The BSD certification by the BSD Certification Group

1. **What is this article about?**

   - Why do we need yac (yet another certification)?
   - What are the different types of certification?
   - Certifications from the point of view of employees and employers.
   - Comparison between certifications.
   - Progress report:
     - Where do we stand?
     - In which languages is the exam available?
     - Can I do the exam in my country?
     - Who can sponsors an exam?
     - What is the cost of developing exams?
     - Which certifications are available and which are planned?
   - What do you need to know? Who is the intended audience?
   - Who defined the objectives? Who controls the quality of the certification?
   - Study resources: where can you find training materials, how to prepare for the exam.
   - How will we test your knowledge: Testing methodology, the importance of using psychometrics.

2. **Who is the BSDCG?**

This article is not about just any BSD certification. We will discuss the certification that is being developed by the BSD Certification Group Advisory Board. The Advisory Board and the rest of the group consists of people who are actively involved in the different BSD projects (DragonFly BSD, FreeBSD, NetBSD and OpenBSD) – many of them are key figures in their communities and help develop their systems.

The BSDCG is working with Subject Matter Experts (SMEs) and a psychometrician to ensure that both the question items and the testing method are a fair and unbiased assessment of the candidate's abilities.

3. **Why is it important to have a *BSD certification?**

   – We need to break the myth that says that *BSD is offering no support.
   – We need to ease and fasten adoption of BSD in business world: match companies that are using or that want to use *BSD with people who are up to the task of managing a BSD environment. There is a chicken and egg problem: people think that there is no support, so the business world does not like BSD, so there is no interest in supporting BSD.
   – There is a need for (standard) objectives for training centers, course developers and publishers. A (standard) certification encourages development of course materials.
   – Companies need help when hiring BSD people. To put it blunt, we need to point out for them which words to do a keyword search on in a CV.
   – We need a revaluation of IT professionals: after the boom of the nineties, we now get the lash-back of the

phenomenon where everybody went into IT without really knowing what they were doing. Now, IT environments are running slow and are badly managed, because most IT professionals are not up to the job. As a result, they are always busy and as a result of their busy schedule, they do not want to change, update or migrate to better solutions.

Note: we call it *BSD because we do not test any specific BSD distribution. *BSD includes all distributions of the BSD family.

There are some problems with traditional certifications that we don't want for our *BSD certification:

- Certifications are made to sell software.
- Certifications are accompanied by official course materials that examinees more or less are forced to buy. There is no free documentation, it is not freely distributable and not easy to find.
- Certifications, like software, expire in order to sell upgrades.
- Knowledge of tools is tested instead of knowledge of techniques.
- There is no input from examinees.

4.   Value of a certification for employers

Some reports, trivially from Microsoft but also from members of more or less independent analyzing businesses, like for instance IDC, point out that employees for a UNIX-like environment on the average cost 30% more than "normal" employees. Hence they jump to the conclusion that the total cost of ownership of such an environment, which can be equipped for instance with freely available BSD software on PC hardware, is more expensive, even though it is cheaper in almost every other respect.

Note: BSD is part of the UNIX family, a collection of robust operating systems that where originally designed for big environments. Since many names of family members end in -NIX, they are sometimes called *NIX to refer to all UNICES together.

However, these reports fail to mention (on purpose?) that *NIX professionals have a much wider knowledge, while e.g. Microsoft "professionals" tend to be niche specialists – and that you need only 1/3 of the people normally required to maintain a Microsoft environment, when you have a free *NIX environment.

Employers tend to forget that finding adequate personnel, not so much as costs, is the real problem. Somebody who knows how to do the job, somebody who can start on the job right away, rather than going through a learning period, is to be preferred by far above someone who has to learn on-the-job. Without wanting to be an evil gossip aunt, whom would you prefer: the freshman (or worse, the would-be graduate who quit college) who installed Linux at home and who has learned everything on his/her own, or the veteran who has enough practical experience to get a certificate?

The problem with certificates, of course, is that there is no consensus. Which certificate proves that a candidate has a professional *NIX experience?

Remember not to always believe the hype. For instance, bsdcertification.com comes to mind. From their name, it is obvious enough that this is a commercial organization, and not a community-driven one. Their last press release is from 2006, testing is for FreeBSD only, and an old version for that. Certifications for OpenBSD and NetBSD were promised, but were never created. As far as we can tell from the web site, this organization is dead.

Even though we have to deal with the little details, a BSD certification remains a good investment if you don't know yet what additional bonus you can offer your employees. All BSD systems are focused on evolution, contrary to for instance Microsoft, which is based on revolution. BSD/UNIX competence hardly becomes outdated: you can build on

it and what you learned in the past will still be valuable in ten years time from now.

Knowledge acquired is not invalidated because of new things that you have to learn now in order to survive in today's IT world. Exams become exponentially more difficult and standards are raised, guaranteeing that fiascoes like the one with the MCSE certification can not occur in our world.

