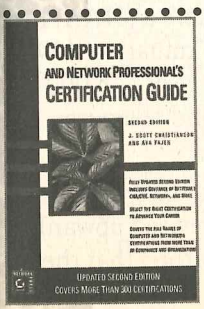
Appendix A

Should You Get Certified?

In the computer and networking fields, certification programs have become the roadmaps that many people use to chart their careers. The widespread popularity of professional certification in the computer industry began with Novell and Microsoft in the late 1980s and early 1990s. Today, nearly every major hardware and software manufacturer offers, or shortly will offer, a certification program. The sheer number of certification programs available has left both computer professionals and employers confused about the significance and value of these various certifications. There are literally hundreds of books on the market to help you study for specific vendor-based certification exams. The purpose of this appendix is to give you an overview of the certification process, and present you with the various options available to you for pursuing a given certification.



Adapted from *Computer and Network Professional's Certification Guide*, by J. Scott Christianson and Ava Fajen
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Why Become Certified?

The primary reason for the popularity of professional certification is that it provides an up-to-date, performance-based assessment of a person's knowledge and skills in a particular area. Traditional credentials, such as a university degree, offer a measure of the number of hours spent sitting in a classroom, but may provide little indication of an individual's current job-related skills. In addition, because of its targeted instruction and frequent updating of content, certification is the only credentialing method that can begin to keep pace with the rapid changes in the computing and networking industry. Certification offers job-related benefits to both employer and employee: the employer knows what a person can do, and an employee can demonstrate his or her computer and networking knowledge and skills without investing the money and time it takes to gain a university degree.

Computer and networking professionals are in demand across the employment spectrum, from business and industry to government and education. And the current high level of demand for information technology professionals—whether highly experienced or newly certified—is expected to continue and even accelerate in the years to come. This appendix outlines some of the many benefits that certification can offer you as a computer or networking professional, including jobs, promotions, professional credibility, and financial rewards. A number of these benefits offer advantages for employers and customers as well.

Open Job Market for Information Technology Professionals

The present shortage of information technology workers in the United States has been well documented. What's more, estimates of the extent of this shortage are quickly being revised upward. For example, in February 1997, the Information Technology Association of America (ITAA) had estimated that 190,000 such positions were unfilled; by January of 1998, ITAA's second annual workforce study reported a shortage of 346,000 individuals—including programmers, systems analysts, and computer engineers—in the U.S. information technology work force.

Similarly, estimates of the number of information technology personnel that will be needed in the future have recently been revised upward. In 1997, the federal Office of Technology Policy (OTP) warned that the United States was not keeping up with the demand for new information technology workers and predicted that an average of 95,000 new jobs would open in the field annually; by 1998 an updated OTP report already had been issued, projecting a need for almost 140,000 information technology workers each year until the year 2006.

Meanwhile, the number of college students graduating with bachelor's degrees in computer science dropped from a peak of 41,889 per year in 1986 to 24,200 per year in 1994, a decrease of 42 percent (*Digest of Education Statistics*, Department of Education, 1996). Universities are clearly not training the numbers of information technology workers that will be needed to meet the demands of the marketplace.

It is anticipated that the shortage of information technology workers will have broad-ranging effects, not just in the computer industry, but in business and industry in general, as well as education and the government. The ITAA and OTP reports suggest that a competent skilled workforce in information technology is crucial to the nation's economy. The ITAA urges industry, education, government, and professional associations to undertake a collaborative effort to head off this shortage. More and more, the information industry is turning to certification programs to fill the gap.

Benefits for Individuals

Many people pursue computer and networking certifications because they expect to receive increased salaries, promotions, or job offers. Evidence does indicate that having the right certification at the right time can have excellent salary and promotion potential. Magazines are full of stories about newly certified individuals with little or no experience who have snagged high-paying jobs.

But certification offers other benefits as well. It provides a portable credential that validates your knowledge and abilities, and it shows others that you are willing to do what it takes to keep your knowledge and skills current. As a result, certification improves your marketability and increases your options, whether you seek regular employment or want to promote your skills and abilities as an independent contractor.

