DB2 10.x certification: Everything you need to know

Roger E. Sanders

May 30, 2013

Certification has long been a popular trend in the Information Technology (IT) industry. Consequently, many hardware and software vendors, including IBM®, now have certification programs in place that are designed to evaluate and validate an individual’s proficiency with their product offerings. But as a DB2® professional, should you become certified? Will being certified increase your ability to administer DB2 databases? Or advance your career? This article is designed to answer these and other questions; it can help you decide if DB2 certification is right for you, and it will show you the path to follow should you decide to acquire one or more of the DB2 certifications that are currently available.

Is becoming certified worth the effort?

Certification has long been a popular trend in the IT industry. As a result, you now see references to it everywhere—books on certification dominate the IT section of bookstores, training courses promise passing scores on certification exams, and many IT professionals include a list of their certifications in their email signatures. But is becoming certified worth the time and effort involved?

When seeking an answer to this question, it’s important to keep in mind that an entire industry has been built around certification. Trainers sell certification-oriented courseware, publishers market books designed to prepare readers for certification exams, consultants offer certification training, and vendors encourage all of these activities because it’s a great way to advertise and promote their products. Consequently, most articles that tout the importance and benefits of certification cannot be taken at face value—instead, they should be read with a certain amount of skepticism. This article is different. It presents a "behind the scenes" look at DB2 certification, and it explores the value of certification objectively, from an IT professional’s point of view.

Why become certified?

So, why do IT professionals become certified? Some do it to demonstrate the depth of their knowledge about a particular product. A few do it for the feeling of pride and satisfaction that comes from mastering the test material. And others do it because they believe possessing certification credentials will lead to a pay raise, a promotion, or a new job opportunity. The truth is that in addition to certifications, several factors including geography, industry, and experience play a role in determining an individual’s salary and position. And while there was a time when people
holding certain certifications could be assured of finding new employment, those times are gone. Today, having one or more certifications on a resume is more of a qualifier than a differentiator.

If your sole reason for becoming DB2 certified is to advance your career, spend some time verifying the marketability of the DB2 credentials you desire. Talk to your peers in person or via online forums. Review ads on prominent job web sites like Monster, Jobster, Dice, and JustTechJobs to find out what the market is looking for. See the Related topics section for links to these job sites.

Often, whether you can enhance your career by becoming DB2 certified is determined by your reasons for pursuing certification. Here are some real-world examples where IT professionals leveraged DB2 certification to their benefit:

• A DB2 programmer wanted to move into database administration. Obtaining DB2 Database Administration certification helped her get the transfer she desired.
• A DB2 developer possessed strong Java™ skills, but didn't know much about the other programming methods that can be used to develop DB2 database applications. Pursuing DB2 Application Developer certification broadened his knowledge.
• A stay-at-home mom wanted to reenter the workforce after a 10-year absence. She became DB2 certified and successfully leveraged her certification as proof that her skills were current.
• A new college graduate wanted to become a database administrator, but received only application development job offers. He obtained DB2 Database Administration certification and, eventually, was offered a position as an entry-level database administrator.
• A mature database veteran realized he needed to update his skills. So, he became certified, which allowed him to achieve his objective; as an added benefit, the certification served as proof that he had met his objective.

My own certification experience has been very positive—because I hold several DB2 certifications, potential employers who have never met me have been able to quickly assess my DB2 knowledge and skills. And, in my current position at EMC, my certifications lend instant credibility when I speak with customers about using EMC technology in their DB2 database environments.

Obviously, the benefits of certification must be weighed against the costs, which can potentially run into thousands of dollars. First, there's the fee that must be paid to take an exam, which for DB2 certifications is $200.00 USD for each exam taken (or retaken). Then, there's the costs associated with exam preparation such as the expense of one or more training classes, the cost of one or more certification exam study guides (books), and the fee that IBM charges for sample/assessment exams, which at the time of this writing is $30.00 USD per exam. Finally, there's the cost in terms of preparation time; discussions on popular certification web sites like CertificationMagazine.com and CertCities.com indicate that most IT professionals spend anywhere from two to six weeks preparing for a single exam. And, if you want to remain current, you'll need to re-certify when new DB2 releases are made available (typically, every 18 to 24 months). So many of these costs are reoccurring.

Whether a certified DB2 Database Administrator is better than an uncertified one is, to say the least, highly debatable. But one thing is certain—if you decide to pursue DB2 certification, in all
likelihood, you'll end up knowing more about DB2 when you're finished than you did at the time you started. And knowing more about a product you work with on a day-to-day basis is almost always beneficial!

**How to become a certified DB2 professional**

The IBM Professional Certification Program is built around distinct certification roles. Therefore, to obtain any of the more than 250 IBM certifications that are available, you must select a role you wish to pursue (based on your knowledge and experience with a particular IBM product), familiarize yourself with the set of requirements that have been defined for that role, and then take one or more certification exams that have been tailored specifically for the role you have chosen. From a DB2 perspective, there are currently five different DB2 10.x certification roles available. They are:

- IBM Certified Database Associate—DB2 10.1 Fundamentals
- IBM Certified Database Administrator—DB2 10 for z/OS
- IBM Certified System Administrator—DB2 10 for z/OS
- IBM Certified Database Administrator—DB2 10.1 for Linux, UNIX, and Windows
- IBM Certified Advanced Database Administrator—DB2 10.1 for Linux, UNIX, and Windows

The roadmap to DB2 10 for z/OS certification is shown in **Figure 1**.

