

# **Database Skills Availability: Critical to Your Selection of Database**

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**Executive Summary**

The availability of database skills is a key factor in judging whether your organization can productively use a database management system (DBMS), and whether it is the right database for you.

Ask yourself: *will choosing this DBMS reduce the “skills challenge” and labor costs we face? Will our organization be able to exploit the full capabilities of this DBMS in solving business problems?*

This white paper analyzes IBM DB2 Version 8 and DB2 9 from the standpoint of acquiring the skills required to install, use, manage and maintain the product. Some sections directly compare DB2 to Oracle and Microsoft SQL Server. Others delve into DB2 itself and how IBM ensures skilled professionals are available to work with the product. The goal is to give you the information you need to judge whether DB2 can address the “skills challenge” you face as a database user.

**As explained in the report, the IT labor market is tightening. This places a premium on selecting a DBMS that helps you meet the skills challenge.**

Vendors that best help their customers meet the skills challenge:

- **Offer “automated databases.”** Self-managing DBMSs reduce the requirement for skilled personnel. This report describes how DB2 new autonomic features enhance ease of use and minimize the skills necessary to administer the database.
- **Support open source software.** Open source skills are becoming predominant. This report compares the open source positioning of IBM, Oracle, and Microsoft, and concludes that IBM best helps customers leverage the growing pool of IT professionals having open source skills.
- **Grow their own talent pool.** Only the most committed vendors invest in the skills programs that make it easier for customers to secure expertise to leverage their database. This report describes IBM’s comprehensive effort to develop the DB2 talent pool and ensure that IT managers have database expertise available.
- **Offer inexpensive database certification.** Certification is the industry’s preferred approach to developing skills. This report compares the DBA certification programs for DB2, Oracle and Microsoft SQL Server, and concludes that IBM’s certification program offers the most cost-effective way for IT professionals to gain database skills.
- **Provide an array of support and training alternatives.** Clients want to define their own support package and choose their preferred means of access to support. This report summarizes IBM’s support and training options and how customers tailor them to their needs.
- **Offer diverse consulting services.** Consulting services are a means to quickly obtain expertise. Services must span both technical skills and business knowledge. This report outlines the wide range of options IBM offers DB2 users.

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## Highlights

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### The Skills Challenge – What is it and Why Does it Matter?

Database Management Systems (DBMSs) are traditionally one of the more complex pieces of software IT sites must install, manage, maintain, and administer. This challenge is amplified by the criticality of databases to most organizations – without modern DBMSs to manage data, typical applications for e-commerce, decision support, and even traditional back-office functions are not possible.

IT personnel must be capable of working with the DBMS chosen to use it properly and fully leverage its capabilities in realizing business value. Programmers must be able to efficiently interface their applications to the DBMS: failure results in slow applications, because database I/O is the single most time-consuming operation performed by application programs. *Analysts* and *application designers* must be able to design solutions that effectively solve business problems using the DBMS. If the DBMS is difficult to understand or use, they may design applications that won't work or won't perform. *Database Administrators* (DBAs) must be able to bring the full power of database features to bear on business problems. They must feel comfortable in resolving database issues even while advising others about how to use the product. DBA expertise can be the Achilles' heel of database projects – many IT projects have failed due to the inability to secure DBA talent or successfully address DBA issues.

***Thus it becomes apparent: Whether you can train (or quickly obtain) IT professionals to work with and leverage your DBMS in solving business problems is key to whether it is the right database for you.***

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Let's look at why DBMS ease of use and manageability is so important from the standpoint of different database users:

**Small IT sites** may not have a DBA on staff. Can they still use the DBMS effectively, or will its complexity be a show-stopper? Must they hire a DBA even to manage packaged applications? Or can staff concentrate on their “real work” without the headache of finding and retaining this specialized expertise?

Large IT sites push the DBMS to its functional and performance limits. The main skills issue they face is: how large a staff will be required to use the database and how much will it cost? Can current employees manage the database, or will the organization be forced to bring in consultants? If they use existing staff, what will it cost to train them? If they outsource, are there a variety of reasonably-priced options available from the database vendor and independent sources?

**Packaged Solution Providers and Business Partners (BPs)** need a DBMS that won't “get in the way” of the solution they offer. A DBMS that is hard to install, requires “special handling” or won't perform can torpedo the packaged solution the vendor sells. If a BP has to focus time, concern, or resources on the DBMS (rather than their own software and client needs), that database has failed them.

This report analyzes IBM DB2 Version 8 and DB2 9 from the standpoint of these common needs. The goal is to give you the information you need to judge whether DB2 can help you address the “skills challenge” you face as a database user.

### A Tightening Market for Database Skills – The “Labor Problem” Returns

Over the past five years, IT organizations have enjoyed an abundant labor pool. The “dot.com” collapse of the year 2000, the terrorist attacks of 9/11, and the ensuing recession created a classic “employer’s market.” Managers found it easy and inexpensive to find skilled database developers and administrators.

**This situation is changing.** Recruiting firms, government studies, online job boards, and industry analysts see a constricting IT labor market. All project a shortage of database professionals (1-3).

Key trends underlie this consensus. Universities graduate fewer computer scientists every year. This incoming labor pool has now reached a low not seen since the 1980s (4, 5). Meanwhile, the “baby-boomers” are retiring. This trend will reach its apex in just a few years and portends a massive exodus from the labor force (6, 7).

The one countervailing trend is offshore outsourcing. Most experts now agree that offshoring has concluded its “honeymoon phase,” and that it will slow – but not negate – the increasing dearth of IT professionals (8-12).

Database professionals will be among the hardest talent to find. The Bureau of Labor Statistics projects database administration as one of the fastest-growing labor-shortages over the next decade (13). DICE, the world’s largest online IT job board, indicates that out of over 100 different skills, the two most sought-after today are “SQL” and “database” expertise (14). The Yoh Index of Technology Wages says that two of the most difficult positions to fill are “data architect” and “DBA” (15).

Small wonder that the Gartner Group warns IT managers that they face an imminent challenge in securing skilled professionals (16).

Underneath it all, the role of the database administrator is changing. Organizations today want answers to questions, not just data. They want “actionable intelligence” derived from the mountains of data they pay to collect and maintain.

New tools for data mining, business intelligence, multi-dimensional analysis, and web services mean more useful data – *but only if an organization knows how to apply them.*

The Robert Francis Group summarizes this trend saying “database administrators are becoming the enablers of business intelligence” (17). DBAs are evolving into a new, critical role. These high-level “data managers” will be what distinguishes flourishing IT departments from those that lag (17-19).

**Conclusion.** Over the past several years, IT managers have enjoyed an “employer’s market” for skilled database professionals. This situation is changing. Those who have been lulled into complacency face an unpleasant surprise. Astute managers recognize this trend and rank the “skills challenge” among their highest priorities when selecting their DBMS.

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*Technologies to achieve these goals include self-tuning software components, “wizards” that lead users through steps, “advisors” that provide optimization and performance recommendations, embedded expert systems, and other technologies.*

**Database Ease of Use – Autonomic Computing Reduces Skill Requirements**

*How easy a DBMS is to use directly affects how easy it is to obtain the expertise required to use it.*

Listening to customer feedback, IBM learned this fundamental fact several years ago. The company found that the “expertise issue” was increasingly important to IT sites. IBM responded with a strategic initiative across all its product lines. Initially launched with a \$1 billion investment as **Project eLiza** (20), it is now generally referred to as IBM’s **Autonomic Computing Initiative** (21, 24). The goal is to reduce the need for expertise by making software that is:

- Self-installing, self-configuring, self-managing, self-tuning, and self-healing
- Able to learn and adapt itself to changing use
- Easier to install, configure, use and maintain

Technologies to achieve these goals include self-tuning software components, “wizards” that lead users through steps, “advisors” that provide optimization and performance recommendations, embedded expert systems, and other technologies.