Although the effort and cost involved in attaining some certifications is considerable, it is generally much less than the time and expense involved in obtaining a college degree. And, in many situations, an employer will carry the financial burden for certification training and testing. In addition, a number of certification programs can help you accumulate college credit at the same time as you are earning a certification.

Increased Salary

A number of surveys have documented the financial benefits of certification. For example, average 1998 salaries were $77,700 for Microsoft Certified Trainers (MCTs) and $67,600 for Microsoft Certified Systems Engineers (MCSEs), according to Linda Briggs's third annual salary survey in *Microsoft Certified Professional* magazine (1998). These salaries were for persons with an average total of five and a half years of experience in information technology (for more information on the MCP, MCSE, and MCT certification programs, see Microsoft's certification site on the Web at `http://www.microsoft.com/mcp/default.htm`. Survey results also indicated that 58 percent of Microsoft-certified respondents believed that their certifications had resulted in salary increases. Briggs estimated that earning an MCSE credential could add approximately $11,000 per year to a previously uncertified individual's salary.

Jobs and Promotions

Certification provides employers with objective evidence that you have a defined set of skills and abilities. Job-seekers and independent contractors alike find that having the right certification can get them preference in the hiring process. Certification can open doors for individuals who have the initiative to seek out new knowledge and skills, but have limited on-the-job experience. Certification can also help experienced computer and networking professionals move up within their current organizations or get good job offers elsewhere. In Linda Briggs's survey, 42 percent of Microsoft-certified respondents received a promotion as a result of attaining certification. Some businesses have actually incorporated vendor certification programs into their internal company certification programs.

Improved Professional Credibility

Potential employers or clients respond well when a computing or networking professional can offer clear evidence of having the skills needed to get the job done. Having relevant, current certifications on your resume gives you an important advantage in this regard; college degrees or years of experience on the resume may not tell an employer whether you have the specific abilities they seek.

A 1995 evaluation of the Microsoft Certified Systems Engineer credential found that more than 90 percent of MCSEs surveyed felt that obtaining certification was useful in helping them improve their professional credibility ("Evaluation of the Microsoft Systems Engineer Certification,"

a report by the Applied Experimental Psychology Group at SIU-Carbondale in conjunction with Applied Research Consultants, July 1995).

College Credit

Certification programs have increasingly incorporated more sophisticated assessment methods to measure and certify learning and competency. A number of certification programs have established a level of quality and reliability that has made them eligible to provide college credit to their participants. For example, it is possible to obtain college credit for Learning Tree International certifications or courses. The American Council of Education (ACE) in Washington, D.C., has determined college course equivalencies for Learning Tree International's courses and certifications. As a general rule, ACE will recommend two college credit hours for each four-day Learning Tree course. The ICCP Certified Computing Professional exams also have been approved by ACE for college credit. Approximately 1,500 colleges and universities in the United States will accept ACE recommendations for college credit.

Other opportunities for getting college credit exist as well. A number of community and technical colleges in the United States offer college credit for courses that are part of the Microsoft curriculum. Vendors have partnered with colleges and universities in some interesting ways. For example, at North Carolina's High Point University, computer information system majors can graduate with both a degree and certification in Visual Basic, Windows NT, and Microsoft Office. Lord Fairfax Community College in Virginia offers a popular 15-credit Network Engineer Certificate Program that gives students hands-on experience in installing and configuring servers and workstations, implementing network security, and planning for disaster recovery. At Seattle Pacific University in Washington, the Microsoft Certified Engineer curriculum implemented in 1996 attempts to ensure the quality of its graduates by incorporating an experience requirement—students must have either a degree or industry experience to be admitted to the program. If you are interested in college credit, look for similar opportunities in your area.

Benefits for Employers

In the world of computers and networking, both hardware and software change quickly. Technologies and programs that are cutting edge this year may be considered outdated by next year. In this environment of fast-paced change, traditional resume credentials may not provide an employer much

information about whether an individual has up-to-date knowledge and skills. How can an employer know whether a prospective employee will be competent to use, implement, or support the most current technologies and programs? For many employers today, certification is the answer.

