



**NATIONAL BDPA**

**2004 JOB OUTLOOK**

**VERSION 2.0**

**OCTOBER 17, 2003**

### Revision History

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## 2004 Job Outlook

### *African American High Tech Workers Need Jobs Now*

The Business Cycle Dating Committee of the National Bureau of Economic Research determined that a trough in business activity occurred in the U.S. economy in November 2001. The trough marks the end of the recession that began in March 2001 and the beginning of an expansion. Even though the 8 month recession was considered over, payroll employment has continued to decline. BDPA contends that the root cause of this "jobless recovery" is due to the loss of high tech jobs through H-1B visas, L-1 visas and offshore outsourcing.

According to the Department of Labor (DOL) the "computer and data processing services industry is projected to be the fastest growing industry in the economy, with employment expected to increase 86% between 2000 and 2010". However, instead of this anticipated growth, we are seeing a continued decline. For example, the DOL reports that the unemployment rate for Computer and Mathematical Occupations has more than doubled from 2.5% in January 2000 to 5.5% in September 2003; and just in the past year alone, from August 2002 to August 2003, over 122,000 high tech jobs were lost. The outlook for IT jobs continues to remain bleak, as more and more employers, in both the public and private sectors, continue the practice of hiring foreign workers and outsourcing IT jobs to offshore locations to take advantage of cheaper labor rates. The impact on African Americans has been phenomenal.

The old adage of being the "last ones hired first ones fired" is not just a myth. During tough economic times and in the midst of downsizing and layoffs, African Americans are traditionally hit harder than their white counterparts. As of August 2003, the DOL reports the unemployment rate for African Americans as almost double the national average at 11.0%. The continued trend of globalization (viz. outsourcing of IT Jobs and the insourcing of H-1B and L-1 Visa workers) has taken its toll on African Americans. This is evidenced by the marked rise in the number of unemployed African American high tech workers and the corresponding disproportionate unemployment rates. The wide disparity in the numbers is significant. According to the DOL, the unemployment rate for African Americans in computer and mathematical occupations is 10.1% while the National average is at 5.2%.

While the upturn in several economic indicators has led to reports that the recession is over, companies continue to downsize and layoff high tech workers. And jobs that are the prime targets for outsourcing offshore and for bringing H-1B and L-1 visa workers onshore (e.g. Application Maintenance and Enhancement, Production Support, System Operations, Help Desk, Applications Program & Analysis, Training, and Documentation) are the same jobs that have a disproportionate number of African Americans. BDPA members who are actively looking for work in this depressed job market report that cheaper foreign labor rates have driven down salary levels to the point that it is not uncommon for unemployed high tech workers to experience a 20%-50% drop in salary when changing jobs.

The bottom line is that there is no longer a shortage of high tech workers. On the contrary, there is now a shortage of available high tech jobs. This shortage significantly impacts African Americans in the Information Technology Industry. To make matters worse, there is a lack of mission critical economic indicators as well as government policy to ensure fair and equitable access to training programs and available IT Jobs.

### **Recommended Countermeasures**

The following countermeasures have been identified through a study of Information Technology Best Practices.

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- Require Accurate and Timely Forecasting:
- Implement Market Driven Training Programs:
- Provide Better Access to Defense Industry Jobs
- Strengthen Diversity Supplier Programs
- Support Internship and Co-op Programs for College Students
- Establish Key Metrics and Regular Reporting
- Put Better Safeguards In Place
- Adopt Industry Best Practices
- Open Access to Industry Experts

**Require Accurate and Timely Forecasting:** What skills are in such short supply that businesses need to fill jobs with H-1B and L-1 visas? The Department of Labor (DOL) must provide realistic forecasts that identify high tech occupations and critical skills shortages. The DOL outlook is outdated and overly optimistic. Realistic short term (e.g. 6 months to a year) job forecasts and long term (2-5 years) job forecasts are needed so that training providers and educational institutions can provide “just in time” training so that American Workers can upgrade their skills to better compete in the fast changing high tech job market. DuPage Workforce Development is initiating a study to identify critical skills shortages, however, the preliminary results won't be available for some time. During these hard times while so many highly skilled American Workers are unemployed, the DOL Business Relations Group (BRG) must work aggressively to close the gaps. Especially in areas of high employment, the BRG needs to mandate that local workforce boards contact local HR departments, in both the private and public sectors, to solicit job forecasts and timely job postings.