Other reasons to prefer a BSD certification over a traditional one:

- It is relatively cheap.
- It is rather difficult, a good test for the candidate's experience: there are not only multiple-choice questions, but also fill-in-the-blank questions, which make it nearly impossible to pass without experience.
- BSDCG values community input and candidates can provide new questions or new objectives through regular update requests.
- BSDCG is vendor-independent, so there is a large item pool of exam questions and a high variation in questions. This has a positive effect on the level of difficulty of the exams.

Some people say that it is a disadvantages not to have a practical test. BUT:

- Time is limited.
- Practical tests require expensive infrastructure and the extra costs would be charged to candidates taking the exam..
- Having a practical test would almost certainly pinpoint the certification to a specific BSD distribution or version.
- We have to get rid of the idea of performance based testing and move towards performance based learning instead: learn students how to use their experience instead of learning them how to use their memory.

5. **Pros and cons for employees**

The most important reason for certification remains of course that you will acquire an extra asset when compared to that other applicant for your dream job. Especially when you just finished school or university, a certificate is a nice addition to your education. But let's be honest, among the working crowd in the BSd world, who really needs a certificate? BSD people know what they know and they don't need to prove anything to anybody, do they? No serious BSD user or administrator has ever needed to provide prove of what he or she knows. Once you have a job and experience, the rest follows.

Another reason to take the exam, which is becoming more fashionable as we speak, is that your
employer asks you to get the certificate. That is also one that is easy to understand. But if we want to find more reasons, things get harder. Maybe you could say that you want to get a certificate in order to prove your knowledge, or maybe you want to know for yourself where you stand, or you decide with a couple of friends to do a contest and see who gets the highest score.

You might also get a certificate because you are confident as to what the future will bring, or because you want to protect your career. If we believe the predictions of economic analysts, free software is going to expand dramatically during the decade to come. We are already past the file and print server phase, and well into the database or Java development platform stage, as more and more companies admit to. You can probably name some cases of adoption right off the top of your head. Even the newspapers are telling everybody who wants to hear that free software is really making it in the business world. It is obvious that we have reached a tipping-point: there will be more free software systems, more *BSD professionals or people claiming to be so, and more incentive to divide them into "the good" and

"the bad". If you are smart, you will make sure that when that time comes, you fall into the right category and make sure that you can show some paper.

I'd have to think really hard to come up with more reasons to certify... When it comes from your own pocket, it is still an investment, however small it may be. After the boom of the nineties, wages in IT are back to normal or at least seriously reduced. You'll probably want to study a bit, too, and that takes time. Time off from work, be it with the approval of your boss, or you'd have to sacrifice your own free time. And all that to prove that you can do something that you know for yourself you're capable of doing...

And then there is the risk that you don't pass, and maybe you will have to explain that mishap to your boss, who meant so well with you and sponsored your exam.

One of the less evident disadvantages of certification is that you force an upper limit onto your own competences. Imagine: Another applicant has a master level certificate, while you only have an entry level certificate because you never felt like going further. Who will be chosen for the job? The candidate who is more experienced, or the candidate who has more certificates? So once you start on a given certification path, you need to go through to the highest level that you can reach, or you run the risk to ruin your chances on the job market.

6. Progress report

The BSDCG did not just come up with a bunch of questions. In order to be credible, first the needs were analyzed with the help of a professional test developer (a psychometrician). She made us perform a Job Task Analysis (JTA), were we assembled input from many people. That makes our certification a good one: it does not only contain the opinions of individual BSDCG Advisory Group members, it also has the input of thousands of others who expressed their opinions about the subjects to test (the exam objectives).

The initial exam, which got out of beta-testing by the end of November of 2007 and is now ready, is available in English only. During the beta-testing period, hundreds of testers with all kinds of competences took the exam. The results were then used to make a statistically valuable analysis that can be used to compare examinees.

The exam objectives are already translated in Mexican Spanish and Russian.

Currently, the BSDCG is focusing on the BSD Associate (BSDA) exam, which is oriented towards beginning users and administrators. Later the BSDCG plans to release a BSD Professional (BSDP) exam, which will test advanced administration skills. The details about this exam will be available by the end of this year (2007).

In order to bring the exam to the candidate, the BSDCG is developing a test platform which consists of a Live CD and a secured environment, lead by one or more of the proctors of our network. A proctor is somebody who has signed a Non-Disclosure Agreement and who leads the exam and makes sure candidates respect our security procedure. We are currently looking for sponsoring and translators to make this platform available in different languages and countries. We specifically chose for this method of exam delivery, as we are on a tight budget and don't want to waste our money on commercial exam centers like Vue or Prometric. Besides, we don't want to run our test environment on MS Windows.

Until the test platform is finished, we work with paper-based exams forms. Apart from anything else, this helps us to reduce costs. We are very concerned that the certification remains accessible for everyone who wants to take the exam. Hence the candidates' contribution is really only a small part of the total cost to publish an exam. The tests, needed for NOCA certification and thus for credibility, cost about 35.000 USD - NPCA being the quality control organization for certifications bodies. Vue and Prometric, the traditional certification bodies, charge +/- 8.000 USD per exam per language (and per version of the same exam!). We calculated that the development of our own test platform would cost

about 15.000 USD. Copyrights and trademark registration would be another 4.000 USD.

