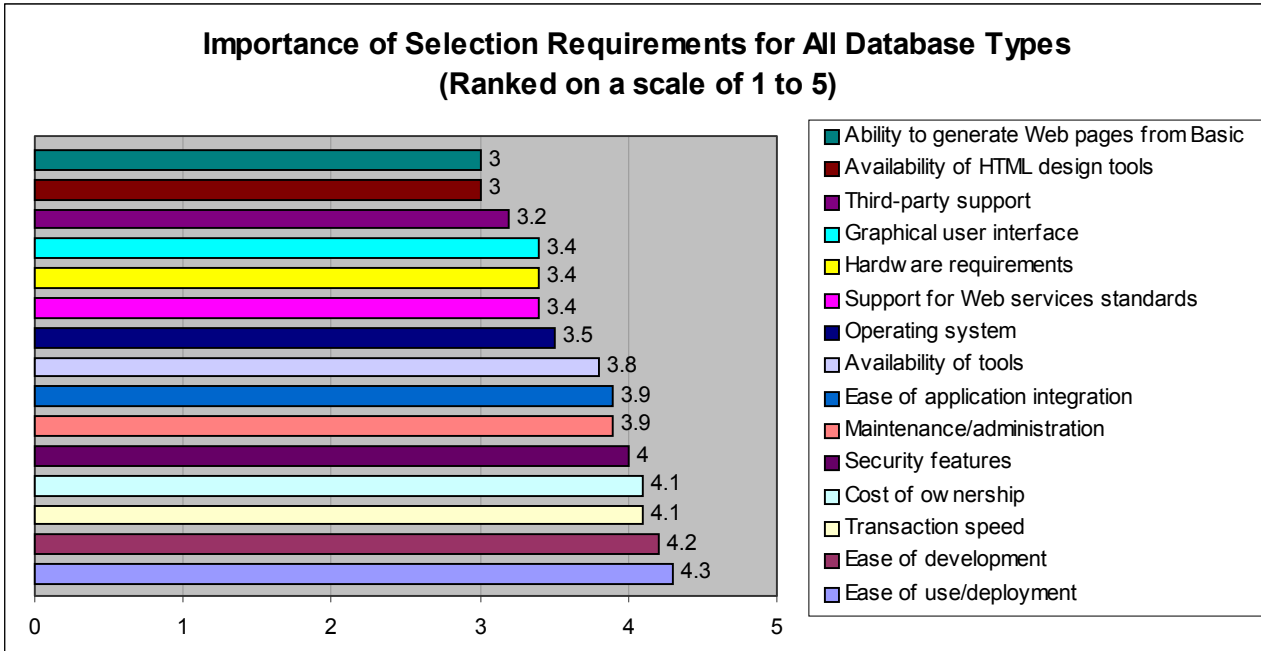


Chart 4

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Trend #3: Multivalue databases are moving to the Web.

Although multivalue applications typically have had “green screen” alphanumeric interfaces, application developers are rapidly moving their solutions to a Web environment, the survey finds. Almost half of the multivalue database sites surveyed, 45 percent already have linked their data to facilitate Web access. Of those that don't, 69 percent are planning or considering such a move within the next 12 months.

Charts 5 and 6 quantify the progress the multivalue community has made moving to the Web and the expected rate of Web-enablement over the next two years.