Autonomic computing has been a major theme in recent releases of IBM’s WebSphere, Tivoli, and Lotus products, as well as in operating systems and support tools (22).

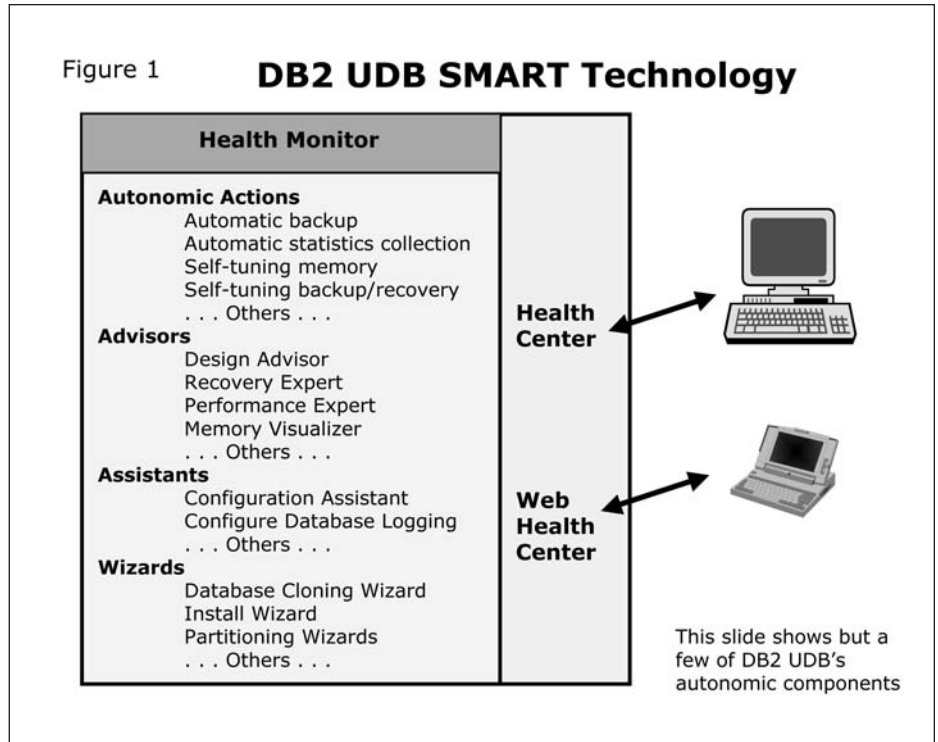
New autonomic features in recent releases of DB2 make the product easier to use and reduce the expertise required to use it. While these releases also address database performance, scalability, and availability, we focus on the new autonomic features because these directly affect the level of expertise required to use the software.

DB2 Version 8 adds **SMART** (Self-Managing And Resource Tuning) database technology that allows database administrators to spend less time configuring, tuning, and managing their databases. SMART covers a wide range of database functions. Figure 1 shows examples.

Central to DB2’s SMART capabilities are the **Health Monitor** and **Health Center**. The Health Monitor is a server-resident tool that manages by exception. It raises alerts when various health indicators are not within default (or prescribed) ranges. It provides pre-configured responses to common problems based on the “best practices” used at thousands of sites. Or, customers can tailor the responses themselves.

The Health Center is the GUI interface that manages these capabilities. Using it, you can, for example, generate and implement a SMART-generated performance recommendation merely by a couple mouse clicks. DB2 Version 8 also has a **Web Health Center** so that DBAs can use the Health Monitor remotely from a web browser or even a PDA.

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DB2 9 will continue this evolution towards the intelligent database. While DB2 always allows you to direct or override its operations, customers will find Version 9's new self-management features reduce the need for expertise because:

- Memory is self-configuring and adaptive
- DB2 optimizes memory across multiple instances running on the same server
- The database can handle physical storage allocation and management
- DB2 automatically runs backups, reorganizations, and statistics collection
- Utility operations like backup and restore tune themselves

***DB2 autonomic features underlie independent research by Solitaire Interglobal Ltd. that find DB2 staff requirements to average less than Oracle's across twenty different staff disciplines (23).***

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Verify this yourself by "test driving" the new DB2. You can download the new no-cost DB2 9 from [www.ibm.com/software/data/db2/v9](http://www.ibm.com/software/data/db2/v9). The product is self-installing and includes over 100 embedded tools for automating and simplifying database functions.

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DB2 9 demonstrates that small and midsize businesses do not need high-powered staff to handle a powerful database. If you're unfamiliar with recent DB2 innovations, you'll be amazed at its self-management. For dedicated applications it offers a "set it and forget it" DBMS.

**Conclusion.** Recent releases evolve DB2 into a more self-managing system. This reduces the labor required to manage the product and the skill level involved. It also frees staff to capitalize on the product's advanced features and leverage them for business value.

For a summary of new DB2 features, download the DB2: What's New manuals for versions 8.1 and 8.2 from [www.ibm.com/software/data/db2/udb/support/manualsv8.html#V8PDF](http://www.ibm.com/software/data/db2/udb/support/manualsv8.html#V8PDF). The DB2: What's New in Version 9 manual will be available in mid-2006. The DB2 developerWorks web site offers complete information on DB2 features at [www.ibm.com/developerworks/db2/](http://www.ibm.com/developerworks/db2/).

### **Leveraging Open Source Skills – Will Your Database Vendor Help?**

A few years ago, only the most adventurous IT organizations used open source software. They used but one or two well-known, "safe" products.

Today, we witness a sea change. Open source software has attained critical mass. This means that:

- Graduating students coming into the IT labor force have open source skills
- Experienced professionals increasingly offer open source skills

A study from Evans Data Corp. summarizes the trend when it states that more than 1.1 million North American developers now work with open source software (25).

*Whether the database vendor you select fits with or fights the open source movement increasingly determines the size of the labor pool available to work with that database.*

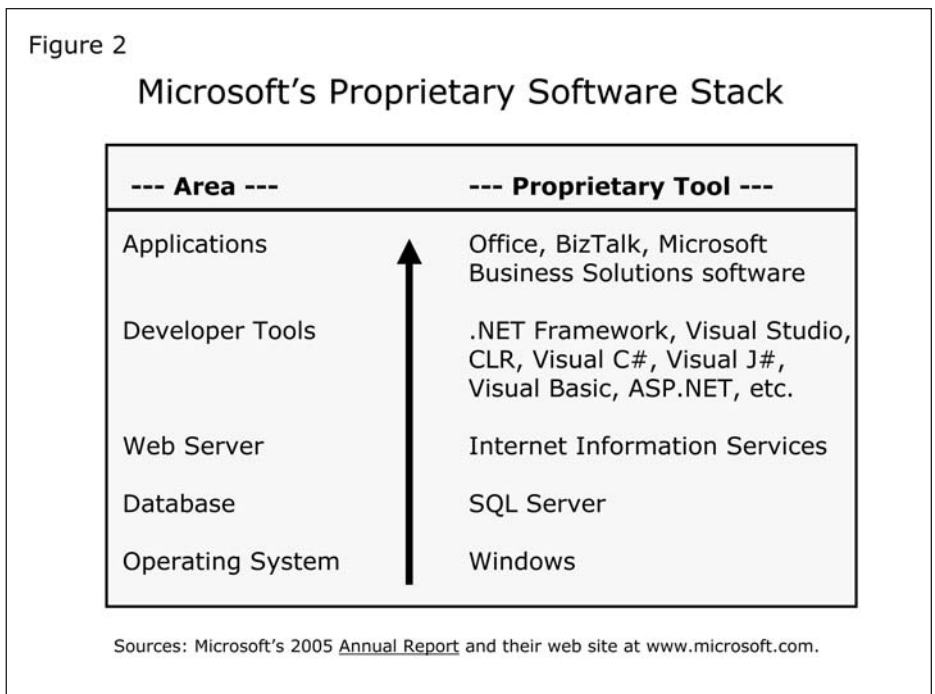
This section compares the open source positioning of IBM, Oracle, and Microsoft. The goal is to help you judge whether the companies align their database strategies with the open source movement. Those that do help you address the skills challenge with candidates who apply their open source skills to your database.