Hiring

Many employers and human resources managers don't have the information technology background they would need in order to be able to quickly assess an individual's abilities by reading a resume. In addition, many hiring managers find that a person's years of computer-related experience are not always an indication that an individual has the specific technical knowledge that is needed. For these reasons, employers may view certification as an objective measure for evaluating the abilities of applicants. If an employer needs someone to set up a system for secure, online commerce, for example, he or she needs to know that a potential hire or independent consultant has some pretty specific skills. A variety of certifications that provide evidence of these skills are now available

While certification may not guarantee that an individual knows all there is to know about a certain piece of hardware or software, it does provide information that employers value. It indicates that a person has at least a basic knowledge of a product—a core level of knowledge that can be the foundation for additional learning. It indicates that an individual is interested in learning about new technologies or products and maintaining up-to-date skills. And it can—depending on the comprehensiveness and rigor of the certification program—indicate an advanced level of knowledge and skill with a particular system, or even the ability to manage complex, heterogeneous company networks.

On-the-Job Effectiveness

Certifications help employers identify individuals with proven knowledge and skill levels. As we have noted, this is certainly important in hiring. But many employers are also encouraging their current employees to get certified. Companies need to have individuals with specific skills on staff, and many have found that certification programs offer the verifiable skills and knowledge their employees need. In addition, employers who send staff for training want to see concrete results. Certification programs that involve performance-based testing give employers independently verified results that demonstrate the value of their training investments.

Research indicates that certification increases employee productivity and effectiveness. A 1995 study by Dataquest, Inc. reported that "managers feel that certified employees provide higher levels of service, learn new technologies faster, and are generally more productive" (Bob Filipczak, "Certification!" *Training* magazine, August 1995). Other studies confirm these results. A 1996 survey of managers who supervise individuals with the Microsoft Certified Solution Developer credential found that managers considered their certified employees to have a significantly higher level of competence on those tasks that were key to their job effectiveness than did non-certified employees under their supervision ("The Value of Certification for Solution Developers," a report by the Applied Experimental Psychology Group at SIU-Carbondale, August 1996).

In 1995, IDC Consulting, a Massachusetts research firm, surveyed managers on the benefits of certification. They found that managers felt certification gave their employees a reliable level of skill and expertise. Managers said that with certified information technology professionals on staff, a company could operate a more complex and decentralized information technology environment without hiring additional employees. Further, the IDC survey reported that managers found the average payback time for certification costs was only nine months. Having certified employees resulted in increased network availability and more effective technical support. These improvements were judged to be worth approximately $14,000 per year to the company per trained employee ("Benefits and Productivity Gains Realized through IT Certification," IDC Report 1995).

Benefits to Customers and Clients

Hiring and supporting certified employees gives resellers and service firms a competitive advantage. In the current market, having a staff that holds respected certifications in a variety of relevant computing and networking technologies can be crucial to getting clients. When companies outsource their information technology management needs, they expect a service provider to have employees with in-depth knowledge and proven competency with a variety of systems. Service firms with certified employees can provide clients with high-quality, consistent services; many organizations know this and hire only contractors who offer certified staff.

Even companies that are not specifically in the business of providing information technology services to others are likely to find that they can provide higher quality service to their customers by having certified employees on staff. Certification improves user support, whether for

internal or external purposes. Employees with certified technical skills can provide effective support for other employees and facilitate quick resolution of problems that impede customer service.

Employees Value Career Growth Opportunities

In today's volatile business environment, companies are unable to guarantee their employees lifetime job security and generous pension plans. Some companies that want to keep their employees happy have begun offering them meaningful career development opportunities instead. Some employers are fearful that paying for training and certification will help employees find better jobs outside their company. Such employers, however, may find themselves losing out anyway, as their employees move away to companies that do support their employees in maintaining up-to-date, marketable credentials.