**Implement Market Driven Training Programs:** According to the DOL Business Relations Group (BRG), the State One Stop Centers were put in place to help American workers upgrade their skill sets to remain competitive. However, the training offered by local training centers (ref: Illinois Employment and Training Center) is not effective in meeting local market demand. BDPA members have been denied training dollars to retool because they are considered to be overqualified for available technical programs that are designed to accommodate unskilled workers who want to upgrade their skill sets. Project management training is critical for meeting Capability Maturity Model Level Three which is required for government contracts. The idea is that H-1B training dollars should be made available for PMP, CMM and Process Engineering training. To compete in the current job market, project managers need to obtain Project Management Institute (PMI) Project Management Professional (PMP) certification. Unfortunately, training dollars for industry recognized technical certifications are difficult, if not impossible to obtain. Changes in DOL program policy are needed to design market driven training programs that are more easily accessible.

**Provide Better Access to Defense Industry Jobs:** There are many IT jobs that could be filled by African Americans in the defense and intelligence communities. BDPA members report that many of the IT job vacancies in the Washington D.C. metro area require active clearances. Currently, the only way to obtain security clearance is through a sponsoring company. It would help if the Federal Government would give more direct access to the security clearance administration apparatus to increase the numbers of cleared African Americans. For example, the “One Stop” career centers could be commissioned to develop training programs and to provide access to entry-level internships to help meet the growing demand for these jobs.

**Strengthen Diversity Supplier Programs:** BDPA has studied numerous diversity supplier programs in the public and private sectors and found that the vast majority of these programs simply pay lip service to the concept of setting aside budget to engage African American businesses. Small businesses are required to invest an inordinate amount of time to fill out volumes of paperwork to get on the right preferred vendor lists, and once on the lists even more time is wasted responding to Requests for Proposal (RFPs) for projects that have already been awarded based on political ties. BDPA has found that no one is held accountable for the effectiveness of Diversity Supplier Programs. This needs to

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change, especially when contracts are awarded for the use of public funds. Federal agencies (e.g. OSD, Navy, Army, Air Force, Homeland Security) are outsourcing billions of dollars in government contracts. A thorough audit is needed to identify the percentage of these funds that have found their way to African American businesses. A closer look at the distribution of H-1B training grants is warranted as well. Recommended guidelines should be developed and enforced by the General Accounting Office (GAO).

**Support Internship and Co-op Programs for College Students:** Federal, state and local governments need to take a proactive stance to provide internships and to promote internships through the “One Stop” career centers and local workforce boards. Recent College graduates are still faced with the age-old “catch 22” that you can’t get a job without experience and you can get experience without landing that first job. BDPA and other career-focused organizations have found, and corporate HR professional agree that the best positioning tool for college students and other new entrants to the high tech workforce are summer internships and co-op programs. Students who spend time in the workforce, not only learn valuable skills, they learn what’s hot and what’s not and how to adapt to the idiosyncrasies of the corporate culture. This is a win-win situation for government agencies and corporate America because the sponsoring entity is able to evaluate the intern, bring them back year after year; and offer permanent employment to an employee who can “hit the ground running” upon graduation.

**Establish Key Metrics and Regular Reporting:** BDPA members report that the DOL training programs that have been put in place by the Employment and Training Administration’s Business Relations Group to help American workers upgrade their skills sets have had marginal success in meeting the market demand for critical skill sets. The implementation of the Office of Management and Budget (OMB) Common Performance Measures for Job Training and Employment Programs will help to identify ineffective training programs, but it will take years to implement these measures. According to the recently released GAO report, “H-1B Foreign Workers: Better Tracking Needed to Help Determine H-1B Program’s Effects on U.S. Workforce”, key indicators needed to evaluate program effectiveness are **not** collected and reported. A special commission is needed to put measures in place to track the number of high tech jobs that have been lost, the reasons why (e.g. due to H-1B Immigrants, offshore outsourcing and lack of marketable skill sets) and the impact to the U.S. workforce. Job forecasts need to be compared to actual employment statistics and variances need to be studied to find ways to improve forecasting methods. Metrics are needed to help uncover the reasons why there is a 2 – 1 difference in unemployment rate between African Americans and others in the same population. These missing statistics need to be made readily available to public and included in economic reports and forecasts.