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**Comparison.** As shown in figure 2, Microsoft vends a proprietary software stack that competes with open source software at every level (26, 27). When you buy SQL Server, you buy into an integrated set of proprietary software tools. This is why SQL Server runs only on the Windows operating system.

EWeek's report on SQL Server 2005 states that Microsoft's goal in their recent release of SQL Server 2005 and Visual Studio 2005 is to inextricably bind the DBMS with the company's proprietary development tools. The result is that "... a developer's mastery of the .Net framework and .Net-oriented tools and practices becomes the crucial skill set" (28).



Microsoft has strong financial incentives to curtail their customer's use of open source software. As the company states in its annual report, "... the popularization of the non-commercial software model continues to pose a significant challenge to our business model..." (27). Microsoft lists this threat as first of two dozen risks to its business.

SQL Server customers can expect little help from their vendor in taking advantage of the fast-growing pool of IT professionals with open source skillsets. Microsoft views customers who leverage open source skills as defectors from their fold.

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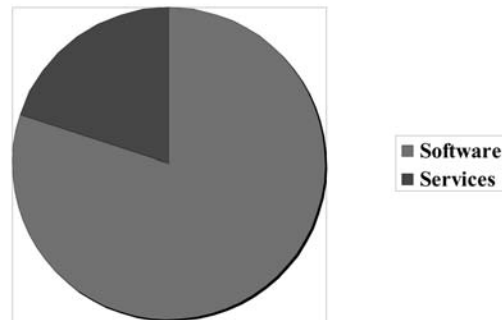
*Like Microsoft, Oracle Corporation derives its revenues primarily from software. Figure 3 shows that the company derives 80% of its total revenue from proprietary software and 20% from services (29).*

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Oracle also presents a full software stack to the customer (see figure 4). This stack consists of proprietary software tools, many of which rest on top of open standards (30).

Figure 3

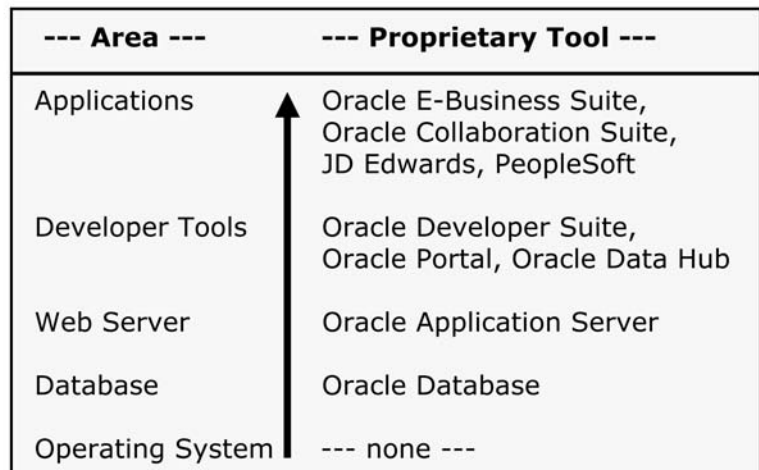
**Oracle Corporation Revenues**



Source: Oracle Corporation 2005 [Annual Report 10K](#)

Figure 4

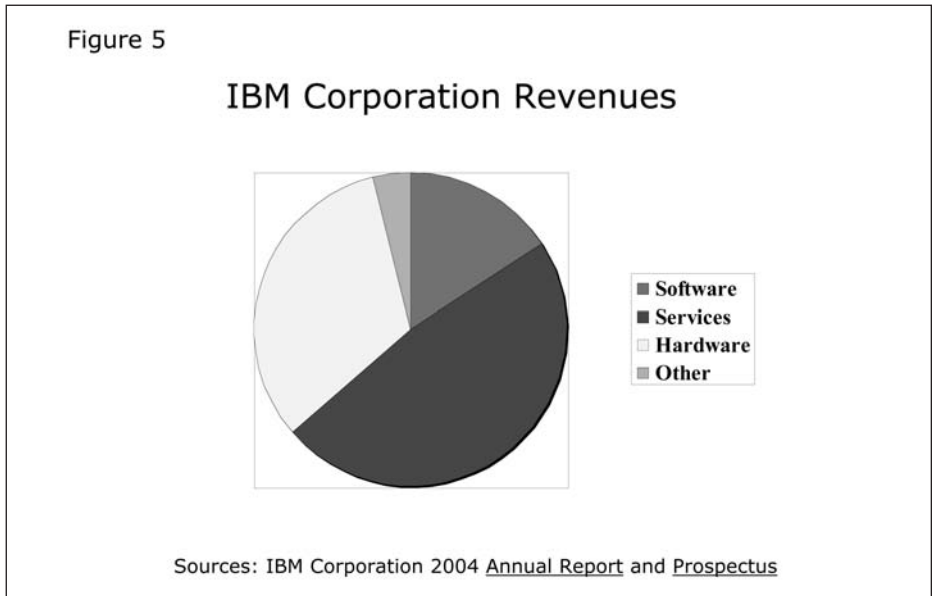
**Oracle's Proprietary Software Stack**



Sources: Oracle Corporation 2005 [Annual Report 10K](#) and their web site [www.oracle.com](http://www.oracle.com).

Oracle Corporation's reaction to open source software is best characterized as "mixed." While its customers charge ahead and leverage open source skills, Oracle Corporation resists. The company's annual report warns that: "Open source alternatives to commercial software in many of our primary markets... are also impacting the competitive environment" (31). Like Microsoft, Oracle Corp. directs its customers to buy into its proprietary software stack.

IBM is the least dependent of the major database vendors on software revenue, as figure 5 shows. 48% of the company's income comes from services and less than 16% is from software (32).



IBM's annual report states: "Central to IBM's approach for building value in the infrastructure category is its support of open standards and its active promotion of Linux and other open source platforms, which help IBM's clients control costs and allow them to benefit from the latest advances created by development communities around the world" (33).