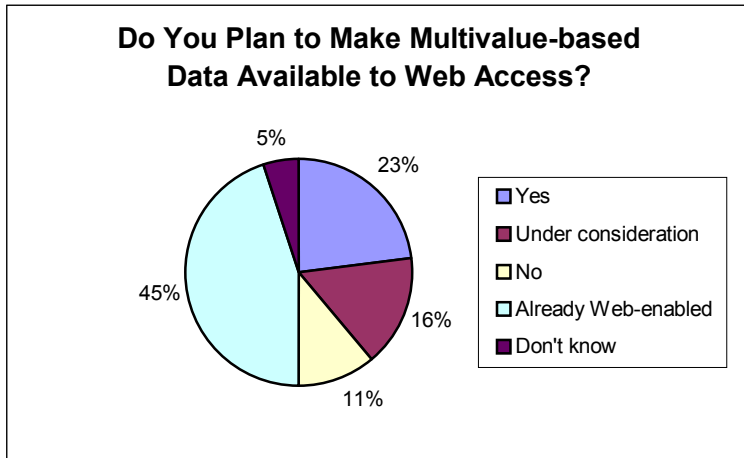


Chart 5

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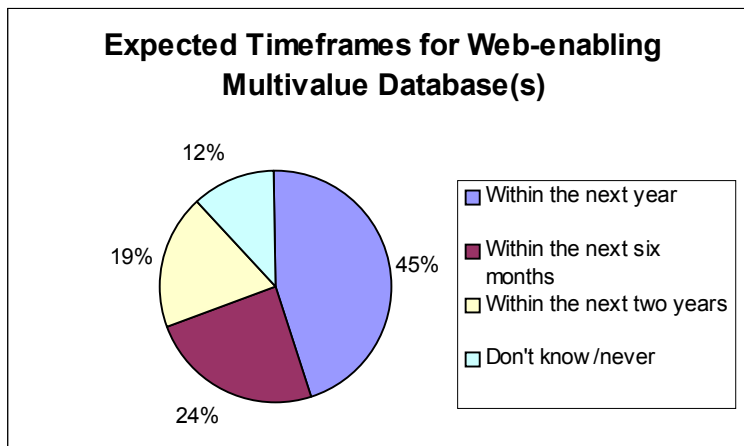


Chart 6

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Some respondents note the ease with which they were able to move their multivalue data to the Web. “Our corporate headquarters recently switched from a multivalue integrated business system to a relational-based ERP solution,” said the database manager with a large West Coast manufacturer. “However, we continue to support 170 of our stores on a multivalue-based wholesale distribution application, as well as several applications still at headquarters that were never converted because of cost and time. I have been able to get an online Web ordering application tied to the multivalue databases up and running in six weeks. It has taken the relational side of the house a year and a half to do the same application. Plus, whenever a change is made to the relational schema, you must get everyone off the system, save the data, rebuild the schema with the changes, and then re-load the data. Not a quick or easy task. A multivalue database is also cheaper to operate in license fees, computer hardware, and time required to accomplish some business tasks.”

Trend #4: XML and Web services top multivalued site agendas.

The survey finds that XML is dramatically remapping the multivalued market. Along with Web services in general, the XML standard ranks at the top of database development technology priorities cited by survey respondents, garnering a rank of 3.6 on a scale of 1 to 5, (with 5 being extremely important). Many industry leaders say the industry is reinventing itself, using the same fundamentals of the architecture, to provide effective XML solutions. This is like a rediscovery of multivalued technology. "XML's more open, multi-layered model is closer to the multivalued format than rows and tables in relational form," said one industry consultant.

Many database managers and developers are discovering the transition to a hierarchical-based XML system is fairly seamless from a multivalued system. "With the move to XML, everything is going to delimited strings," said the head of a healthcare software vendor. "Without any fuss, we're ready to roll. Whereas, someone with a SQL mindset probably isn't used to delimited strings. It's a totally different architecture, so they're likely to have a pretty tough time complying with these new standards."

Graphical user interfaces also rank as an important area for multivalued database developers, the survey finds. The ability to front-end multivalued applications with a familiar, user-friendly GUI is vital to the future acceptance of the technology. "It's an issue of perception," said the IT director for a midmarket retailer. "People view the typical data entry screen of an older multivalued application as an 'old-fashioned'-looking screen while not understanding the efficiency of what's happening behind the scenes. This public relations issue can best be dealt with by developing Web-based applications that will permit both browser and VT100 emulation."

Chart 7 indicates that XML and Web services, the most intriguing new technologies, are of equal interest to the multivalued community. Both can be used to integrate multivalued applications into large information infrastructures.