At the same time that career growth increases employees' job capabilities and enhances their marketability, it can also lead to higher morale and job commitment. Employees appreciate the opportunity to maintain current job skills. As a result, employers that support their employees in obtaining certification may see improved employee morale and job satisfaction at the same time as the company benefits from improved productivity and customer service.

Criticisms of Certification

Certification is not without its detractors. Some critics assert that a single multiple-choice test can't tell you whether a person can handle real-world problems using a particular product. It is true that not all certification programs involve hands-on, performance-based testing. Many programs do, however, and the general trend is to move certification programs in that direction. Furthermore, the multiple-choice tests that vendors use are typically designed—by teams of practicing information technology professionals and skilled prometricians (professionals in testing and measurement)—to assess knowledge and abilities as they will be needed in real-world applications.

In addition, some critics have observed that there are certification programs available that do not actually require either any experience or any testing. It is true that certification programs vary widely in their level of difficulty. Some programs don't offer much challenge, while others—such as Cisco's CCIE program, or Sun's Java Developer certification—have

gained notoriety for their difficulty. In addition, some of the more rigorous certification programs require documentation of a specified number of months or years of relevant on-the-job experience as a prerequisite to even entering the program.

Other critics of vendor-based certification assert that the vendors are the primary beneficiaries of certification programs because they generate vendor income, create product loyalty, and improve customer satisfaction (because the availability of certified personnel gives customers improved access to qualified product support). While some of this skepticism is undoubtedly justified, those who reject certification outright because it benefits vendors will miss out on the many benefits that certification offers to individuals, employers, and customers. Further, many of the criticisms leveled against vendor-based certification programs are not applicable to organization- or association-based programs, which tend to offer substantive, comprehensive, standards-based training at a reasonable cost.

Other detractors remind us that good customer service requires more than technical skill. There is an important lesson here as well. Without a doubt, the individuals who reap the most success in the information technology field are those who combine high levels of product-related skill and knowledge with strong interpersonal skills.

MANAGING CERTIFICATION PROGRAMS: VENDOR COOPERATION BENEFITS EVERYONE

Mike Serpe, Chairman, CEdMA Certification Task Force

While the competition between computer and networking vendors can be intense, managers of computer-related education and certification programs do find it beneficial to communicate with each other. One vehicle for this communication is the Computer Education Management Association (CEdMA), a worldwide nonprofit organization for information technology education and certification managers. CEdMA holds a wide variety of meetings and conferences for its membership and provides a unique sharing environment for program managers to exchange insights and experiences. A large number of the world's most influential computer and information technology product companies are active members of CEdMA.

CONTINUED ➟

Within CEdMA, there are several task forces that emphasize specific areas of interest. One of these, the CEdMA Certification Task Force, is specifically designed around the needs of certification program and testing management. This task force promotes communication in several ways. First, it holds monthly conference calls. Each call is run as an open forum, but is focused on one particular topic or hot issue. An average of 20 managers and executives from prominent information technology product corporations around the world participate in each call. Participants receive discussion topics in advance and prepare to either ask questions or share insights on that particular topic with the rest of the Task Force. In addition, the task force meets twice annually at CEdMA conferences, and holds seminars at other information technology education conferences such as Tech Learn, ITTA, and others. The CEdMA Certification Task Force also hosts an electronic newsgroup that allows members to continue discussions from meetings or share information and findings relevant to certification.

CEdMA provides a unique, secure, confidential environment, free of vendor interests and competition. All information discussed in CEdMA forums is considered highly classified and is not available to outsiders. If you are interested in CEdMA, check out the Web site at `www.cedma.org`.

You can also find out more by contacting Mike Serpe, CEdMA Certification Task Force Chairman, at `mserpe@informix.com`. Originally from New York City, Mike is now based in San Francisco as the Worldwide Manager of the Informix Software Certified Professional Program. Mike has wide experience in computer education, training, and certification programs, and also teaches high performance driving and racing with vintage Porsche racing cars.

Keeping Updated

It can be difficult to keep up with the changes in various certification programs. Company mergers, changes in product lines and management, and a number of other variables cause some companies to rapidly change, add, or delete specific certifications within their certification programs.