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***IBM sees open source as a “win-win” value proposition and helps customers leverage its momentum with DB2. IBM's actions substantiate this.***

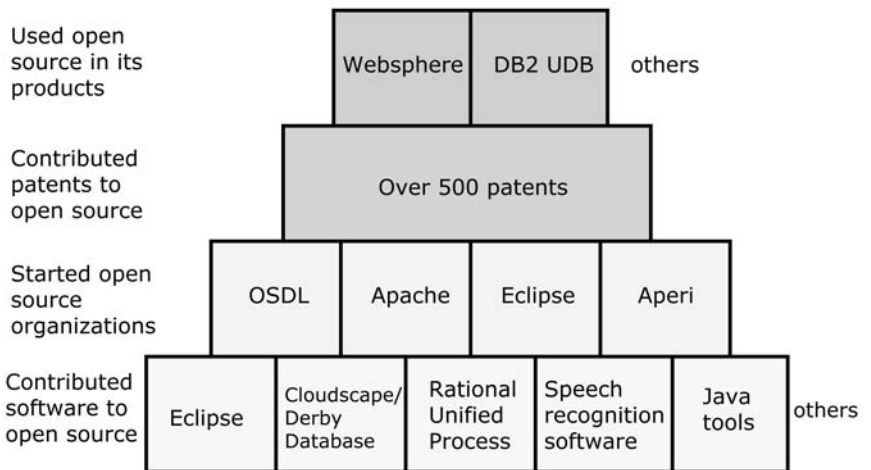
IBM sees open source as a “win-win” value proposition and helps customers leverage its momentum with DB2. IBM's actions substantiate this. As figure 6 summarizes, IBM:

- Helped found the major open source foundations, including the Open Source Development Lab, the Apache Software Foundation, the Eclipse Foundation, and Aperi, the open-source storage consortium.
- Contributed key software to the open source community. Examples include the popular Eclipse development platform, the Derby database, the Rational Unified Process for design, speech recognition technology, many Java tools, and scripting languages.
- Contributed over 500 patents to indemnify the open source community.
- Invested over \$1 billion in Linux and was the first vendor to make \$1 billion from Linux-related products and services.
- Bases its own products on open source software, including Websphere and parts of DB2 (34-43).

Figure 6

**IBM's Open Source Leadership**

**IBM has . . .**



**Conclusion.** Whether customers can capitalize on the open source movement to easily acquire skills depends in part on whether their vendor encourages or discourages the practice. Microsoft's financial incentives prompt it to oppose open source software at every turn. Oracle is similarly dependent on proprietary software, from which it derives 80% of its annual revenue.

IBM supports open source strategies and identifies its customers interest in open source software with its own. Customers capitalize on this symbiosis to more easily secure skills for their staffs working with DB2 than for any other commercial database.

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**Growing the Talent Pool - IBM's DB2 Commitment and Programs**

Vendor programs to grow the talent pool of IT professionals who work with their database are essential because they ultimately determine how large that talent pool becomes. Since these programs represent an up-front product investment to the vendor, not all vendors support their products with the same range of programs or with the same commitment. From the vendor perspective, the returns on such investment only become evident over time. This does not map well onto the quarterly timeframe the stock market imposes on their financial results.

From the viewpoint of the IT manager, these programs are critical because they:

- Dictate the growth rate and size of the IT talent pool from which IT managers will secure database skills
- Show the level of commitment the vendor has to its DBMS product
- Include programs IT managers can take advantage of

This section overviews the major programs through which IBM grows the DB2 talent pool. This allows you to judge the level of commitment IBM shows to DB2 and which of these programs might benefit your organization.

IBM views their programs as “on demand” customer resources. The goal is to provide timely information, training, support, and expertise as needed by customers, in the ways individual customers prefer.

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**Support.** *Vendor support is critical to the successful use of any database product.*

From its long track record in supporting IT sites, many IT managers consider IBM support the “gold standard” against which others are measured. Features of DB2 support include:

- DB2's Information Center component seamlessly integrates web-based support into DB2. The product guides and aids staff in their online search for information, support, and answers to their questions.
- IBM's breadth of support options gives IT managers alternatives in how to handle problems and the assurance they will be resolved.
- Unlike some vendors, IBM does not try to force DB2 customers into any particular support model. Customers choose which approach they best feel addresses their needs. They can tailor support services to their own requirements.

Figure 7 shows the range of support options and how they fit together. Customer self-help, optionally launched by DB2's Information Center, includes product updates and fixes, alerts, tips and hints, common procedures, and FAQs. Web support provides the ability to submit, monitor, and track problems through a common world-wide web site. *Voice support* includes global access to certified support personnel and 24/7 aid for mission-critical problems. Premium support goes beyond standard support services and enables DB2 users to define their own support system that might include, for example, proactive upgrades and fixes, accelerated problem resolution, technical account management, and structured knowledge transfer.

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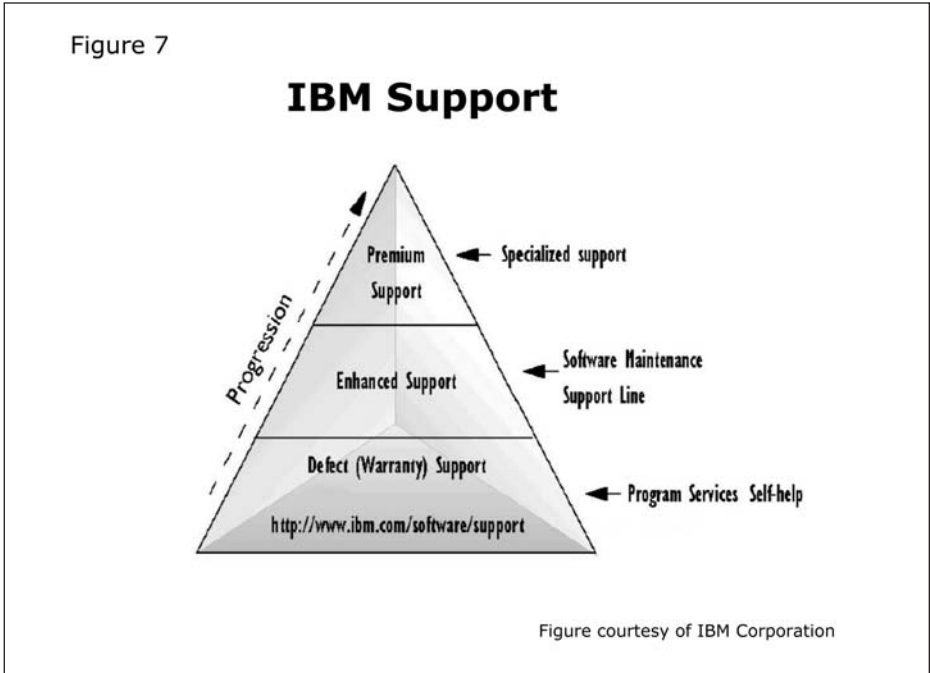
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Learn more from the IBM support web page at [www.ibm.com/software/support/](http://www.ibm.com/software/support/). The IBM Software Support Handbook describes IBM support and the available options. Read it online or download it from the support web page.