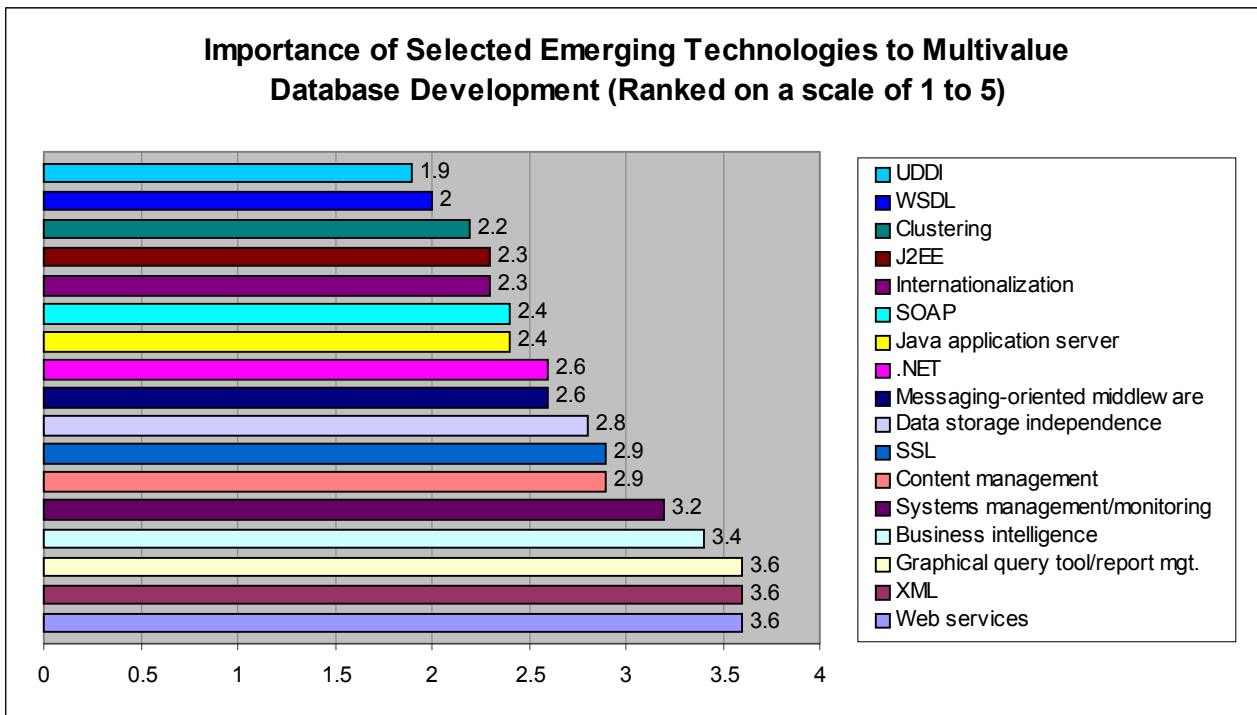


Chart 7

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Trend #5: Low awareness challenges the multivalued market.

Respondents are overwhelmingly pleased with the capabilities and technology of their multivalued database systems. Almost 85 percent cite the ease of application development made possible by these systems, and 81 percent cite the low maintenance and administration requirements.

The main drawback of these systems is not technical, but one of visibility. The low profile of these systems hurts the overall acceptance of multivalued technology, respondents agree. "Market uncertainty" leads as the greatest challenge to multivalued technology, as cited by 50 percent of the respondents to this survey. Lack of marketing and advertising follows at 46 percent, and lack of management awareness at 43 percent.

The business model through which multivalued databases are sold also keep visibility low. Multivalued database applications have always been sold through VARs or are developed internally, so the ultimate end-users are only aware of the front-end application and not the database technology behind the scenes.

Respondents also cite other reasons for the low profile of multivalued technology. "Since the Pick operating system was never allowed to flourish, there is no visibility for this OS," said one respondent, the head of a small IT consulting group. "Also, vendors don't really advertise the multivalued environment. If a prospective buyer does not already know about multivalued database offerings, they are next to impossible to find."