NOTE

In December of 1998, authors J. Scott Christianson and Ava Lee Fajen set up the Certification Update Web site (`http://www.certification-update.com`) as a supplement to their book, *The Computer and Network Professional's Certification Guide* (Sybex, 1999). This Web site provides information on new certifications and changes to existing certifications. You will find links to information on many certifications and a section on job-hunting resources for the computer and networking professional.

The certification field is very dynamic with new certifications appearing constantly and old ones being withdrawn. Once you have selected a particular certification to pursue, we recommend you contact the sponsoring vendor or organization to confirm details, particularly costs.

Importance of Recertification

An issue that will take on increasing importance over time is the need for recertification. Many certification programs are brand new, or less than a year or two old, while others have been revamped recently. But any certification will have a limited useful life.

Many certification programs are tied to specific versions of certain products. An individual who wants to have current credentials will need to obtain certification on new versions as they are released. Programs that do offer recertification options vary widely in the effort required for maintaining certification. Some require testing or extensive continuing education coursework; in other programs, the effort needed to maintain certification is minimal.

It's important to remember that, in the field of information technology, your need to seek new education opportunities will be ongoing. Because skills and knowledge can become outdated more quickly today than ever before, the most successful computer and networking professionals are those who commit themselves to lifelong learning. In addition, it will be important to periodically assess whether you want to adhere to the same certification path you have been following or whether it's time to target different technologies or product lines instead. An eagerness to learn new technologies and products as they emerge will keep you highly employable for many years to come.

INSTRUCTOR-LED TRAINING

Instructor-led training can be a great way to learn the ins and outs of a product or technology and to prepare yourself for taking a certification exam. Typical courses last two to five days and involve both lecture and lab sessions. The instructor lectures on a topic or feature of the product and then provides an opportunity for hands-on practice with the technology. Labs provide a chance to work through a variety of tasks and scenarios yourself, with the help of an instructor readily available. This allows you to try things that you might not normally want to attempt with your company's server or network.

Another advantage to taking instructor-led courses is that if you take a course from a vendor, or a vendor's training partner, you may be able to take a course that corresponds directly to a certification test. These courses offer a curriculum that is designed by the vendor to provide content that corresponds to the test objectives on the certification exam.

A disadvantage, however, to taking instructor-led courses, is that they are usually fairly expensive. A typical two-day course may cost $500 to $1,500, while a five-day course may cost $1,000 to $2,500 or more. In many situations, however, employers foot the bill to send their employees to instructor-led courses. In a recent survey of Microsoft-certified professionals, 57 percent reported that their employers paid for their certification programs, 33 percent paid their own costs, and in 10 percent of cases, individuals and their employers split the cost ("Third Annual Salary Survey," Linda Briggs, *Microsoft Certified Professional Magazine*, February 1998). For independent contractors in the U.S., the situation is usually reversed. A survey by Kenda Systems found that 60 percent of independent contractors end up paying for their own training, and only 27 percent had their training paid for by the client company. The other 13 percent worked an arrangement to split the costs. ("By the Numbers," *Contract Professional*, 1998.)

Whether you are paying out of your own pocket or your company is footing the bill, it is critical that you select your course provider carefully.

Selecting a Training Provider

A wide variety of course providers are available, and the market is growing rapidly. The different provider options—higher education training partners, authorized training providers, and independent training organizations—

are outlined below. Regardless of the type of provider you select, there are several things to consider before you enroll in a course, including the provider's real-world experience and knowledge base, their teaching experience, and the design and level of the course.

Experience

Do the instructors have computer or networking experience outside the classroom? If so, is that experience current? A number of training organizations require their trainers to work as consultants in the field so they maintain current skills and have experience confronting and mastering unique problems and situations. University instructors may also have plenty of up-to-date experience; for example, night instructors may also be the daytime support staff for the campus network. If you make sure you take your course from an instructor who has current, real-world experience, you will be likely to get training that is practical and directly applicable to your work environment.