**Put Better Safeguards In Place:** The recent drop in the H-1B visa limits from 195,000 to 65,000 is a step in the right direction but it does not address the hundreds of thousands of H-1B already in place. It also does not address the fact that companies are finding it easier to obtain L-1 visas to bring in unlimited numbers of foreign workers in support of their outsourcing and globalization efforts. L-1 visas do not have an annual cap and are not subject to prevailing wage laws. According to the GAO, Department of State statistics show that the use of L-1 visas has increased substantially since fiscal year 1998. It is time to close the loopholes that disadvantage American workers by putting caps and tighter controls on H-1B and L-1 visas; and tying caps to the unemployment rate and the number of visa workers already employed. For example, all employers looking to hire foreign workers, either onshore or offshore, should be required to file discovery reports that identify the shortages of qualified American workers. Strict guidelines are needed to ensure that fair labor practices are not violated as corporations and government agencies continue to overlook qualified American workers in an effort to hire cheap foreign labor. Government policy is needed to institute tougher penalties for non-compliance to these guidelines in the form of fines paid by the CEO and other company officials who are in violation of fair labor practices.

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**Adopt Industry Best Practices:** Through the Best Companies for Blacks in Technology Awards Program, BDPA and WorkplaceDiversity.com have identified several companies that stand head and shoulders above the rest when it comes to instituting highly effective diversity programs that demonstrate a commitment to people. These companies understand that diversity has a bottom line business case value and maintain key indicators of a healthy working environment. They are able to produce impressive metrics on demographics, diversity programs, tenure, promotions, terminations, diversity recruiting, career path programs, and minority vendor programs. For example, Allstate Insurance, winner of the BDPA Epsilon Award for the Top Company for Blacks in Technology, offers a wide range of programs that are especially effective in grooming African Americans for positions in senior management. Lockheed Martin received high marks for its highly effective diversity supplier program. Blackwell Consulting Services, an African American owned company, received above average ratings due to superior professional development programs. FleetBoston Financial was noted for their innovative program that encourages employees to donate volunteer hours in support of community outreach initiatives, for establishing a wide range of diversity recruitment programs; and for the active participation of their senior leadership in their diversity initiatives.

**Open Access to Industry Experts:** African American high tech workers are being impacted in greater numbers by downsizing resulting from globalization (e.g. H-1B and L-1 Visas and offshore outsourcing). Concerned employees become even more alarmed when they observe what appear to be discriminatory and unfair labor practices. Discouraged by today's stagnant job market, frustrated employees are beginning to seek legal action like class action lawsuits and unionization as the only viable option to avert impending job loss. Employers and government agencies need to demonstrate greater sensitivity to the emotional impact of job loss and layoffs by providing free career coaching and counseling services to help boost low morale. Both unemployed and employed high tech workers need access to market research and qualified industry experts with expertise in long term career planning that involves retooling and retraining for redeployment into more specialized and creative roles.

### A Call To Action

BDPA looks to partner with legislators, government agencies, public policy makers, corporations and industry associations to develop a win-win strategy for all parties involved. We believe that African Americans serve a vital role to help solve this complex issue by sharing expertise. We look to form mutually beneficial partnerships to develop policy changes and broad based countermeasures that will secure the future of America's high tech workers. To really make a difference, we need your help.

Please contact me to directly to discuss ways that we can work together to address this very serious issue facing the nation.

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### About BDPA

Earl Pace and the late David Wimberly founded BDPA in 1975. For over 25 years, BDPA is a global member focused organization that positions its members at the forefront of the IT industry. BDPA remains committed to delivering IT excellence to our members, strategic partners, and community. BDPA offers a comprehensive set of education life cycle and career development programs to help members every step of the way, from the classroom to the boardroom. BDPA has over 3,000 members in over 40 chapters and an online community of over 21,000 subscribers. About 60% of BDPA members are IT professionals (e.g. software developers, business analysts, testers, project managers, etc.). About 25% are high school and college students. Another 10% are entrepreneurs and consultants.