**Figure 1. Roadmap to DB2 10 for z/OS certification**

On the other hand, the roadmap to DB2 10.1 for Linux, UNIX, and Windows certification is shown in **Figure 2**.
If you look closely at these certification roadmaps, you will discover that, to receive **IBM Certified Database Associate—DB2 10.1 Fundamentals** certification, you must pass the DB2 10.1 Fundamentals exam (Exam 610). And, if you want to acquire one or more of the other DB2 certifications available, you will need to pass one or more additional certification exams. For example, to obtain **IBM Certified Database Administrator—DB2 10.1 for Linux, UNIX, and Windows** certification, you must pass the DB2 10.1 DBA for Linux, UNIX, and Windows exam (Exam 611); to acquire **IBM Certified Database Administrator—DB2 10 for z/OS** certification, you must pass the DB2 10.1 DBA for z/OS exam (Exam 612).

One nice feature of the IBM Professional Certification Program is its modular design—each certification exam is wholly independent of the others. Consequently, after passing the entry-level DB2 10.1 Fundamentals exam (Exam 610), you are free to take, in any order, any of the other DB2 certification exams available. And, each time you pass a certification exam, you will receive another certification—provided you have met any prerequisites that have been defined for that certification. It is important to note that if you have already passed the DB2 9 Family Fundamentals exam (Exam 730), you are not required to take the DB2 10.1 Fundamentals certification exam (Exam 610); as shown earlier in the certification roadmaps in Figure 1 and Figure 2, either the DB2 9 Family Fundamentals exam (Exam 730) or the DB2 10.1 Fundamentals exam (Exam 610) can be taken to meet the prerequisite that is required for many of the other DB2 10.x certifications available.

**Arranging to take a certification exam**

In most cases, if you want to take a DB2 certification exam, you must contact IBM's authorized testing vendor, Thompson Prometric, and make the necessary arrangements. Thompson Prometric's web site offers a list of their testing centers—there are many to choose from throughout the world—and after finding a testing center that's convenient to you, you will need to specify which exam you want to take and then provide the necessary payment. You must make arrangements to take a certification exam at least 24 hours in advance, and when you contact Thompson Prometric (via their web site) you should be ready to provide the following information:
1. Your name (as you want it to appear on your certification certificate).
2. Your unique testing identification number, if you have one (if you have taken an IBM certification exam before, this is the number that was assigned to you at that time; otherwise, Thompson Prometric will supply one).
3. A telephone number where you can be reached.
4. A fax number.
5. The mailing address to which you want all certification correspondence, including your certification welcome package, to be sent.
6. Your billing address, if it is different from your mailing address.
7. Your email address.
8. The number of the certification exam you wish to take (for example, Exam 610).
9. The method of payment (credit card or check) you wish to use, along with any relevant payment information (such as credit card number, expiration date, and card security code).
10. Your company's name (if applicable).
11. The testing center where you would like to take the certification exam.
12. The date that you would like to take the certification exam.

When you arrange to take a DB2 certification exam, it's a good idea to have paper and pencil/pen handy so you can write down the test applicant identification number you will be assigned—you will need this information when you arrive to take your exam. If you have already taken one or more IBM certification exams, you should make the testing administrator aware of this and ask them to assign you the same identification number that was used before. This will allow the certification team at IBM to quickly recognize when you have met all the exam requirements for a particular certification role. If you were assigned a unique applicant identification number each time you took an exam, you can go to the IBM Professional Certification Member web site and access Member Services to combine all of your exam results under one ID.

Each certification exam costs $200.00 US and scheduling procedures vary according to how you decide to pay. If you choose to pay by credit card, you can make arrangements to take the exam immediately after you provide the appropriate payment information. However, if you elect to pay by check, you will be required to wait until the check has been received and payment is confirmed before you will be allowed to make arrangements to take the exam. Thompson Prometric recommends that if you pay by check, you write your registration ID on the front and contact them seven business days after the check is mailed. By that time, they should have received and confirmed your payment, and you should be able to make arrangements to take the exam at that time. If, for some reason, you need to reschedule or cancel your testing appointment after it is made, you must do so at least 24 hours before your scheduled test time. Otherwise, you will be charged the full price of the exam.

It is important to note that IBM frequently offers certification testing, for a nominal fee, at some of the larger IT conferences such as the International DB2 User's Group (IDUG) DB2 Technical conference, and the IBM Information On Demand (IOD) conference. So, if you are planning on attending one of these conferences in the near future, you may be able to arrange to take one or more certification exams there, at a greatly reduced cost.
On the day you are scheduled to take the certification exam, you should arrive at the testing center at least 15 minutes before the scheduled time—you will need this additional time to sign in. As part of the sign-in process, you will be asked to provide the applicant identification number you were assigned when you made arrangements to take the exam, as well as two forms of identification. One form of identification must feature a recent photograph, and the other must feature your signature. Examples of valid forms of identification include a driver's license (photograph) and a valid credit card (signature).

Once you are signed in, the exam proctor will instruct you to enter the testing area and select an available workstation. The proctor will then enter your name and identification number into the workstation you have chosen, provide you with a pencil and some paper, and instruct you to begin the exam when you are ready.

**Taking a DB2 certification exam**

The first thing you will see when you sit down to take a DB2 certification exam is the title screen of the IBM Certification Exam testing software. This screen consists of the IBM Certification Logo, the title "Professional Certification Program from IBM," the name of the exam that is about to be administered, and a welcome message containing your name and some basic information on how to get started. Before proceeding, you should do the following:

- Verify that the exam you are about to take is indeed the exam you expected to take. *If the name of the exam shown on the title screen is different from the name of the exam you had planned on taking, bring this to the attention of the exam proctor immediately!*
- Verify that your name is spelled correctly. The way your name appears in the welcome message shown on the title screen reflects how it has been stored in the IBM Certification database. Consequently, this is how all correspondence to you will be addressed, and more importantly, this is how your name will appear on the certification credentials you will receive once you have met all of the requirements for a particular certification role.