"The biggest problem is market awareness," said another respondent, an analyst/programmer with a large direct-mail retailer. "Oracle advertises its products all the time. I never expect to see a multivalued database advertisement ever on TV, let alone during events like the Super Bowl. I would drop dead in shock if I ever saw a TV commercial touting the strengths of multivalued."

One respondent recommends that multivalued vendors provide much of the technology for free or at low cost, in order to grow the installed base. "Selling seats or systems by CPU no longer meets the need to the multivalued product world," said the senior systems analyst with a large midwestern manufacturer. "Vendors must look at getting the installed base to grow. This requires almost giving away development tools, client licenses, and seats. Clients must be almost free. Vendors need to sell support, service, and integration." In addition, this IT manager recommends that vendors make their customer lists available to the market as well as to local user groups.

"Multivalued databases are the 'Betamax' of the database industry," said one respondent, a marketing manager with a small nonprofit organization. "They're cleaner, leaner, faster, cheaper, easier to use and easier to modify, yet they're the stepchildren of the big table-based databases."

PART 3: CHARACTERISTICS OF RESPONDENTS

This study represents the most comprehensive look at the multivalue database application development and user community ever conducted.

As Chart 8 shows, the respondents to the survey were a mix of internal company developers and value-added resellers. A small number also sell packaged applications based on multivalue technology.

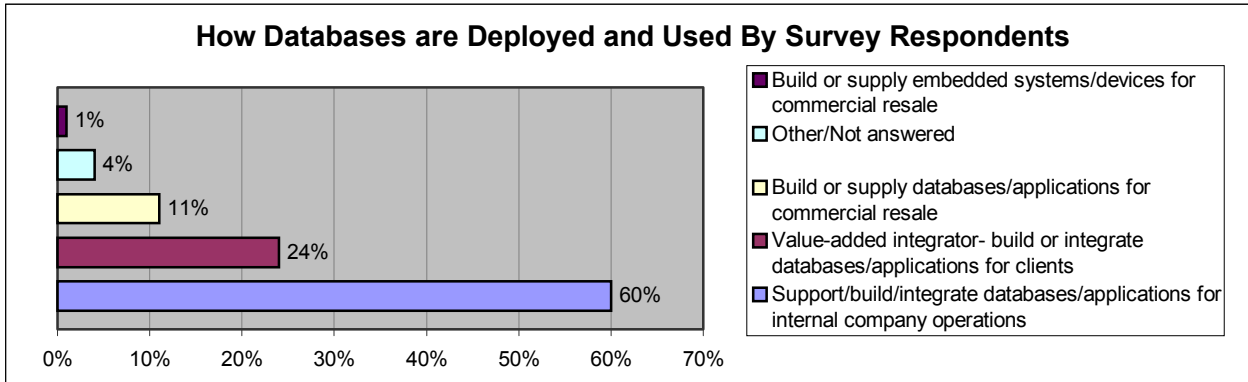


Chart 8

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Chart 9 indicates that 78 percent of the respondents build, manage, purchase, or administer databases and database applications.