Certification

What training certifications does the instructor possess? If there is a training certification available for this specific product or technology, does the trainer have it? What other certifications does the instructor hold, including both training credentials and product-related certifications? An instructor with sound instructional skills and a wide range of product and technology knowledge is likely to offer high-quality instruction. In addition, such an instructor will be conversant with other technologies and products that are related to the topic at hand and will be equipped to provide you with a well-rounded learning experience.

Instructional Design

Does the course follow the vendor's official curriculum or one that has been approved by the vendor or organization? If not, how is the course structured?

Does the course provide only lectures or does it also involve lab components? A course that offers only lectures or has only minimal lab time won't prepare you to use a new product or technology on your own. Always look for a course that allows you plenty of hands-on time with the product or technology you want to learn to use—this is crucial to good learning.

What type of materials will you receive when you take the course? Will you take home a good text and/or lab books that you can use as a reference as you implement your new knowledge? Will you be able to receive a copy of the instructor's slides on CD-ROM?

Advisement

It may seem too obvious to mention, but the importance of enrolling in the appropriate course cannot be overemphasized. This is a key factor in maximizing your investment; a course that is too basic or too advanced will be a waste of your time and money. A good training organization will provide you with some means to determine which course is appropriate for you. This may involve an interview or completion of a questionnaire. Be sure to carefully read the brochure or description of the course in which you are interested. Most companies require that instructors cover, at a minimum, all the points listed in the brochure for the course.

A variety of providers offer instructor-led courses that can lead to computer and networking certifications. The three main categories of organizations that provide this type of instruction are described below.

Colleges, Universities, and Vocational Schools

Many vocational schools, technical and community colleges, and four-year colleges and universities now offer good training opportunities at a reasonable price. We mention this option first because many people tend to overlook this alternative. Some high schools, colleges, and universities have become academic educational partners with vendors. A vocational school or college may offer the training you need as a short course; depending on the content, you might find a one- or two-day course, a weekend course, or a two- to four-week evening course that meets your needs.

It may be worth your while to seek out such opportunities in your local area, especially if you are interested in having the opportunity to get college credit as well as a certification.

Authorized Training Providers

An authorized training provider is a training center that has been authorized by a particular vendor to offer an approved curriculum covering that vendor's product line. Vendors are usually happy to provide you with a list of authorized training providers located in your area. There are literally thousands of authorized training provider locations across the United States and around the world.

Independent Training Organizations

A number of independent training companies also provide courses throughout the United States and around the world. There are literally hundreds of such organizations to choose from.

NOTE

A new phenomenon in the IT training world is certification "boot camps." These are intensive, one- to two-week sessions that quickly bring you up to speed on the information you need to pass the required tests for a particular certification. Students typically work 12 to 16 hours each day, taking courses, working on labs, and studying in groups. There are several popular programs for obtaining the MCSE and CNE credentials. For those who can't work a self-study program or set of occasional courses into their schedule, attending such an intensive program can be just the ticket.

A number of certification programs offered by independent providers have established a level of quality and reliability that has made them eligible to provide college credit to their participants. For example, it is possible to obtain college credit for Learning Tree International certifications or courses and for ICCP Certified Computing Professional exams. The American Council of Education (ACE) in Washington, D.C. has determined college course equivalencies for these courses and certifications. Approximately 1,500 colleges and universities in the United States will accept ACE recommendations for college credit.

Self-Study for Certification

For most people, the process of obtaining certification will involve at least some self-study. In some instances, self-study will be the only way to learn the information one needs to know to pass a certification test. In other cases, an individual may choose to combine some self-study with other study approaches as part of an overall plan for achieving their certification and career development goals.

Self-study has many advantages. One of the most important features of self-study is that it can be much less expensive than instructor-led study.

While an instructor-led course might cost several thousand dollars, a comprehensive self-study book or video may cost less than a hundred dollars.