Passport Advantage and Passport Advantage Express are special IBM programs that bundle software licensing and support in a single contract. This simplifies licensing and ensures DB2 customers quality support. Benefits include:

- Software maintenance with each product license
- Comprehensive, flexible upgrade coverage
- Predictable budgeting for upgrade and migration costs
- Secure access to Passport Advantage Online
- Flexible, easy-to-access, responsive, cross-platform customer support
- Access to IBM software technical support for all of a customer's designated IT staff
- 24x7 access to support for business-critical outages
- Self help via the Internet

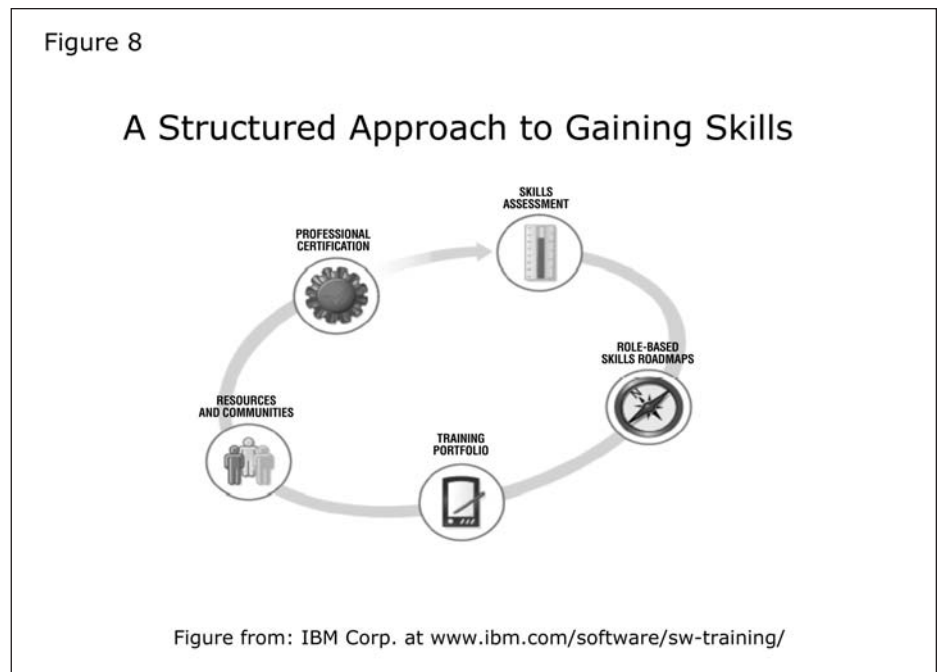
*Passport Advantage focuses on larger enterprises, while Passport Advantage Express is a transaction-based program that meets the needs of smaller businesses. Get information on the Passport Advantage program at its web site: [www.ibm.com/software/passportadvantage](http://www.ibm.com/software/passportadvantage).*

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### IBM Training: An On Demand Approach to Skills Development

IBM training is also an “on demand” service. This enables customers to get the training they need, in a timely manner, through the delivery mechanism they prefer.

Figure 8 diagrams IBM’s recommended approach to acquiring skills. This role-based approach helps customers assess their needs and acquire skills in the most effective manner. “Roadmaps” help customers efficiently train their staffs.



**IBM Training** offers a wide variety of courses for DB2 clients. This group addresses the needs of end users, managers, developers, operators, database administrators and support staff. The wide breadth of subject coverage is matched by the diversity of delivery media. For example, in addition to traditional classroom training (at their facilities or yours), IBM also offers web-based “e-learning,” CD-ROM courses, self-directed training, and Digital Video Library courses. These minimize your costs by eliminating travel expenses.

IBM further reduces your costs by integrating free self-study courses into the curriculum (47-50). No other database vendor offers such a mix of training options.

Look at IBM’s training and certification web page at [www.ibm.com/software/sw-training/](http://www.ibm.com/software/sw-training/). You’ll see how figure 8 applies, with assessment and role-based training integrated into the training portfolio and professional certification. The range of courses, delivery mechanisms, and ways to learn are unparalleled. They give IT managers the “on demand” ability to acquire the staff skills they require.

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The news and special offers page at [www.ibm.com/software/data/education/news.html](http://www.ibm.com/software/data/education/news.html) presents ongoing enhancements and new offers. Among the many options is the **IBM Education Advantage** program, a package that makes training staff easy and inexpensive.

**Partner Programs.** You'll also find IBM's partner program on the training web pages. IBM Training gives IBM Business Partners the ability to offer complete solutions to their customers. The program consists of IBM-supplied courseware and technical training materials. These allow Business Partners to offer customers a comprehensive curriculum across DB2 and other IBM products, such as WebSphere, Tivoli, and Lotus.

Benefits to participants include:

- The ability to include training as part of complete customer solutions
- Expansion of existing course portfolios, leading to increased revenue and market presence
- Cross-brand training across the major IBM product families
- Quality assurance through the IBM Certified Instructor role

Get more information on IBM's training partner programs from the web pages at [www.ibm.com/software/data/education/ecis.html](http://www.ibm.com/software/data/education/ecis.html) and [www.ibm.com/software/partners/educationcenters/](http://www.ibm.com/software/partners/educationcenters/).

**Mobile Academy for Content Manager.** The **DB2 Content Manager** is a companion product to the DB2 family of products that helps store, organize, manipulate, and present multimedia data. The product's popularity has skyrocketed as customers seek new ways to use and manage multimedia. DB2 Content Manager leverages this unstructured information to derive business value.

The Mobile Academy for DB2 Content Manager brings Content Manager training to customer sites. The package teaches IT professionals how to use and master the product. Its self-paced approach eliminates instructor fees and travel costs, while providing everything technicians need to know to certify with the DB2 Content Manager. Find more information on this program at [www.ibm.com/software/data/education/mobile-academy.html](http://www.ibm.com/software/data/education/mobile-academy.html).

*The program includes over 1,300 faculty members at over 90 schools. More than 450,000 students are being taught at 1,800 colleges and universities where they are teaching courses that include open standards, open source and IBM products.*

**Academic Initiative.** IBM's **Academic Initiative** is a world-wide program designed to develop technical talent at colleges and universities. The program includes over 1,300 faculty members at over 90 schools. More than 450,000 students are being taught at 1,800 colleges and universities where they are teaching courses that include open standards, open source and IBM products. The goal is to fill the skills pipeline by fostering a close relationship between IBM and academia.

The program addresses the needs of DB2 customers for qualified talent because it ties IBM into the breeding ground for new IT expertise. The Academic Initiative provides universities with free software and support, webcasts and newsletters, discounts on hardware and software products, forums and community, course materials, curriculum assessment, faculty and staff training, blogs and RSS feeds, access to jobs and fellowships, and other resources to develop technical talent.



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The program explicitly recognizes the central role of DB2 and database management software. The **Academic Initiative for DB2 Information Management** nurtures DB2 skills in graduating students.

For further information, access the IBM Academic Initiative program home page at [www.ibm.com/university/](http://www.ibm.com/university/). The Academic Initiative for Information Management is at [www.ibm.com/university/data/](http://www.ibm.com/university/data/).

**Publications and Web Sites.** *Quick, easy access to technical information determines whether you can derive maximum value from your DBMS.* It is essential for problem-solving. Much of the ever-expanding universe of DB2 technical material is available at little or no cost. Here we list just a few of the better-known resources.

Dozens of web sites offer DB2 articles, hints and tips, example code, FAQs, Q & A, and other information. Among the best are IBM's DB2 Developer Domain at [www7b.boulder.ibm.com/dmdd/](http://www7b.boulder.ibm.com/dmdd/), IBM's DBA Central at [www.ibm.com/developerworks/db2/zones/dba/](http://www.ibm.com/developerworks/db2/zones/dba/), DB2 Magazine at [www.db2magazine.com](http://www.db2magazine.com), IDUG Solutions Journal at [www.idug.org](http://www.idug.org), and DBAZine at [www.dbazine.com](http://www.dbazine.com). Free online forums for posting questions and interacting with other DB2 professionals include the International DB2 Users Group (IDUG), at [www.idug.org](http://www.idug.org), DB Forums at [www.dbforums.com](http://www.dbforums.com), and IBM's own forums at [www.ibm.com/developerworks/forums/db2\\_forums.jsp](http://www.ibm.com/developerworks/forums/db2_forums.jsp). IBM's new alphaWorks website unveils new technologies at [www.ibm.com/alphaworks](http://www.ibm.com/alphaworks).