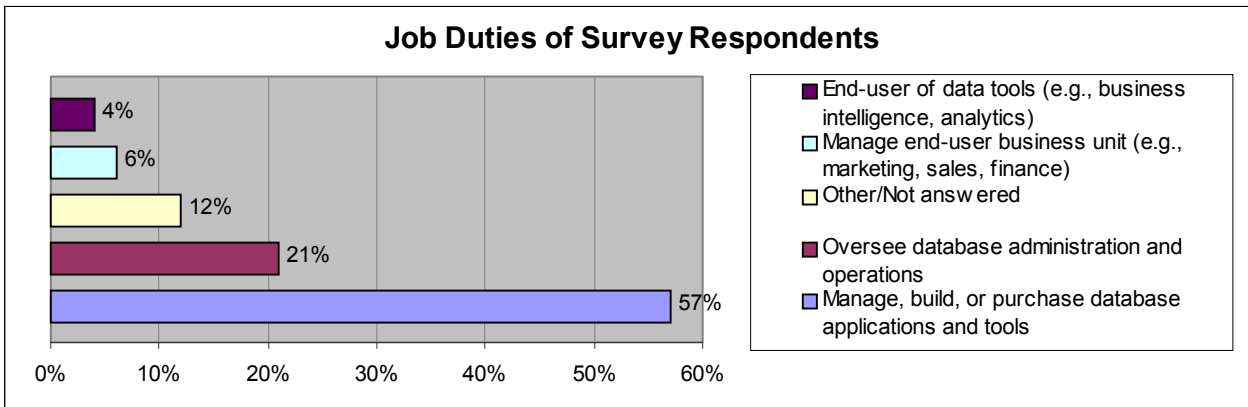


Chart 9

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Chart 10 confirms that the respondents largely have hands on, day-to-day experience with multivalued technology.

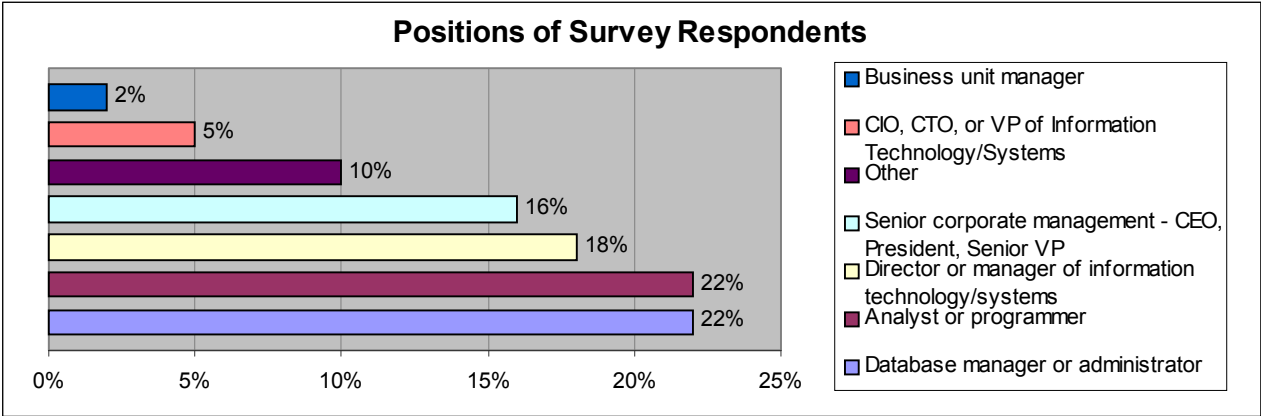


Chart 10

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Charts 11 and 12 lay out the breadth of industries in which multivalued applications can be found, as well as the universe of company sizes. The use of the technology has proliferated through virtually every industry sector. And perhaps somewhat surprisingly, its use is not restricted to the small- and mid-sized business arena. Nearly 25 percent of the respondents to this survey work in enterprises with 1000 employees or more.