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Another 5% are managers and senior executives. BDPA also has a growing constituency of teachers, university professors and HR recruiters. BDPA members represent all ethnicities, age groups, and income levels and are geographically disbursed across the U.S. with a growing international following in Canada, England, France and Ghana.

### Sources

BDPA, the Premier Organization for African Americans in Information Technology  
<http://www.bdpa.org/>

National BDPA 2004 Job Outlook  
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Department of Labor Computer and Data Processing Services Job Outlook  
<http://www.bls.gov/oco/cg/cgs033.htm>

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<http://www.doleta.gov/h-1b/html/TEN3-03.htm>

Department of Labor Unemployment Statistics  
<http://www.bls.gov/cps/>

Department of Labor Occupational Outlook Handbook, 2002-03 Edition  
<http://www.bls.gov/oco/home.htm>

Illinois Employment and Training Center (IETC)  
<http://www.ietc-dupageco.com>

DuPage Workforce Development  
<http://www.ietc-dupageco.com/jobseekersjtpa.htm>

Project Management Institute (PMI) Project Management Professional (PMP) Certification  
<http://www.pmi.org/>

GAO-03-883 "H-1B Foreign Workers: Better Tracking Needed to Help Determine H-1B Program's Effects on U.S. Workforce"  
<http://www.gao.gov/new.items/d03883.pdf>

Web Portal to Organized Labor for High Tech Workers  
[www.TechsUnite.org](http://www.TechsUnite.org)  
<http://www.washtech.org/wt/>

WorkplaceDiversity.Com, The Source for Diversity Talent™

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<http://www.workplacediversity.com/>

NJ Senate Bill S1349 Banning the outsourcing of government projects and provides that only citizens or persons authorized to work in the US pursuant to federal law may be employed in performing certain government contracts.

[http://www.njleg.state.nj.us/2002/Bills/S1500/1349\\_11.HTM](http://www.njleg.state.nj.us/2002/Bills/S1500/1349_11.HTM)

### **Job Seeker Advice**

Frustrated job seekers are finding out the hard way that often times it doesn't matter how good you are and how much experience you have because companies are finding highly qualified job seekers who are more than willing to take a salary cut rather than face the dismal prospects of remaining unemployed. *The only way to get ahead and stay ahead in this challenging job market is to constantly distinguish yourself from the competition by demonstrating great performance and maintaining highly marketable skills.*

The job hunt game is constantly changing. You can no longer submit your resume to the proliferation of career sites and then wait to be called. And unless you know how to use a few tricks of the trade, responding to job leads is often times a losing proposition. Companies are inundated with literally thousands of resumes and now they are faced with the laborious task of screening resumes. It is often hit or miss as to whether you will make the final cut because business savvy HR Recruiters are now using search engines to find the handful of resumes that they will review manually to submit to the Hiring Manager for consideration.

How will you succeed where countless others have failed? You need an inside track! When times are tough and the going gets rough it all boils down to same truism you have heard time and time again: "it is not just what you know but who you know".

BDPA needs to take the concept of marketable skills to the next level. We need to forecast future demand and prepare our BDPA members to make sure that they have the skills and characteristics necessary to be competitive in the marketplace. This is a mission critical assignment that drives to the core of what BDPA is all about.

It is necessary to get re-trained on a regular basis in order to stay competitive in the Information Technology Industry. This is because technology is constantly changing causing technical skills to become quickly outdated. This requires intense training and ongoing education to keep up with the latest developments. And to be effective, in depth training must be specific to a particular type of equipment and computer software language.

African Americans in Information Technology can take advantage of the training dollars from the H-1B visa legislation. A \$3,000 re-employment account is available to unemployed workers to retool and improve their skill sets. Training grants are also available for African American entrepreneurs who want to provide training services. To remain competitive in the marketplace, African Americans need to train hard, train often and train for the right jobs in the right industries.

African Americans in Information Technology must learn business development skills. We have to continually assess labor market needs for workers with high technology skills. Staying abreast of industry trends is essential and can be accomplished by checking job postings and engaging in a rigorous discipline of career planning on an ongoing basis. Networking online and in groups is the best way to keep your finger on the pulse of the industry. In this way you can better understand future job requirements, perform a skill gap analysis, develop a training plan, take the training and then position yourself for a career change.