As for the BSD flavors that we check for, the exam questions currently deal with FreeBSD, NetBSD, OpenBSD and DragonFlyBSD. When tested, the candidates will be asked questions about all types of BSD systems, there is no possibility to opt for a specific distribution or version. As a consequence, we are probing for understanding, not for knowledge of details and memory capacity. Also, the BSDA is not a requirement for the BSDP.

In cooperation with the communities, we arrived at the conclusion that test objectives can be divided into 7 categories with the following weighting:

– Installation and upgrading the operating system and software: 13$.
– Securing the operating system: 11%.
– Files, file systems and disks: 15%.
– User and group management: 12%.
– Basic system administration: 12%.
– Basic network administration: 15%.
– Basic UNIX knowledge: 17%.

The BSDA exam has 100 questions covering these subjects. From the web site, you can download a command reference mapping each of the BSDA commands to the four operating systems covered by the BSDA. Furthermore, the BSDCG conceived a document describing the BSDA Certification Requirements, which can also be downloaded from the web site.

In order to gather funds, the BSDCG created a courseware DVD that gathers all the study materials from the web site. The collection consists of the exam objectives, the command reference, an explanation on our quality control mechanisms, and software and documentation for FreeBSD, OpenBSD, NetBSD and DragonFlyBSD.
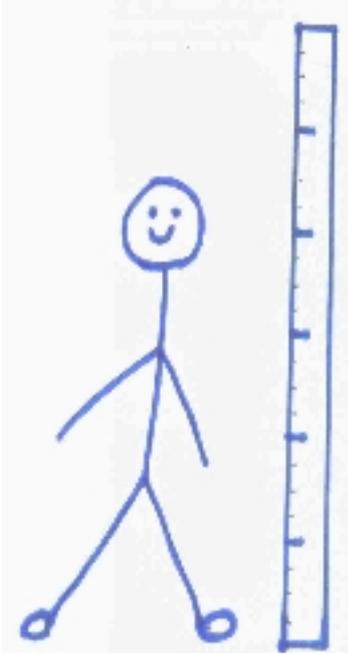

BSDA Courseware

Summer 2007 Edition

Essential tools for your
BSD Associate certification

7. **Certification standards**

We want our exam to be a quality test. Therefor, we apply the rules as defined by NOCA, the National Organization for Competence Assurance, which defines the standards for certification bodies.

Among other criteria, NOCA certification requires that you use psychometrics for the analysis and quality control of your exams. According to the dictionary, psychometrics is the "Mathematical analysis of psychological processes". In other words, psychometrics is the science that measures human variables: not only knowledge, but also practical experience. This science is also devoted to the development of tests by means of statistics.

A test is just a tool to measure the amount of Knowledge, Skills and Abilities (KSAs) that a person has in some area. It is often difficult to comprehend a quantity of knowledge, since it seems to be so abstract. But in actuality, any quantity of measurement is just an abstraction.

For instance, the measurement of height in inches, feet or meters appears on the surface to be a real and concrete measurement. But if you think about it, the inch was simply created and defined by people. There is no naturally occuring inch and there are no natural units of measurement at all. One cannot hold an inch, and it really is just an abstraction that is generally agreed upon. It is this general agreement that makes the inch a useful measurement tool. It is this common frame of reference that makes a unit of measurement functional and useful. Psychometricians do the same with exams: they create a common frame of reference that enables us to measure knowledge about a given subject.

A psychometrician has a university degree in psychology and usually additional degrees in the measurement of the human mind, in industrial psychology or in quantitative psychology. He or she is trained in the development of questions that test human features, including those features that indicate mastery of a given field of competence. A trained psychometrician is the difference between a bunch of questions and a tool that accurately measures and documents knowledge and experience. For the development of their tests, psychometricians use scientific methods to assure that the exam complies with the four rules of a good test:

- The questions are fair: no trick questions, only objective answers are possible, brain dumpers and others who don't play the game in a fair way stand no chance.
- The questions are accurate: they are updated regularly, especially in the volatile world of IT.
- The questions are clear and the wording specific, they can not be misinterpreted and all candidates can understand them without difficulties.
- The questions allow the test body to perform precise measurements of the competence of the examinees.

The psychometrician also uses scientific methods to determine the following:

- Scoring procedures: when do you get points for a good answer, and how many?
- Passing score levels: how much do you have to score in order to pass the test? Subject matter experts assist the psychometrician to determine this.
- Different versions of a test are equal: by means of statistical calculations the exam is compiled. New questions are piloted first: the answers to those questions are not scored until the validity of the question has been proved statistically, during this test phase the statistical information about the quality of the item is gathered.
- Planning of the rotation scheme, which is important for the security of an exam (again a measure against brain dumpers).

While other certifications (like RedHat and Novell) might also use psychometrics (they did not answer our questions), given the lower numbers of certified examinees, it is unsure whether the use of psychometrics is useful for them.

8. Recertification

Once you get your BSDA, it will not expire. BSDP on the other hand is testing somewhat more volatile subjects. The BSDCG is as yet undecided what the recertification scheme will be for this certificate.

9. More information

http://www.bsdcertification.org

Mailinglist: bsdcert@lists.nycbug.org