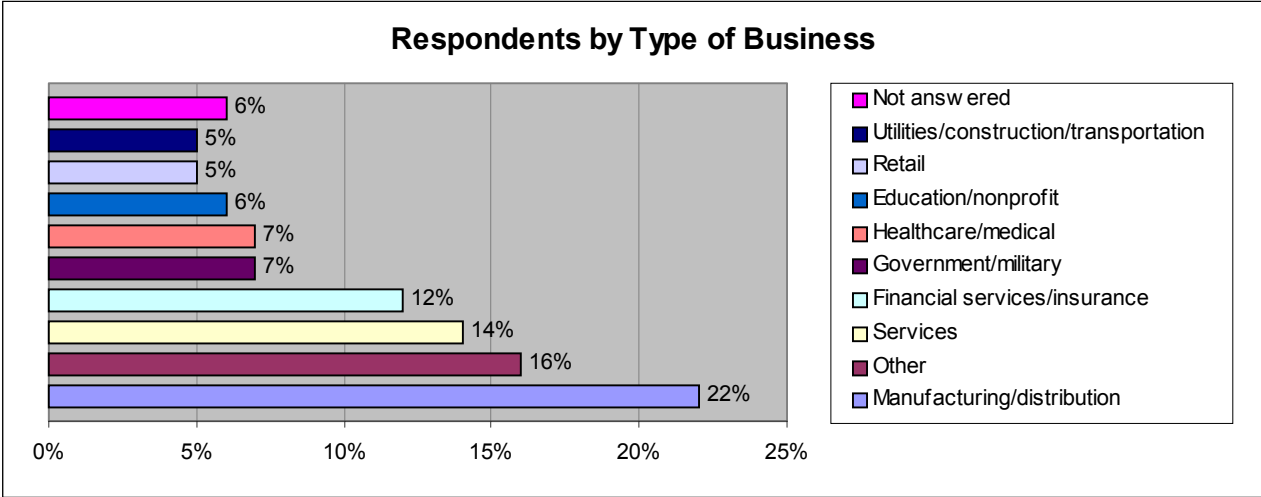


Chart 11

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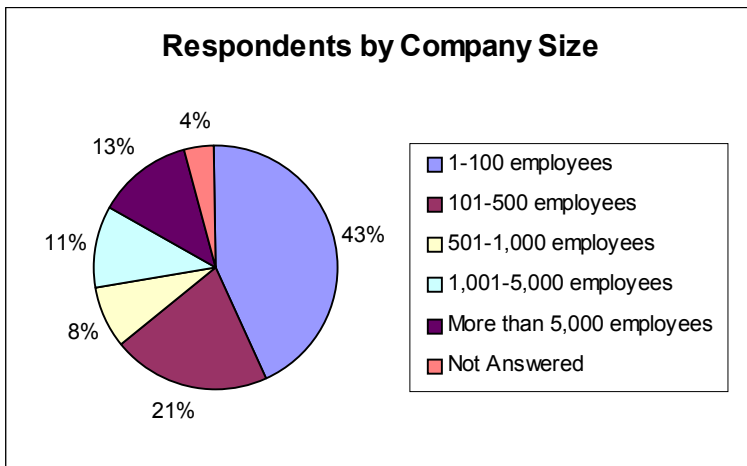


Chart 12

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CONCLUSION

The multivalue database community of users remains enthusiastic about the technology. The community is comprised primarily of corporate developers and value-added resellers who created relatively customized applications built on a multivalue database platform. They find that it is easier to develop applications, deploy applications, modify applications, and administer applications using an underlying multivalue database.

The multivalue community is not hesitant to create mission-critical applications with this technology. Moreover, the use of multivalue databases is not restricted either to a narrow range of industry sectors or company sizes. Instead, it can be found in virtually every industry sector and in very large as well as very small companies.

In addition, new technologies promise to enable multivalue-based applications to be integrated into broader enterprise information infrastructures. Multivalue applications are increasingly Web-enabled. Moreover, multivalue application developers are embracing XML and Web services, the two most significant emerging data integration and application integration technologies.

Nonetheless, the multivalue community faces serious challenges. Perhaps the most formidable is visibility. Despite approaching the 40th anniversary of its creation, multivalue technology is little known. Indeed, the term multivalue itself is a relatively recent invention and not yet completely accepted by all players in the community. A major player has reverted to the older Pick nomenclature for the technology, contending that the term multivalue refers only to one feature of the technology and has not been broadly embraced in the mainstream IT community. Also, over the past several years, many of the major vendors have faced business challenges due to several different reasons including the economic conditions in IT generally. Those challenges have made it even more difficult for multivalue technology vendors to get the word out about their specific offerings and to attract third parties to develop add-on and enhancement products.

This executive summary contains only selected highlights of the data collected. For more information about the scope of the complete study, contact Tom Wilson, president Unisphere Media, at 973-665-1120 or Tom@dbta.com, or visit our Web site www.dbta.com/multivalue.

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