In addition, the title screen of the IBM Certification Exam testing software lets you know how many questions you can expect to see on the exam you are about to take, what kind of score you must receive to pass, and the time frame in which you must complete the exam. **Table 1** shows how many questions can be found on each exam, along with the required passing score and the time in which the exam must be completed.

**Table 1. DB2 10.1 certification exam information**

<table>
<thead>
<tr>
<th>Exam number</th>
<th>Exam title</th>
<th>Number of questions</th>
<th>Required passing score</th>
<th>Time allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>000-610</td>
<td>DB2 10.1 Fundamentals</td>
<td>69</td>
<td>66%</td>
<td>90 minutes</td>
</tr>
<tr>
<td>000-611</td>
<td>DB2 10.1 DBA for Linux, UNIX and Windows</td>
<td>59</td>
<td>61%</td>
<td>90 minutes</td>
</tr>
<tr>
<td>000-612</td>
<td>DB2 10 DBA for z/OS</td>
<td>67</td>
<td>60%</td>
<td>90 minutes</td>
</tr>
<tr>
<td>000-614</td>
<td>DB2 10.1 Advanced DBA for Linux, UNIX and Windows</td>
<td>54</td>
<td>60%</td>
<td>90 minutes</td>
</tr>
</tbody>
</table>
The IBM Information Management Certification web site contains detailed information on the DB2 certification program, along with in-depth information about each of these exams.

Even though each certification exam must be completed within a predefined time limit, you should never rush through an exam just because the "clock is running". The time allotted is more than adequate for you to work through the questions at a relaxed and steady pace.

When you are ready to begin, select the Start push button located in the lower left corner of the screen. At that point, the clock will start running, and the first exam question will be presented, along with four (or in some cases, five) answers for you to choose from. All of the questions are multiple choice. The current question number will also be displayed in the top left corner of the screen, along with the total number of questions found on the exam. So, if you answer each question in the order they are presented, this portion of the screen can serve as a progress indicator.

Immediately below the question number, you will find a special check box that is referred to as the Mark. If you would like to skip the current question for now and come back to it later, or if you're uncertain about the answer(s) you have chosen and would like to look at this question again after you have completed the rest of the exam, you can select this check box. After every question has been viewed once, you will be given the opportunity to review the marked questions again. At that time, you can answer any unanswered questions remaining and reevaluate any answers about which you have some reservations.

Once you have seen every question, an item review panel containing a numerical listing of the questions that make up the exam you've just taken, along with the answers you provided, will be displayed. Questions you marked by selecting the Mark check box are preceded by the letter "M," while questions you skipped or that you did not provide the correct number of answers for are assigned the value "I" to indicate that they are incomplete. By clicking the Review Marked button located in the lower-left corner of the screen, you can quickly go back through just the questions that have been marked. Similarly, by clicking the Review Incomplete button (located just to the right of the Review Marked button), you can go back through just the questions that have been identified as being incomplete.

One of the first things you should do when the item review panel is displayed is resolve any incomplete items found. When the exam is graded, every incomplete item is marked incorrect, and points are deducted from your final score—no additional penalty is incurred for getting an answer wrong, so you should try to provide an answer for every question. Then, if time permits, go back and review any questions that you marked. Once you feel comfortable with the answers you've provided, submit the exam for grading by clicking the End button, which should be located in the

<table>
<thead>
<tr>
<th>Exam Code</th>
<th>Exam Name</th>
<th>Questions</th>
<th>Passing %</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>000-617</td>
<td>DB2 10 System Administrator for z/OS</td>
<td>63</td>
<td>60%</td>
<td>90 minutes</td>
</tr>
<tr>
<td>000-543</td>
<td>DB2 9.7 Application Development</td>
<td>60</td>
<td>60%</td>
<td>90 minutes</td>
</tr>
<tr>
<td>000-545</td>
<td>DB2 9.7 SQL Procedure Developer</td>
<td>60</td>
<td>60%</td>
<td>90 minutes</td>
</tr>
</tbody>
</table>
lower-left corner of the item review panel. You will then be asked to confirm your decision to end the exam; upon confirmation, the testing software will evaluate your answers and produce a score report that indicates whether you passed or failed.

Each certification exam is broken into sections, and regardless of whether you receive a passing grade, you should take a few moments to review your section scores. This can help you assess your strengths and weaknesses. And, if you received a failing score, this information will help you identify the areas you should spend more time reviewing before you attempt to take the exam again.

**What to expect once you've taken an exam**

Shortly after you take a certification exam (usually within five working days), Thompson Prometric will send your results, along with your demographic data (that is, name, address, phone number, and so forth) to the IBM Certification Group for processing. If you passed the exam, you will receive credit toward the certification role the exam was designed for, and if you have met all of the requirements that have been defined for that certification role, you will receive an email (at the email address you provided during registration) directing you to the IBM Certification Members website, where you can download a certificate suitable for framing (in the form of a PDF file), camera-ready artwork of the IBM certification logo, and guidelines for using the "IBM Certified" mark. If desired, you can also receive a printed certificate and/or a wallet-sized certificate via regular mail by going to the appropriate web site (referenced in the email) and requesting these materials—you will be asked to provide your Fulfillment ID and Validation Number (also provided in the email) as verification that you have met all the requirements for certification.

Upon receipt of the welcome package, you are officially certified and may begin using the IBM Professional Certification title and trademark. You should receive the IBM Certification Agreement and welcome package within four to six weeks after IBM processes the exam results. However, if you failed to pass the exam and you still wish to become certified, you must make arrangements to retake the exam (which means that you must pay the testing fee again). There are no restrictions on the number of times you can take a particular certification exam; however, you may not take the same exam more than two times within a 30-day period.

**What are the DB2 certification exams like?**

If you've never taken a certification exam before, you're probably wondering what a DB2 certification exam looks like. A good way to find out is to take one of the sample/assessment exams that IBM offers. But, keep in mind that different individuals come away from these sample/assessment exams with different ideas about how challenging the actual exams will be—depending on their knowledge and experience, some find these exams to be relatively easy while others consider them difficult.