IBM Press publishes a library of DB2 and related books available at [www.ibm.com/software/data/education/bookstore](http://www.ibm.com/software/data/education/bookstore). Search for "DB2" on [www.amazon.com](http://www.amazon.com) and you'll see a long list of current DB2 titles from many publishers.

Some DBMS products only include the "install guide" in their documentation. The DB2 product includes the complete DB2 manual set. All DB2 manuals are also freely downloadable from the web. For example, download the Version 8 manuals from [www.ibm.com/software/data/db2/udb/support/manualsv8.html#V8PDE](http://www.ibm.com/software/data/db2/udb/support/manualsv8.html#V8PDE).

IBM's special "red books" relate advanced tutorials and performance techniques. They are downloadable gratis from <http://publib-b.boulder.ibm.com/Redbooks.nsf/Portals/Data>.

All resources are accessible whether or not your site licenses DB2. If you are evaluating databases, use them to help your technical staff make an informed choice.

**Conclusion.** When you purchase a DBMS, you enter into a long-term relationship with its vendor. This is because most organizations keep their DBMS far longer than the timeframe they intend when they evaluate and select the product. IT managers should not just evaluate the database product; they must ask also themselves: is this vendor the best long-term partner? This section outlined a comprehensive set of database services and programs unrivalled in the industry.

***All resources are accessible whether or not your site licenses DB2. If you are evaluating databases, use them to help your technical staff make an informed choice.***

**Highlights**

**Training Your Staff**

**DBA Certification Programs: IBM DB2 vs. Oracle vs. Microsoft SQL Server**

Over the past decade, certification programs have become widely accepted as the de facto measurement of skills. IT managers look to certification programs as a standardized means of training and a way to ensure staff skills meet accepted levels.

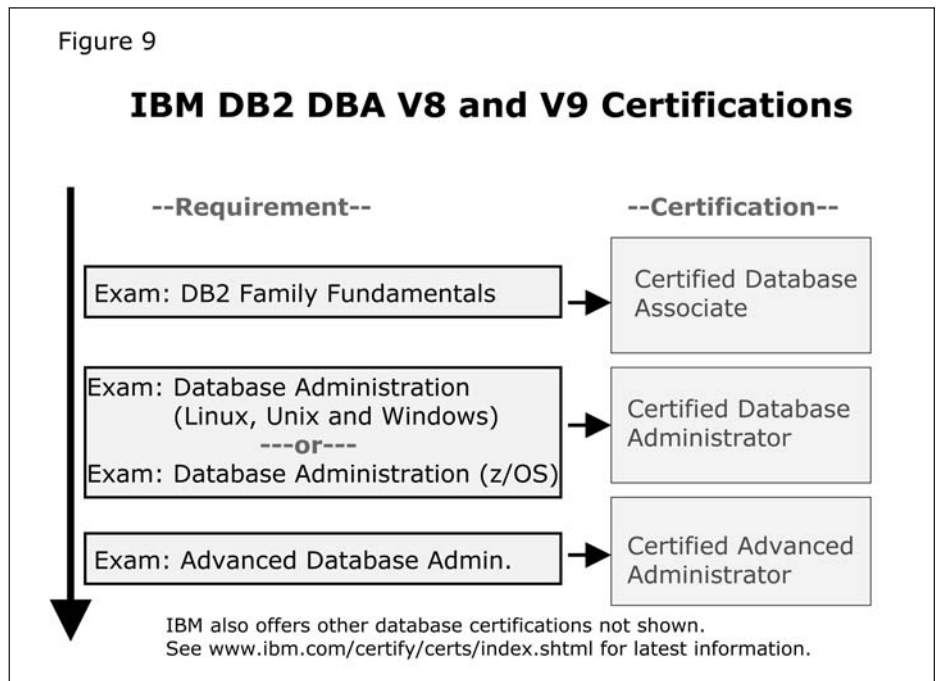
The DBA certification programs offered by the major vendors are important to IT managers because they directly impact:

- The size of the professional talent pool for each DBMS
- The future growth of the talent pool
- How much it costs to train your staff in the DBMS

This section compares the DBA certification programs offered by IBM for DB2 Version 8 and 9, Oracle Corporation for Oracle10g, and Microsoft for SQL Server 2000.

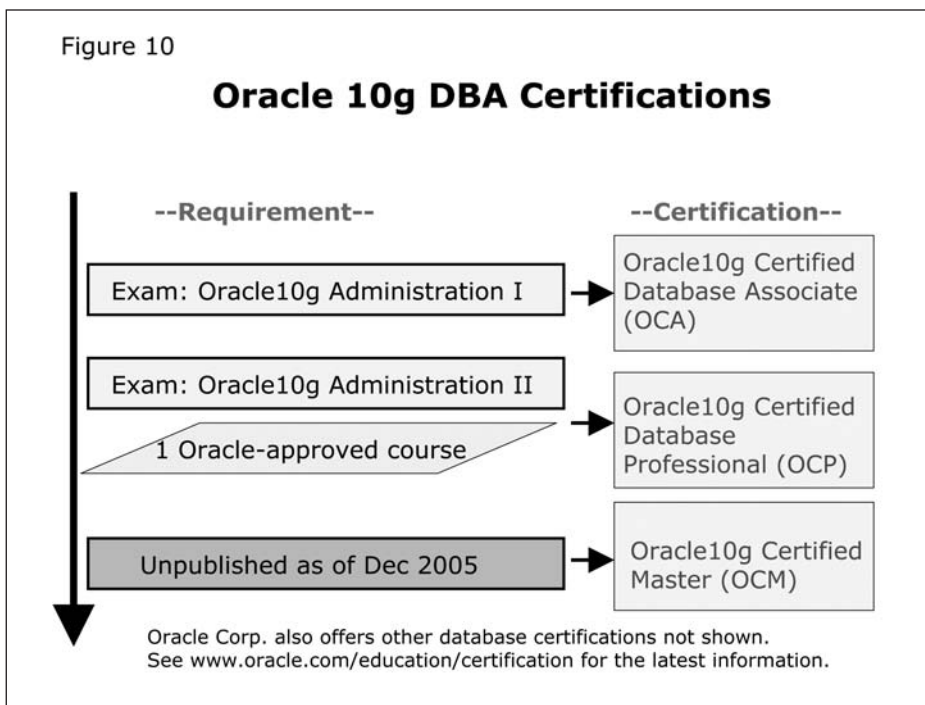
Vendors may design their certification programs however they wish, so visit the vendors' web sites for any recent changes (44). Each vendor represents that their certification teaches DBAs what they need to know about their product.

*Vendors may design their certification programs however they wish, so visit the vendors' web sites for any recent changes (44).*



**DBA Certification Programs.** Figure 9 diagrams the requirements of IBM's DB2 DBA certification program. A candidate passes one exam to become an IBM Certified Database Associate, a second exam to become a Certified Database Administrator, and a third to become a certified Advanced Administrator. Candidates can stop at any point in this process, and there are no certification requirements other than passing the exams. The "Certified Database Administrator" is widely viewed as the standard IBM DBA certification.

Figure 10 diagrams Oracle’s DBA certification requirements. Like IBM, there are three levels of certification. These are referred to as the Oracle Certified Associate (OCA), Oracle Certified Professional (OCP), and the Oracle Certified Master (OCM). The OCP credential is widely considered the standard Oracle DBA certification.