In order to do it right, retooling requires an objective study of skill sets compared to market demand. It is recommended that you engage the services of a professional career coach. The Department of Labor (DOL) provides employment services at regional One Stop Career Centers, however, because these career counselors do not have intimate knowledge of the Information Technology Industry, the benefits from this free service are marginal. The first step in retooling is to study the market to find your “ideal job”. This can be done by surfing the internet for job postings. Be careful to do your homework on the real market demand. This is because there are many job postings on the internet for jobs that simply do not exist.

The DOL Bureau of Labor Statistics (BLS) keeps a plethora of employment and unemployment statistics by occupation and industry. This data is available nationally and geographically. Take the time to look at employment trends. For example, even though a job in the telecommunications industry may look attractive, a study of the employment trends will show that there has been a steady decline in available jobs with a corresponding increase in the unemployment rate. A similar study of web development jobs will show that jobs of this type are on the rise. Geographical indexes are helpful, because, in some cases it is easier to break into a new job type by working in an area that has not been hard hit by unemployment.

Once the ideal job(s) is identified, an objective skill assessment is needed. This is done by a careful analysis of current skills compared to the job requirement. The DOL provides generic Knowledge, Skills and Abilities for hundreds of occupations. Using this database along with current job posting will yield a good understanding of job requirements. Take the time to test this understanding by running it past those who are already in the job you want. Networking online and face-to-face at program meetings, career fairs, trade shows and other professional networking events does this. A skill gap analysis is conducted by comparing the skill requirements for the ideal job to the objective skills assessment. A career development plan documents the training necessary as well as recommended job assignments to acquire the pre-requisite work experience. Sometimes it is necessary to take on volunteer assignments (e.g. volunteer to be a web master for your chapter, church or community technology) or to take a job for less pay to get valuable work experience.

Positioning yourself for a career change is easier said than done. You have to be at the right place at the right time. And due to the tight job market, opportunities are few and far between, so don't be surprised if your success depends even more on who you know rather than what you know. This is where relationship building and networking become critical to continued success. You have to keep your eyes and ears open for opportunities when they pop up and then more quickly to present yourself with a tailored resume and cover letter. You must be proactive and take initiative. Soft skills like interpersonal skills, leadership skills, team building skills, and basic business skills are quickly becoming the deciding factor between candidates who have equally impressive technical skills, advanced degrees and industry recognized certifications.

### ***Hot Jobs and Highly Marketable Skills***

In order to stay competitive in this ever-changing world of Information Technology, there is a constant need to retool and retrain. Anyone interested in a long-term career will have to accept a life long learning experience. Believe it or not, there was a time before the Internet was born when mainframe programmers ruled the day! The mainframe programming jobs of days gone by are virtually non-existent and have been replaced with careers opportunities in web technology, cyber security, and network administration. Whether you are fresh out of college, recently downsized or simply looking for a career change, you will need to know what's hot in this tight IT Job Market so you can plan your next move. Here is a brief look at where the hot jobs are today.

**Web Technology:** Even after the dot com bomb, there is still a heavy demand for content providers, skilled developers and graphics designers who are adept at web technology, e-Commerce and other online order fulfillment applications. Web developers with expertise in client server technology that utilize computer languages like Visual Studio, XML, XSL, HTML, DHTML, C/C++, Java/J2EE, JSP, ASP, ASP.NET, Perl, API's, Perl, CGI JavaScript, VB, VBscript, VB.NET, Smalltalk, Eiffel, C#, Python Websphere, Weblogic are highly marketable. Experience functioning in a multi-discipline development team environment is helpful.

**Network Administration:** With the advent of the internet, intranet and extranet, IT professionals with networking skills are very much needed. This includes understanding network topologies, routers and TCP/IP technology. Cisco, Microsoft and Novell certification is recommended. The best job candidates know how systems work together or are certified in operating and configuring the hardware that supports the networking backbone.

**Database Base Administration:** Database administrators, data modelers and developers knowledgeable of database technology are still in demand. Many front-end client server applications rely heavily on Oracle database back-end systems to store and retrieve huge amounts of data for customers, vendors and other stakeholders. Developers with expertise in Oracle DB, Oracle App Server, Apache, SQL Server, MySQL and other major database platforms are even more marketable. Post secondary educational institutions continue to struggle to keep up with the demand that makes this career path very attractive for IT professionals looking for a career change.