Another way to get some idea of what a particular DB2 certification exam is going to look like is to review the objectives that have been defined for that exam. Exam objectives identify the topics (which are grouped by sections) that questions on an exam will cover—the objectives that have been defined for the DB2 10.x certification exams can be seen by following the links provided in [Table 1](#) and selecting the **Objectives** tab when the Web page for the exam chosen is presented.
One thing is certain—whether you consider yourself a DB2 novice or an expert, you will need to study if you want to pass any of the DB2 certification exams available. Experience alone will not be enough. IBM prides itself on creating comprehensive certification exams that cover a broad range of topics; topics that are both relevant to the role a particular certification exam has been designed for and that cover new features and functionality that may have been recently introduced. Therefore, in order to correctly answer enough exam questions to receive a passing score, you will, in all likelihood, need to broaden your knowledge base.

**How the DB2 certification exams are developed**

American poet John Godfrey Saxe once said, "Laws, like sausages, cease to inspire respect in proportion as we know how they are made." Some might argue that the same can be said for formalized tests. But, having participated in the development of twenty DB2 certification exams, I strongly believe that knowing how the DB2 certification exams are put together can provide valuable insight into how an individual should prepare for one. So, just how are the DB2 certification exams developed? A flow chart that outlines the process can be seen in Figure 3.

**Figure 3. The DB2 certification exam development process**

The work needed to complete the majority of this process is performed over a five to six week period, by several (typically eight to twelve) subject matter experts (SMEs) and the IBM DB2 Certification Program Manager. Many of the SMEs are IBM employees who work with DB2 on a day-to-day basis; others are experienced DB2 DBAs or consultants. No one SME is an expert on everything; instead, each SME usually specializes in three or four areas (such as, security, database design, or high availability) or they have a significant amount of experience with some of DB2's latest features (such as temporal tables, time-travel queries, and row and column access control). Everyone involved meets on a regular basis (via conference calls and live meeting sessions) and approximately half of the work is done during these sessions.

**Creating a role description**

The DB2 exam development process usually begins with the creation of a high-level role description. This description explains the purpose of the certification exam and identifies the certification role's target audience. In broad terms, it defines the following:

- The scope and nature of activities that are typically performed by someone in the role.
- The knowledge and skill expected of someone who would pursue certification for the role.
- Typical job experiences, work environment, and so forth for someone in the role.
- Knowledge, skill, and experience prerequisites that are relevant to, but not covered specifically by, certification for the role.
For instance, the following role description was created for the DB2 10.1 Fundamentals certification exam (Exam 000-610):

"The Database Associate certification is an entry level exam for a user of any of the DB2 family of products. This individual is knowledgeable about the fundamental concepts of DB2 10.1 through either hands on experience or formal and informal education. The database associate should have an in-depth knowledge of the basic to intermediate tasks required in day-to-day administration, basic SQL (Structured Query Language), understand which additional products are available with DB2 10.1, understand how to create databases and database objects, and have a basic knowledge of database security and transaction isolation."

**Identifying categories**

Once a role description has been defined, the next step is to identify five to eight categories that describe, at a high level, the work that is typically performed by someone in that role. Categories provide the framework that will be used to organize tasks, and ultimately, they will form the sections that will be used to provide diagnostic feedback (via the sections score report) to everyone who takes the certification exam. Categories are developed by asking (and answering) the following questions:

- If the role were represented as a pie chart, what would the "slices" look like and what would their labels be?
- What are the most meaningful "chunks" of work that is typically done by someone in the role?
- What are the key activities around which work is performed by someone in the role?

When you view the objectives that have been defined for a particular certification exam, the sections shown correspond to the categories that were identified during this phase of the exam development process.

**Identifying tasks**

After anywhere from five to eight categories have been identified, the next step is to produce a list of individual tasks that are directly related to each category, and that are applicable to the certification role. For example, "Demonstrate the ability to configure and manage DB2 servers, instances, and databases" would be an appropriate DB2 Server Management-related task for a DB2 10.1 for Linux, UNIX, and Windows Certified Database Administrator.

Tasks are developed by asking (and answering) the following questions:

- What are the key activities (related to each category) one needs to be able to perform to be successful in this role?
- What knowledge and skills are needed to complete the work that someone in this role would be expected to perform?
- What are some key accomplishments that might be expected of someone in this role?
- What products or deliverables are created or result from work performed by someone in this role?
To be valid, a task must be an observable, measurable action that is required for successful job (role) performance. This ensures that the certification exam keeps an applied, job-related focus. And ideally, the list of tasks produced should flow in a natural, logical sequence (as related to each category).

Creating an exam blueprint

As categories and tasks are identified, they are documented in a specially-formatted spreadsheet to create what is known as an exam blueprint. And once the most relevant categories and tasks have been recorded, the following questions are used to complete the exam blueprint for the certification exam that is being developed:

1. How critical is each task or activity for successful performance in the designated role? The following scale is used to define criticality:
   a. Errors in performing this task or mastering this knowledge area are not likely to have negative consequences.
   b. Errors in performing this task or mastering this knowledge area may have some minor negative consequences.
   c. Errors in performing this task or mastering this knowledge area may result in negative consequences.
   d. Errors in performing this task or mastering this knowledge area may result in significant negative consequences.