The OCA and OCP credentials each require passing one exam. The OCP level also requires taking one “hands-on course.” This course must be Oracle Corp.- approved and may be taken in person or via the web. This requirement for instructor-led training was introduced with Oracle9i release 2.

Oracle Corp. is updating its OCM requirements as this study is being written. They will be posted in early 2006 according to Oracle’s web site. For Oracle9i, the OCM required an OCP certificate plus two more instructor-led courses from Oracle University. OCM candidates also had to pass a two-day test, called the OCM Practicum Exam, administered only at Oracle University.

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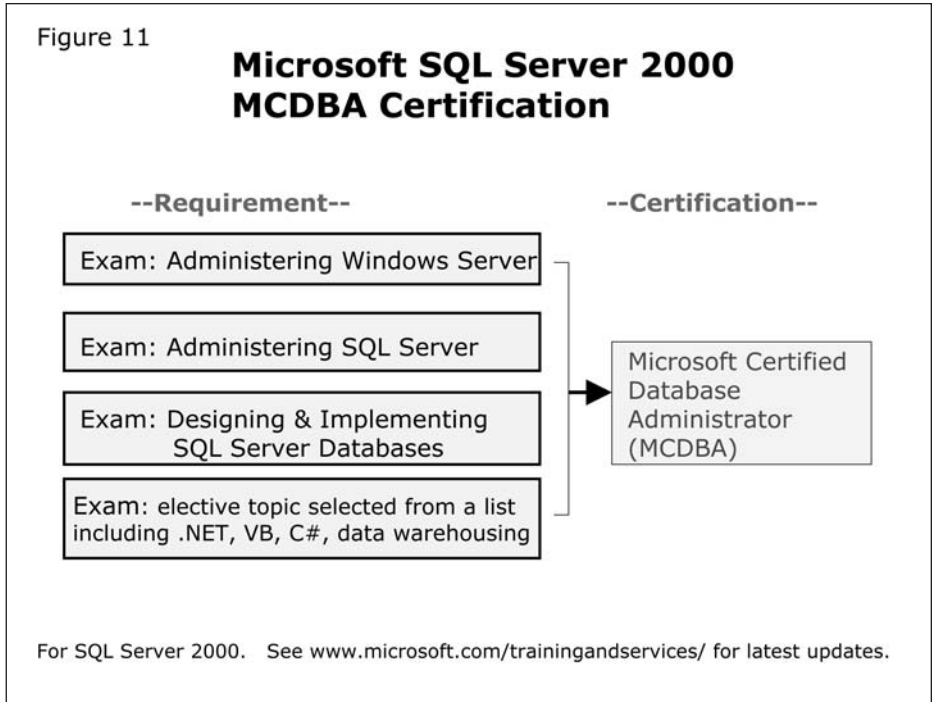
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**Highlights**

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Figure 11 shows how IT professionals become Microsoft Certified DBAs (MCDBAs) for SQL Server 2000. They must pass four exams, taken in any order. One test covers Windows Server, two are on SQL Server 2000, and one is an elective. The candidate selects the elective from a list of about a dozen tests, most of which cover programming with .NET, C#, or VB. If a candidate has passed any of the MCDBA exams in pursuing any other Microsoft certification, that exam counts towards the MCDBA and does not have to be re-taken. Microsoft offers no database certifications other than the MCDBA.



Microsoft is changing their certification program as this study is being written, to reflect what they call a “new generation of certifications.” This is a complete revision that affects all of Microsoft’s certifications. Details are not yet finalized but changes for DBA certification appear certain. See Microsoft’s certification web site for further information as it becomes available (45).

***What a vendor charges for certification affects the size of the talent pool for their product, and how easy it is for IT managers to find qualified database talent.***

Costs and Comparison. The cost of a certification often determines whether IT professionals certify for a particular product. 45% of all certification candidates pay all their own certification costs, while another 13% pay for part of the tab (46).

What a vendor charges for certification affects the size of the talent pool for their product, and how easy it is for IT managers to find qualified database talent.

When IT managers pay for their staff to certify, certification and training costs are a significant part of the total cost of ownership (TCO) for selecting that DBMS.

Figure 12 compares typical costs for DBA certification for DB2 Version 8 and 9, Oracle10g, and SQL Server 2000. Figure 13 details the assumptions that underlie figure 12. The biggest certification expenses are for classroom training and those associated with a larger number of exams.

Figure 12

**DBA Certification -- Cost Comparison**

	DB2 UDB	Oracle	SQL Server
Exam Fees	\$240	\$250	\$500
Books	\$150	\$150	\$300
Classes	\$0	\$3,000	\$0
Classes travel	\$0	\$0 *	\$0
DBMS access	\$0	\$0	\$0
Work time lost	\$5,000	\$5,000	\$10,000
<b>TOTALS--</b>	<b>\$5,390</b>	<b>\$8,400</b>	<b>\$10,800</b>

\* Oracle certification *might* require travel to fulfill the class requirement, depending on its location or whether one takes a web-based class. This could increase costs.

Figure 13 Explanation for all numbers in figure 12

**Exam Fees** – As set by the vendors.

DB2	= 2 exams at \$120 each = \$240 total
Oracle	= 2 exams at \$125 each = \$250 total
SQL Server	= 4 exams at \$125 each = \$500 total

**Books** - Assume a cost of \$75 per book, with one book needed for each exam.

DB2	= 2 exams at \$75 each = \$150 total
Oracle	= 2 exams at \$75 each = \$150 total
SQL Server	= 4 exams at \$75 each = \$300 total

**Classes** – As required by the vendors.

DB2	= Candidates take IBM's free GUI DB2 courseware	= \$0
SQL Server	= Candidates take Microsoft's free e-learning courses	= \$0
Oracle	= 1 hands-on course is required. Fees vary by class, we assume candidates take the most appropriate course to prepare for the OCP exam, the 5-day "Administration Workshop II." This costs \$3,000 and can be taken in person or via the web.	= \$3,000

*Candidates who must travel to fulfill the course requirement may have significantly higher expenditure for Oracle certification.*

**Classes travel expense** - Assumed to be \$0 (see previous note for Oracle).

**DBMS and manuals access** - All vendors offer free DBMS and manual downloads

**Work Time Lost for Study** - We assume 5 work days are consumed for each exam taken (for study time, hands-on experience, any classroom training, and taking the exam itself). At a labor rate of \$500 per day (about \$62 per hour), 5 work days lost means each test represents a labor cost of \$2,500.

DB2	= 2 exams at \$2,500 each = \$5,000 total
Oracle	= 2 exams at \$2,500 each = \$5,000 total
SQL Server	= 4 exams at \$2,500 each = \$10,000 total

The figures show that IBM DB2 is the least expensive DBA certification. One reason is that IBM offers free, computer-based training. These free courses are equivalent to what candidates get in typical class room training. (See for yourself by downloading the courses through the web links of references (47-50)). IBM also gives free exams to candidates at their technical conferences and through the independent International DB2 Users Group.

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**Highlights**

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IBM's pricing model clearly indicates that their intent is to grow the DB2 talent pool. For IT managers and professionals, this means it is easier and less expensive to acquire DB2 expertise than to certify with either Oracle or SQL Server.

Oracle offers a comprehensive DBA certification comparable to IBM's. But the Oracle DBA certification is expensive due to its course requirement. All candidates incur the course fee and the time required to take the class. Some will also have travel and hotel costs. Given that half of all professionals pay for their own certification, this fee constricts the pool of certified Oracle DBAs.