**Cyber Security:** Technology experts with experience in tightening network security are in a special demand, particularly in government agencies, in the healthcare industry and in technology companies. New regulations, the proliferation of computer viruses and concerns over homeland security are the industry drivers that continue to make this a booming business. See [www.isc2.org](http://www.isc2.org) for the more information on the CISSP and SSCP certifications and the Information Standard for Information Security.

**Project Management:** As organizations flatten and the technical disciplines of project team members become more diverse, many companies are finding that project managers are worth their weight in gold. Companies with Project Management Offices (PMOs) have introduced advanced methodologies into their corporate culture and have found that these advancements have helped them to deliver products on time, within budget and with higher quality. Business Analysts and Application Developers are pursuing lucrative careers as project managers as a long-term career path. If you are contemplating a career in Project Management, you should seriously consider getting a Project Management Professional (PMP) certification from the Project Management Institute (PMI). See [www.pmi.org](http://www.pmi.org) for more details.

**Systems Architecture:** Understanding technology is a necessary prerequisite to a long and prosperous career in Information Technology. Those who aspire to become technical experts can move up the corporate ladder by obtaining certifications and distinguishing themselves by working through challenging technical problems. The technical gurus who can develop technical infrastructure, technology standards and methodologies, complex network topologies, system integration and architecture will always be in demand. Unfortunately, we are finding that more and more jobs that require "hard core" technical skills are prime targets for outsourcing offshore.

**Business Technologists:** Business consultants with strong technical skills are hard to find. Prime candidates are those who have an undergraduate technical degree coupled with a graduate degree in business. They are bringing in top dollar, on shore and off shore, because they possess the skills that are needed to drive bottom line business results. Technically savvy business analysts save money by leveraging technology to develop state of the art products. And since they understand business and technology, they can serve as interface between business partners and technical developers located all

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around the globe. Business Analysts adept at quality engineering (e.g. ISO audits, six sigma, CMM) are also finding great career opportunities as companies look to drive down costs by reengineering business processes.

**Information Technology Management:** There is a growing demand for upwardly mobile African Americans in Information Technology Management. More and more companies are starting to tie executive compensation to Diversity program metrics. Executives are finding that active involvement in diversity programs like internal employee affinity groups and external networking groups like BDPA are important components of their diversity scorecard. Developing and promoting African Americans into the executive ranks is another important measure of success for corporate diversity programs. Because many IT professionals prefer to stay on a technical career path, filling the executive pipeline with managers and directors ready to move up to the next level has become increasingly difficult. Forward thinking companies are finding that BDPA offers an excellent proving ground for their employees to hone their leadership and team building skills. Companies are using BDPA to develop the leaders of tomorrow by encouraging their employees to volunteer for challenging leadership positions.

**Workforce Development Initiatives:** Technology companies dedicated to workforce development provide resources to those interested in pursuing careers in Information Technology. Industry leaders such as Microsoft, IBM, HP, Oracle, Dell, Cisco and PeopleSoft, just to name a few, offer a wide variety of programming and online training opportunities. See their corporate websites for more information. The US Department of Labor workforce investment system that is managed by the Employment and Training Administration ([www.doleta.gov](http://www.doleta.gov)) is another great resource site.

**Connecting People with Jobs:** To be successful in the fast paced ever-changing world of IT, you have to constantly retool and continually demonstrate role model behavior. Non-profit organizations like BDPA ([www.bdpa.org](http://www.bdpa.org)), the Premier Organization for African Americans in Information Technology, provide resources and networking opportunities for career development. BDPA serves a valuable need in the community by connecting people with jobs. Companies come to BDPA to tap into our talent pool of qualified IT professionals. BDPA understands how to leverage the strengths of our diverse IT workforce and we look to share these best practices with others. We look beyond recruitment to focus on retention, upward mobility, fair representation of African Americans at all levels, and succession planning.