2. How complex are the demands associated with each task? What level of knowledge should a certified candidate possess for each task? The following scale is used to define skill levels:
   a. Knowledge—Has general familiarity with task; limited knowledge, no experience; recalls factual information relevant to the task (knowledge questions involve, for example, listing, labeling, defining, selecting).
   b. Comprehension—Understands and comprehends concepts associated with the task; can explain the task to others; has limited ability to perform the task (comprehension questions involve, for example, interpreting, translating, restating, explaining).
   c. Application—Can apply knowledge to solve problems related to the task; can execute the task, perhaps with some assistance (application questions involve, for example, illustrating, calculating, solving, demonstrating).
   d. Analysis—Has in-depth knowledge; can execute the task without assistance; analyzes and responds appropriately to situations (analysis questions involve, for example, comparing, contrasting, stating conclusions, diagramming, detecting errors).
   e. Evaluation/Synthesis—Comprehensive knowledge; can give expert advice to others; makes sound judgments and evaluates alternatives (evaluation/synthesis questions involve, for example, integrating, generalizing, designing, constructing, judging, assessing).

3. How many questions are needed to adequately cover each task?
4. What percentage of the exam should be devoted to each category?
5. How many test questions are needed for one form of the exam?
A portion of the exam blueprint that was created for, and subsequently used to develop the DB2 10.1 Database Administrator for Linux, UNIX, and Windows certification exam (Exam 000-611) can be seen in Figure 4.

Figure 4. A portion of a DB2 certification exam blueprint

![DB2 certification exam blueprint](image)

Once the exam blueprint has been finalized, each SME identifies the topics they feel comfortable writing questions for, and the DB2 Certification Program Manager uses this information to make the appropriate writing assignments. Each SME is assigned the same number of questions and in some cases, two or more SMEs may be asked to write questions for the same task. Then, the SMEs spend the next three weeks working on their respective writing assignments. It takes me anywhere from one to three hours to write a single test question, and I usually end up writing somewhere between 14 and 24 test questions per exam.

Writing certification exam questions

Believe it or not, a significant amount of work goes into the development of a certification exam question. Not only does a question have to meet the criticality and skill-level requirements that have been assigned to the task it is written for, but each question written must also adhere to a rigid set of guidelines that will make both it and its answer defensible, should the exam’s validity be challenged in a court of law.

Before we look at the guidelines that are used to develop exam questions, we must first examine the components that a question is comprised of. These components, along with their definitions, are listed in Table 2 and can be seen in Figure 5.

Table 2. Components of a certification exam question

<table>
<thead>
<tr>
<th>Component</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>The complete set of components that make up a test question</td>
</tr>
<tr>
<td>Stem</td>
<td>The part of the item to which a test candidate should respond</td>
</tr>
<tr>
<td>Options</td>
<td>Stem response choices</td>
</tr>
<tr>
<td>Key</td>
<td>The correct, best answer to the stem</td>
</tr>
</tbody>
</table>
Distractors | Incorrect options—choices that a test candidate who does not know the answer to the stem or who is not paying attention might select
Reference/Rationale | A source where the key (correct answer to the question) can be verified or an explanation (which can be referenced) as to why the key is valid

Figure 5. Components of a certification exam question—illustrated

The first step toward creating a valid item involves identifying an objective the stem will cover (using information found in the exam blueprint), and turning an idea about that objective into a stem (question) that addresses an important aspect a candidate would be expected to know. Then, the following guidelines are used to fine-tune the stem and get it into its final form:

1. Ensure the stem contains simple, clear, and direct language; the stem should be kept as short as possible.
2. Make sure the stem is clear and complete; the stem should contain all of the information needed to decide on an answer.
3. Ensure the stem focuses on one central idea or problem—if a stem tests too many ideas, it may be too complex to clearly evaluate what a candidate does and does not know.
4. Make sure the stem focuses on “need-to-know” rather than “nice-to-know” information.
5. Eliminate any “teaching” information used. Teaching information is any information the candidate should already know that is not needed to answer the stem.
6. Remove anything that “dresses up” the question. In other words, remove any unnecessary details that might make the question more difficult to understand or more time consuming to read.
7. Eliminate all jargon and colloquialisms used. A colloquialism is a word or phrase that is employed in conversational or informal language. Keep in mind that for some candidates, English is a second language.
8. Define all acronyms and initialisms used. Acronyms are abbreviations that can be pronounced as words; initialisms are abbreviations that are formed using the first letter of each word in a series of words.

Once the stem has been finalized, the next step is to supply the options—providing the key is relatively easy; but, coming up with good distractors can be somewhat of a challenge. That's because the best distractors make it difficult for the candidate to guess the key. Good distractors also discriminate between those who know the material and those who do not. The following guidelines are used to develop and fine-tune this portion of an item:
1. Ensure the options use simple, clear, and direct language; keep the options as short as possible.
2. Ensure that the key is the best and only correct answer.
3. Ensure that all of the distractors are plausible; if a distractor is easily eliminated, consider replacing it with:
   a. A common misconception or error in technique
   b. A rule-of-thumb, process, product name, DB2 command, or SQL statement that does not fully satisfy or apply to the situation or problem presented in the stem
   c. An option that is good, but inappropriate for the situation presented in the stem
4. Ensure all options are similar and parallel in construction.
5. Ensure all options are similar in length—keys that stand out from distractors because of their length make it easy for a candidate to make an "educated" guess.
6. Avoid "All of the above" and "None of the above" keys as they minimize the understanding candidates are required to demonstrate.

The last step in completing an item involves providing a reference or rationale; every item must contain supporting documentation that will help a reviewer to understand the answer or show a reviewer where to go to verify the answer. Consequently, references should include chapters and page numbers, or specific web page links, as appropriate. To be valid, a reference must also be available to every test candidate.

Rationales are helpful when a question requires an integration of knowledge and/or hands-on experience such that no one reference is sufficient—rationales are critical for many complex scenario-based questions. A lot of times, I write DB2 Command Line Processor scripts to validate my questions and answers; these scripts, along with one or two references serve as a rationale. To be complete, a rationale should indicate why the correct choice or choices are right and why the incorrect choices are wrong.