Even if cost isn't a big issue, however, you still may find that self-study has appealing advantages in some cases. Self-study allows you to select study times that fit well with your schedule. In addition, self-study lets you work at your own pace. You can select the topics you need to work hardest on and focus your energies on those areas. And, also in contrast to being in a class, you will not have to waste any time dealing with topics that you have already mastered. These advantages—flexible scheduling and working at your own pace—can be disadvantages for some people, of course. A successful self-study program requires a greater level of self-discipline than a program of instructor-led training.

A variety of resources can be used in a self-study program, including study guides and books, videotapes, computer-based training, online training, and practice tests.

NOTE

One of the most effective techniques you can use to check your understanding and retention of new material is to try to teach it to someone else. Try telling a colleague at work what you have learned. If you are not able to clearly explain the concept or process, it is time to hit the books again.

Study Guides and Books

Most certification programs offer a basic study guide and preparation materials for their exams. These can be an excellent resource for self-study and may also inform you about other helpful learning resources. And, although you may want to explore additional learning resources, the information you get directly from the certifying entity will most accurately portray the knowledge and skills that will be evaluated on their tests.

A number of publishers, including Sybex, sell excellent books that provide entire self-study programs for specific certification tests. When selecting a text for self-study there are several things to consider.

Level of Presentation

Some books begin at a very basic level, while others assume that you already have a good understanding of the fundamentals. For some of the more popular certifications, a wide selection of books will be available. Take time to find a text that starts at the level that will work best for you.

Exercises

Does the text provide instructions for hands-on exercises that you can try out on your machine?

Sample Questions/ Sample Tests

Does the text provide questions to assess your comprehension at the end of each chapter? Does it offer a sample test that you can take to determine whether you are ready for the real test? Some books include a CD-ROM that contains multiple sample tests.

Pointers to Other Sources of Information

Does the book provide references to additional sources of useful information? Some texts suggest other resources on specific topics, including other books, product manuals, and online help files.

Endorsement

Some study guides have been endorsed or otherwise approved by the certification program they cover. This is a good indication that the book will cover the salient points of the certification you are pursuing.

Videotaped Study Programs

If you prefer the instructor-led training format, but time or money constraints prevent you from attending an instructor-led course, a videotaped course may be what you want. A videotape lacks the interaction of the classroom, but it may compensate for this with an increased use of graphics and special effects. Some videotape programs offer supplementary items that enhance your learning process. For example, a video package may include a student workbook with step-by-step instructions on setting up the program or process you are learning.

Computer-Based Training

Computer-based training, most often in a CD-ROM format, can offer a combination of video, text, and simulation exercises. One of the advantages of this type of training format is that you can jump from one topic to another in a way that best suits your learning needs.

The cost of computer-based training can vary widely, depending on the type of certification program and the subject matter. Some of the more specialized computer-based training programs can be quite expensive. Depending on the type of software license associated with a training package, you may be able to sell or trade your software when you are done with it (several providers exclusively prohibit this practice, however, so check your licensing agreement carefully).

A large number of training providers offer computer-based training programs.

Online Training

Online training for certification is very popular. One of the big advantages of online training is that you can network and share information with your classmates. This type of training varies widely in quality and cost, and can take several formats. Available offerings range from slick multimedia presentations that students download at their convenience, to a set of e-mail lectures that are sent to the student on a preset schedule.

There are many sources for online training. Some of the best-known providers include Ziff-Davis University (`http://www.zdu.com/`) and Scholars.com (`http://www.scholars.com/`). There are hundreds of others as well.

Practice Tests

Practice tests, if available, are an important component of your study program. They offer an excellent opportunity for you to test your knowledge before you fork over the bucks to take the real test. A practice test can help you zero in on the areas where you need extra study. In addition, practice tests help you become familiar with the format of the exam.

A number of certification programs offer free sample tests on their Web sites. Some of these don't offer a lot of questions, however. If you want more sample tests, you may be able to buy them. Several companies are in the business of making practice tests for use by certification candidates. These tests may allow you to take multiple practice exams that contain randomly selected questions drawn from a large pool of test items. These practice exams may also provide explanations of the questions and the correct (and incorrect) answers; this can be extremely useful in understanding the concepts that are giving you trouble.