### **Other Hot Jobs**

Network Administrator  
System Programmer  
Quality Assurance/Testing Experts  
GSM/GPRS Field Support Engineer  
Business Continuity Professionals  
Apache  
BEA  
PHP  
Oracle 9iAS  
Oracle Financial Suite  
HRIS analysts and developers with experience with Lawson, SAP or PeopleSoft

### ***A Word to College Students***

College students have to make a special effort to prepare for a career in Information Technology because entry level positions are few and far between and are becoming increasingly competitive. Gone forever are the days when companies sent teams of employees to college campuses to recruit college students. Now that the supply is significantly outstripping the demand, college students have to make a special effort to position themselves as early in their career as possible. BDPA has learned that the best

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positioning tool are summer internships and co-op programs. Students who spend time in the workforce, not only learn valuable skills, they learn what's hot and what's not and how to adapt to the idiosyncrasies of the corporate culture. Co-op opportunities also give students a preview as to what it is like to work as an employee vs. as an independent consultant/entrepreneur. And it is a win-win situation of Corporate America, because the sponsoring company gets to try out and the intern, bring them back year-after-year and then make them an offer for employment upon graduation from college.

Here are some of the advantages for co-op students that BDPA members see:

- o You remove one of the largest barriers to entry in getting a job - lack of experience. Depending on the industry and the company the coop student finds themselves doing meaningful tasks. For those students who repeat at the same company the work will level and complexity of the work will increase with a new coop stint.
- o A try before you buy scenario. The student gets to explore with limited risk (6 months of their lives) the type of job that they are thinking about spending the rest of their lives doing.
- o Depending on how the student approaches it he could explore various assignments within various companies and thus build up a feel for how corporate America works.
- o Sometimes students are hired by the company at the end of their coop assignment. Sometimes this happens even before the assignment ends (it's how I got my start in the industry on two separate occasions).
- o The coop student can often earn money to put towards their tuition.

For more information on the BDPA Student Internship Program, please visit our website at:

<http://www.bdpa.org/internship.cfm>

### ***Diversity/Careers Magazine – Job Opportunities***

BDPA members receive a free subscription to the Diversity/Careers in Engineering and Information Technology Magazine ([www.diversitycareers.com](http://www.diversitycareers.com)) as a member benefit. It is published bi-monthly. The magazine is full of advertisements and articles that highlight companies recruiting IT talent. Articles and links to job opportunities are also available online (see web links below).

| Topic  | Article   | Job Opportunities   |
|--|---|---|
| <b>August/September 2003 Issue</b>                                       |   |   |
| <b>Defense technology steps up to the challenge</b>                      | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/defense.htm">http://www.diversitycareers.com/articles/pro/03-augsept/defense.htm</a>   | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/defense.htm#chart">http://www.diversitycareers.com/articles/pro/03-augsept/defense.htm#chart</a>                                 |
| <b>Creativity &amp; focus keep semi engineers on top</b>                 | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_semi.htm">http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_semi.htm</a>                             | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_semi.htm#chart">http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_semi.htm#chart</a>                 |
| <b>Healthcare IT: strong &amp; growing</b>                               | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/changingtech_healthcare.htm#chart">http://www.diversitycareers.com/articles/pro/03-augsept/changingtech_healthcare.htm#chart</a> | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/changingtech_healthcare.htm#chart">http://www.diversitycareers.com/articles/pro/03-augsept/changingtech_healthcare.htm#chart</a> |
| <b>Telecom services companies: now hiring leading-edge technologists</b> | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_telecom.htm">http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_telecom.htm</a>                       | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_telecom.htm#chart">http://www.diversitycareers.com/articles/pro/03-augsept/techupdate_telecom.htm#chart</a>           |
| <b>Career Opportunities</b>  | August/September 2003<br>Companies Actively Recruiting  | <a href="http://www.diversitycareers.com/articles/pro/03-augsept/pro_jobs_augsept03.htm">http://www.diversitycareers.com/articles/pro/03-augsept/pro_jobs_augsept03.htm</a>                       |
| <b>June/July 2003 Issue</b>  |   |   |
| <b>Software engineering offers</b>                                       | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/fod_african.htm">http://www.diversitycareers.com/articles/pro/junejuly03/fod_african.htm</a>                                     | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/fod_african.htm#jobs">http://www.diversitycareers.com/articles/pro/junejuly03/fod_african.htm#jobs</a>                           |