**The review and validation process**
Once the SMEs have completed their writing assignments, they meet again with the DB2 Certification Program Manager via conference calls and live meeting sessions to thoroughly review every item that has been written. Part of the review process involves asking (and answering) the following questions about each item:

- Does the item map to the identified objective?
- Is the item targeted at the right skill level?
- Does the item address important information?
- Does the item test concepts and ideas that reflect best practices?
- Is the item structured around one central idea or problem?
- Is the wording of stem and options simple, direct and clear?
- Does the stem include all information needed to answer the question?
- Is there any extraneous information that can be eliminated from the stem or the options?
- Is the key the best and only correct answer?
- Are all of the distractors plausible?
- Is the item very similar in form and content to another item? If so, the two items should appear on different forms.
• Does the item include information that provides a clue to the answer to another item? If so, the two items must appear on different forms.

If the answer to any of these questions (with the exception of the last two) is No, the SMEs participating in the review process will attempt to make any changes that are needed to correct the item. Or, in some cases, the item will be returned to the author so it can be rewritten, in which case, the rewritten item will go through the review process again. Only when all of the items written pass this comprehensive test, does the exam development process move to the next and final phase—the Angoff review.

**Determining the passing score—the Angoff review**

To be legally defensible in the United States, as well as to meet the *Standards for Educational and Psychological Testing*, the passing score for a test cannot be arbitrarily determined. Instead, it must be justified using empirical data. Because of this, IBM uses something known as the Angoff Method to determine the passing score for each of their certification exams.

The Angoff Method relies on qualified judges to examine the content of each test item (question) and predict how many minimally-qualified candidates will be able to answer that item correctly. The average of the judges predictions for a particular item becomes that item's predicted difficulty; the sum of the predicted difficulties for each item, averaged across the number of judges used and the number of items reviewed, becomes the recommended Angoff cut score, which is the lowest score a minimally-acceptable candidate is likely to achieve.

Consequently, after all of the items for a DB2 certification exam have been thoroughly reviewed, the SMEs who participated in the exam development process are trained on how to use the Angoff Method. Acting as judges, each SME then rates each item according to how many minimally-qualified candidates (out of 100) they believe will be able to answer the item correctly. Once the first round of ratings have been collected, everyone participating in the Angoff review is shown the ratings of the other SMEs for the items in which the ratings varied greatly. Then, the SMEs are asked to rate each item again—this second round of rating gives an SME the opportunity to change his or her initial rating based on the judgment of the other SMEs. The second round of ratings is then averaged across the SMEs to determine the final passing score for the exam.

**Creating the certification exam forms**

Once a passing score for a certification exam has been obtained, the DB2 Certification Program Manager distributes all of the items that were developed across three different forms, according to the exam blueprint. One of these forms (Form C) serves as the sample/assessment exam that was talked about earlier; the other two (Form A and Form B) are randomly administered to individuals who take the certification exam.

**How to prepare for a DB2 certification exam**

So, what is the best way to prepare for a DB2 certification exam? To a certain extent, the answer to this question is governed by the way in which an individual learns best. Some people prefer to learn new things by reading a comprehensive book on the subject; others learn best by attending an instructor-led course in a classroom environment.
Howard Fosdick, an independent DBA contractor who is a founder and former president of both the International DB2 User’s Group (IDUG) and the Midwest Database Users Group (MDUG) and more importantly, is the author of the original version of this article, recommends a four-pronged approach to preparing for a DB2 certification exam that looks like this:

1. Get hands-on experience with DB2.
2. Read a good DB2 certification exam study guide (book).
3. Take practice exams.
4. Use IBM’s free study resources. IBM’s free materials are exceptional; you can leverage them to pass the tests while keeping your certification costs low.

Get hands-on experience with DB2
Having hands-on experience with DB2 is critical if you want to become DB2 certified. Fortunately, getting hands-on experience is relatively easy. If you have a DB2 environment set up at work, ask your manager if you can spend some time on the system practicing for DB2 certification. Most supervisors will not only give you that time, but they'll also be impressed by your ambition and desire to get ahead.

Better yet, download and install DB2 Express-C (at no charge) and run it on your own Windows or Linux computer. DB2 Express-C is a fully-functional version of DB2—not a stripped-down version like some of the “free” software packages that are available from other software vendors. Therefore, it contains all of the features and functionality you will need to master in order to pass the DB2 certification exams available.

Along with the DB2 Express-C software, the DB2 Express-C web site offers a free book on getting started with DB2 Express-C, a link to the IBM DB2 Express-C forum, where you can exchange ideas and share solutions with others in the IBM DB2 Express-C community, and the opportunity to purchase a 12-month DB2 Express-C software subscription, along with IBM support.

Read a good DB2 certification exam study guide
In addition to the wide variety of IBM Redbooks on DB2 that are available free of charge, there are several good books on DB2 that can be purchased through online booksellers. So, which book should you use? A book that is designed specifically for the DB2 certification exam you want to prepare for—if one exists. The material contained in such a book will, in all likelihood, cover all of the topics you will need to be proficient in to pass the certification exam the book was written for. Unfortunately, at the time of this writing, there are not a lot of DB2 10.x certification exam study guides to choose from. A list of books designed to help you prepare for various DB2 certification exams that are either planned or that are currently available, along with a few other books you might find useful, can be seen in Table 3 and Table 4.

<table>
<thead>
<tr>
<th>Exam targeted</th>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>000-610</td>
<td>DB2 10.1 Fundamentals: Certification Study Guide</td>
<td>Roger E. Sanders</td>
</tr>
<tr>
<td>000-612</td>
<td>DB2 10 for z/OS Database Administration: Certification Study Guide</td>
<td>Susan Lawson and Daniel Luksetich</td>
</tr>
</tbody>
</table>
Before you purchase any book, read the reviews that have been posted by individuals who have already bought it to get some idea about how useful the book will be as a DB2 certification exam preparation resource. Book reviews can often be found at online booksellers like Amazon.com or Barnes and Noble. Or, if you can find a copy at your local bookstore, skim through the book paying close attention to the index and table of contents. You want to make certain you pick a book you like because you will be spending a lot of time with it.