Microsoft's SQL Server 2000 DBA certification program is less comprehensive than either IBM's or Oracle's. It offers only the single MCDBA certification. Moreover, the MCDBA is an odd DBA certification in that:

- The DBA certification requires fulfilling a Windows exam requirement
- Two of the four exams candidates pass to become MCDBAs can have nothing to do with databases

***Microsoft is changing their entire certification program - not just their DBA certification - as this study is being written.***

Microsoft is changing their entire certification program - not just their DBA certification - as this study is being written. We hope that the new program will focus more on DBA needs and less on Windows and Microsoft's development tools. For SQL Server to compete in all segments of the database market it needs a comprehensive DBA certification program comparable to those offered by IBM and Oracle.

**Conclusion.** DBA certification programs affect how easy it is to train your staff with a database product and how much that training costs. They impact the size of the product's labor pool. Comparing the database certification programs from IBM, Oracle and Microsoft shows that IBM provides the most cost-effective, comprehensive program.

### Consulting Services – Fast Access to Expertise

IT managers often find that a timely and efficient way to acquire database skills is to look to the DBMS vendor. This may involve using vendor consultants; outsourcing a particular application project to the vendor; outsourcing infrastructure and technical support to the vendor; outsourcing overseas; or, some combination of these options.

Some IT managers rely on the vendor only to fill a few small gaps in their staff. Others outsource an entire operation. In either case, IT managers must ensure that the vendor they select provides depth, breadth and expertise.

IBM provides DB2 consulting services through the IBM Software Group, IBM Global Services (IGS), and its business partners. The goals of IBM consulting include:

- A single point of contact for customers that integrates the necessary breadth and depth of consulting services
- Ease of access to experts
- Industry and business understanding
- Optimization of the customer's environment
- Outsourcing solutions tailored to fit customer needs

**IBM Software Group.** The IBM Software Group specializes in deep technical product skills oriented towards database projects. This team taps experts in DB2 product development and technical support as needed. It integrates seamlessly with IBM Global Services and IBM Business Partners to achieve customer objectives. Areas of special focus include:

- Content Management
- Business Intelligence and Data Warehousing
- WebSphere Information Integration
- z/OS and OS/390 systems
- Online Transaction Processing systems
- **The Regency Services Program**  
(a premier level of proactive support services for managing the environment)

**IBM Global Services.** IBM Global Services supports all forms of skills acquisition and outsourcing through its three main lines of business:

- **Business Consulting Services (BCS)** – consulting that aids customers in business process innovation, enabling applications, and integration
- **Integrated Technology Services (ITS)** – services for the design, building, and maintenance of customer technology infrastructures
- **Strategic Outsourcing Services (SO)** – cost-competitive outsourcing of customer processes and operations



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### Highlights

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The *breadth* of IBM's Global Services is evident in its status as the world's largest IT services company. Its revenues nearly double that of its nearest competitor. IBM employs 70,000 business and industry experts and over 170,000 technology experts. The company's employees are distributed across North America, Europe and Asia. 23,000 IBM professionals work in India. As the largest US-based IT employer in India, IBM should be carefully considered by those hoping to offshore (51, 52).

The depth of IBM Global Services is underscored by its deep involvement in transforming customers' businesses. Called Business Performance Transformation Services (BPTS), this helps clients optimize their operations through new business designs and processes. It optionally includes outsourcing or offshoring services. This result is "on demand" businesses that are more flexible and responsive to business changes and opportunities (53).

IBM Global Services also offers the full spectrum of DB2-specific services including "Implementation Services" and "Operational Support Services." These cover all DB2 operations, from installation through applications development and ongoing support.

**IBM Business Partners.** IBM has some 16,000 business partners, addressing a wide range of customer needs for specialized knowledge, vertical market expertise, turn-key solutions, high-level design and analysis, and hard-core technical skills. Business Partners offer nearly 26,000 applications based on IBM's information management portfolio. There is truly an application and a partner to fulfill every conceivable business need (53).

**Conclusion.** Most IT managers look to their DBMS vendor to provide at least some of the database skills they require. This support may range from a little training or on-site consulting, all the way up to outsourcing an application development project, their technical infrastructure, or even the entire IT operation.

IT managers must be sure the DBMS vendor they select can provide the services they need. This brief overview shows that IBM has a proven track record across a wide range of services and support roles.

Get information about the IBM Software Group at [www.ibm.com/software/data/services/](http://www.ibm.com/software/data/services/). To learn more about IBM Global Services visit [www.ibm.com/services/](http://www.ibm.com/services/). For details on their DB2-specific services see [www.ibm.com/services/us/index.wss/offerfamily/its/a1000423](http://www.ibm.com/services/us/index.wss/offerfamily/its/a1000423).

***IT managers must be sure the DBMS vendor they select can provide the services they need. This brief overview shows that IBM has a proven track record across a wide range of services and support roles.***

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45. Microsoft describes their next generation of certifications at their new certification web page, <http://www.microsoft.com/learning/mcp/newgen/>.
46. These numbers are from Certification Magazine's annual Salary Survey for 2005, dated 12/05. Find it online at [http://www.certmag.com/articles/templates/cmag\\_feature.asp?articleid=1524&zoneid=1](http://www.certmag.com/articles/templates/cmag_feature.asp?articleid=1524&zoneid=1). Certification Magazine is at [www.certmag.com](http://www.certmag.com). Other studies confirm these findings. For example, the Foote Partners study reported in "Paper Chase," Eweek, 09/03/01, p. 40, cites a nearly identical percentage of self-paid certification candidates.
47. Among IBM's free, downloadable DB2 tutorials are these. Six free Version 8 tutorials for developers are at: [http://www.ibm.com/developerworks/db2/library/tutorials/db2cert/db2cert\\_V8\\_tut.html](http://www.ibm.com/developerworks/db2/library/tutorials/db2cert/db2cert_V8_tut.html). Six more free Version 8 tutorials for database administrators are at: [http://www.ibm.com/developerworks/db2/library/tutorials/db2cert/701\\_prep.html](http://www.ibm.com/developerworks/db2/library/tutorials/db2cert/701_prep.html).
48. Another free, downloadable resource is IBM's DB2 "fast path" courses. One of these two courses targets developers, the other database administrators. Both can be downloaded from the "Downloads and CDs" section of the DB2 DeveloperWorks main page at <http://www.ibm.com/developerworks/db2>.
49. Access any of the free IBM DB2 tutorials and certification study resources through the main education web page at <http://www.ibm.com/software/data/education.html>.
50. IBM's DB2 DeveloperWorks is at <http://www.ibm.com/developerworks/db2/>. This site gives access to the free tutorials listed above as well as articles, research notes, FAQs, hints and tips, example programs, downloadable utilities, and other resources. Another source of good DB2 information is IBM's DBA Central web site at <http://www.ibm.com/developerworks/db2/zones/dba/>.
51. All figures in this paragraph are from IBM's Annual Report and its Prospectus for 2004. Download these from IBM at <http://www.ibm.com/annualreport/>.
52. "Smart Money on India," by Aaron Ricadela, InformationWeek, 12/12/05, p. 24-26. [www.informationweek.com](http://www.informationweek.com).
53. IBM describes its Business Performance Transformation Services and its customers success in BPTS joint endeavors in its Annual Report and Prospectus for 2004. The reports also give statistics on IBM employees and business partners. Download them from IBM at <http://www.ibm.com/annualreport/>.