**Take practice exams**

Earlier, it was mentioned that a good way to find out what a DB2 certification exam looks like is to take one of the sample/assessment exams that IBM has available. Similarly, taking a sample/
assessment exam is a good way to prepare for a certification exam—as we saw earlier, the sample/assessment exam is created as part of the certification exam development process. Some of the questions that were thought to be too easy or too difficult during the Angoff review may have ended up on the sample/assessment exam, but the exam itself will be very similar to the actual certification exam and it will follow the same exam blueprint. You don't see the answers to the sample/assessment exams, but you do get a score that indicates whether you have passed or failed. Sample/assessment exams can be found by following the links provided in Table 1 and selecting the Test preparation tab when the Web page for the exam that was chosen is presented.

You will also find sample questions, along with detailed answers, in many of Roger E. Sanders' DB2 certification study guides, which are listed in Table 3. These sample questions follow the same format as the DB2 certification exams and they are developed using the exact same exam blueprints that were used to create the exams.

In addition to IBM, vendors like Pass-Guaranteed.com also offer practice certification exams for a nominal fee. But, beware of vendors that offer to sell you the actual exam questions! These vendors have a reputation for inaccuracy, plus using their offerings violates the terms and conditions of IBM's certification policies and their Certification Agreement. (You'll find links to these items in the Related topics section of this article.) You're much better off using materials from a reputable company.

**Use IBM's free study resources**

One of the advantages of certifying with DB2 is that IBM offers a tremendous amount of free material that can be used to prepare for the certification exams. Compare what's available from IBM with the free materials offered by Oracle and Microsoft for certification candidates and you'll be glad you chose to certify with DB2. In fact, there are so many free resources available that it's nearly impossible to list them all. So, in this section, we'll look at just those resources that are most useful for preparing for the DB2 certification exams.

Let's start with IBM's self-study courses. IBM's Information Management Training and Certification web site contains a wide variety of complimentary self-study courses and tutorials that are available for download. The DB2 certification-specific courses that can be accessed from this site include:

- **DB2 10.1 Fundamentals Certification Exam 610 preparation tutorial series**
- **DB2 10.1 DBA for Linux, UNIX and Windows Certification Exam 611 preparation tutorial series**
- **DB2 9.5 SQL Procedure Developer Certification Exam 735 preparation tutorials**
- **DB2 9 Fundamentals Exam 730 Certification preparation tutorial series**
- **DB2 9 DBA for Linux, Unix and Windows Exam 731 Certification preparation tutorial series**
- **DB2 9 Application Development Certification Exam 733 preparation tutorial series**

Each of these tutorials are built around the corresponding certification exam's objectives. So, they give you a good overview of the material that is likely to be covered on the exams. The DB2 Version 9 tutorials are listed just in case you are interested in certifying with that version. I
personally believe that it's always best to obtain certification for the latest DB2 release, but if your company is not yet at that version, you may find it beneficial to certify at the version your company is currently using. Of course, if you certify at the latest release level, your new-found knowledge can help you lead the transition when your company eventually decides to upgrade.

All the DB2 reference information you could ever ask for is also freely available on the web. The most important references include:

- **DB2 10 for z/OS Information Center**
- **DB2 10.1 Information Center for Linux, UNIX, and Windows**
- **DB2 10 for z/OS PDF books**
- **DB2 10.1 for Linux, UNIX, and Windows English manuals**
- **DB2 for z/OS - Technical Resources**
- **IBM Information Management Redbooks.** These are technical manuals on specific topics that can be downloaded for free or be purchased in hardcopy for a nominal fee.
- **IBM Publications Center**, where you can find any IBM published product, free or not.

IBM's developerWorks Information Management web site is the portal through which IBM passes information and free products to DB2 users. At developerWorks, you'll find news, information, downloads, tutorials, white papers, podcasts, wikis, webcasts, blogs, forums, conference news—all related to DB2.

There are also many free DB2 resources available from other sources. For example, the International DB2 Users Group (IDUG) provides members with access to a Technical Library, LISTSERV services, DB2 videos, DB2-related blogs, and information about Regional DB2 User's Groups that exist throughout the world. Web sites like Channel DB2, Database Journal, and Database Toolbox also offer comprehensive information on DB2.

Another good resource is IBM Data Magazine (Formerly DB2 Magazine) and if you like blogs, look at PlanetDB2, which is an "aggregator blog" that consolidates important postings from other DB2-related blogs and makes them available from a single point of access.

Many find that peer interaction helps them study; discussing the material is vital to their learning. If you're such a person, there many active online DB2 forums to choose from, most of which are open to everyone. For example:

- The DB2 forums found on IBM's developerWorks Information Management web site.
- DBForum's DB2 forum.
- The International DB2 Users Group (IDUG) DB2 LISTSERV.
- Channel DB2.
- The DB2 expert forum on IBMMAINFRAMES.com.
- The DB2 forum on Tek-Tips.
- The DB2 Development forum.

Your challenge will not be locating DB2 information—it will be identifying and studying those resources that are most relevant to the certification exam you intend to take. The key to success is to follow the exam objectives that have been defined. Follow the links provided in **Table 1** and
select the **Objectives** tab when the Web page for the exam chosen is presented. You can't learn everything there is to know about DB2, so concentrate your efforts on studying material the exam objectives dictate.

### Additional (but not necessarily free) resources

So far, all of the resources we have looked at are free. But there are many purchasable resources that could be well worth the investment. Here are just a few:

- **International DB2 conferences**: IBM and the **International DB2 Users Group (IDUG)** both offer technical conferences that are held annually: IBM's Information on Demand conference and IDUG's conferences for North America, Europe, Australia/Asia, India, and Latin America. Not only are these conferences full of technical seminars, but they give you the opportunity to interact face-to-face with your DB2 peers.

- **Regional DB2 user group meetings**: IDUG maintains a worldwide list of regional and local DB2 users groups—visit the IDUG web site to find out where and when your local DB2 users group meets. Local DB2 user group meetings are relatively easy to get to and typically have low admittance fees.

- **Instructor-led courses**: IBM offers a wide selection of instructor-led and self-study courses. To see IBM's specific course recommendations for each certification exam, follow the links provided in Table 1 and select the **Test preparation** tab when the Web page for the exam that was chosen is presented. Do you need instructor-led training to pass a certification exam? IT professionals who are have experience using DB2 probably do not (although an instructor-led course is almost always helpful). Those new to DB2 will probably benefit greatly from an instructor-led class.

If you *are* interested in instructor-led classes, you can learn more about what's available from IBM by visiting IBM's **Training and Certification for Information Management** web site. Self-paced virtual classes, instructor-led online training, onsite training, and group training discounts through programs like the **IBM Education Pack** are among the offerings available. You can also search the Internet for "DB2 training" to find DB2 certification-oriented courses that are offered by vendors other than IBM.

### How to minimize costs

For many, whether or not to pursue DB2 certification is a cost versus benefit decision. We've already looked at some of the benefits—some are tangible, if not easily measured, like being able to demonstrate the depth of your knowledge about DB2. Others are intangible, like the pride and satisfaction you'll gain from professional growth.

But, the costs can vary greatly depending on how you decide to prepare for the DB2 certification exams. And to be accurate, the costs must include your time and effort, as well as any monetary investment required.

Your biggest potential expenditure is for instructor-led courses (online or in a classroom environment), which can run in the thousands of dollars US. Fortunately, you can easily avoid this cost, provided you're committed and willing to study and learn on your own.
The most difficult costs to avoid are those for any certification study guides (books) you might want and the certification exam fees. But these costs are relatively low, with certification books going for somewhere between $35.00 and $70.00 US, and the exams costing $200 US (per exam). Even then, these costs can be reduced; here's how:

- Purchase used books instead of new ones. Some online booksellers like Amazon.com offer used books (which are often sold by other retailers) for individuals who don't want to buy new.
- If you plan on buying new books, and you intend to purchase more than one, take advantage of Amazon's "Better Together" discount.
- Visit IBM's Assess and Save Certification Offer for Information Management web site and take advantage of any "certification specials" that might be available. IBM frequently offers discounts on certification exam fees, for example, if you pass a sample/assessment exam or buy an approved certification study guide.
- Take one or more certification exams at an international DB2 conference. Certification exams are typically offered at a greatly reduced price ($25.00 - $35.00 US) at IBM's Information on Demand conference and at most IDUG conferences. In some cases, the first certification exam you take is free.
- Test outside the United States, where fees are often much less. This works best for those on green cards or work visas who can schedule their testing while they are out of the US.

Perhaps the most important determining factor is whether your company supports you in your certification efforts. Many companies will budget a set amount annually for each employees' education. If that's your situation, find out if it's possible to use this funding to pay for any certification course you might need. Other companies will pay for conferences or informal training materials (such as books, testing fees, or online classes). Even companies that won't cover any expenses will often give you time at work to prepare for certification exams. Companies view certification as a win-win for employer and employee; rare is the employer that does not support, in some manner, its workers who commit to self-improvement through certification.

**Conclusion**

Whether DB2 certification is right for you is a highly personal decision. Most find the benefits compelling, but the benefits of certification must be weighed against the costs, both in terms of preparation time and money spent. Many candidates spend no more than the cost of a single book and a testing fee in their quest for DB2 certification; but, even then they may invest anywhere from two to six weeks in preparation.

Whether a certified DB2 professional is better than an uncertified one is, to say the least, highly debatable. But one thing is certain—if you decide to become DB2 certified, in all likelihood, you'll end up knowing more about DB2 when you're finished than you did when you started. And knowing more about a product you work with on a daily basis is always good.

The key to becoming DB2 certified is to be aware of the *unwritten tips* that can help you obtain certification. In this article, I have tried to document those tips, as well as give you a behind-the-scenes look at how DB2 certification exams are developed. Hopefully, the information contained in this article will give you a distinct advantage. Good luck!
Acknowledgements

The author would like to acknowledge Howard Fosdick for developing an earlier version of this article. A significant portion of his original work was reused and/or updated to create this article.
Related topics

- Read the IBM certification policy to get answers to your questions about privacy and testing policies.
- Read the IBM professional certification agreement to see the terms and conditions of the IBM Certification Agreement.
- Visit the IBM Information Management Bookstore to obtain an up-to-date list of certification books that are currently available, organized by certification type.
- Visit the Information Management Certification Online Assessment Tests web site to learn how you can take any of the online practice assessment exams available.
- Read this interview with Roger E. Sanders to learn more about how DB2 certification tests are put together and how certification can help your career.
- Visit some of the prominent job sites for information on what certification the market is looking for. Monster.com, Jobster.com, Dice.com, and JustTechJobs.com
- Download DB2 Express-C, a no-charge version of DB2 Express that provides a solid base to build and deploy DB2 applications, as well as get hands-on experience using DB2.
- Evaluate IBM products in the way that suits you best: Download a product trial, try a product online, use a product in a cloud environment, or spend a few hours in the SOA Sandbox learning how to implement Service Oriented Architecture efficiently.

© Copyright IBM Corporation 2013
Trademarks
(www.ibm.com/developerworks/ibm/trademarks/)