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| Topic   | Article   | Job Opportunities   |
|---|---|---|
| <b>rewarding careers for African Americans</b>                          |   |   |
| <b>Civil engineers are building the future</b>                          | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/ct_civil.htm">http://www.diversitycareers.com/articles/pro/junejuly03/ct_civil.htm</a>         | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/ct_civil.htm#jobs">http://www.diversitycareers.com/articles/pro/junejuly03/ct_civil.htm#jobs</a>             |
| <b>Pharma &amp; biotech continue to move ahead</b>                      | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/ct_pharma.htm">http://www.diversitycareers.com/articles/pro/junejuly03/ct_pharma.htm</a>       | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/ct_pharma.htm#jobs">http://www.diversitycareers.com/articles/pro/junejuly03/ct_pharma.htm#jobs</a>           |
| <b>RF/microwave engineers are still in demand</b>                       | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/tu_rf.htm">http://www.diversitycareers.com/articles/pro/junejuly03/tu_rf.htm</a>               | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/tu_rf.htm#jobs">http://www.diversitycareers.com/articles/pro/junejuly03/tu_rf.htm#jobs</a>                   |
| <b>Gratifying careers in assistive technology</b>                       | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/tu_assistive.htm">http://www.diversitycareers.com/articles/pro/junejuly03/tu_assistive.htm</a> |   |
| <b>Career Opportunities</b>   | June/July 2003<br>Companies Actively Recruiting   | <a href="http://www.diversitycareers.com/articles/pro/junejuly03/pro_jobs_junejuly03.htm">http://www.diversitycareers.com/articles/pro/junejuly03/pro_jobs_junejuly03.htm</a> |
| <b>April/May 2003 Issue</b>   |   |   |
| <b>Women connect in electrical engineering</b>                          | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/fod_women.htm">http://www.diversitycareers.com/articles/pro/aprmay03/fod_women.htm</a>           | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/fod_women.htm#jobs">http://www.diversitycareers.com/articles/pro/aprmay03/fod_women.htm#jobs</a>               |
| <b>Defense &amp; aerospace move forward with a renewed mission</b>      | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/ct_defense.htm">http://www.diversitycareers.com/articles/pro/aprmay03/ct_defense.htm</a>         | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/ct_defense.htm#jobs">http://www.diversitycareers.com/articles/pro/aprmay03/ct_defense.htm#jobs</a>             |
| <b>In retail &amp; consumer products IT, your work impacts everyone</b> | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/ct_retail.htm">http://www.diversitycareers.com/articles/pro/aprmay03/ct_retail.htm</a>           | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/ct_retail.htm#jobs">http://www.diversitycareers.com/articles/pro/aprmay03/ct_retail.htm#jobs</a>               |
| <b>Systems engineers think on a large scale</b>                         | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/tu_engineers.htm">http://www.diversitycareers.com/articles/pro/aprmay03/tu_engineers.htm</a>     | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/tu_engineers.htm#jobs">http://www.diversitycareers.com/articles/pro/aprmay03/tu_engineers.htm#jobs</a>         |
| <b>Technical services ramps up again this year</b>                      | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/tu_technical.htm">http://www.diversitycareers.com/articles/pro/aprmay03/tu_technical.htm</a>     | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/tu_technical.htm#jobs">http://www.diversitycareers.com/articles/pro/aprmay03/tu_technical.htm#jobs</a>         |
| <b>Career Opportunities</b>   | April/May 2003<br>Companies Actively Recruiting   | <a href="http://www.diversitycareers.com/articles/pro/aprmay03/pro_jobs_aprmay03.htm">http://www.diversitycareers.com/articles/pro/aprmay03/pro_jobs_aprmay03.htm</a>         |
| <b>February/March 2003 Issue</b>  |   |   |
| <b>Government agencies seek tech skills</b>                             | <a href="http://www.diversitycareers.com/articles/pro/febmar03/ct_government.htm">http://www.diversitycareers.com/articles/pro/febmar03/ct_government.htm</a>   | <a href="http://www.diversitycareers.com/articles/pro/febmar03/ct_government.htm#jobs">http://www.diversitycareers.com/articles/pro/febmar03/ct_government.htm#jobs</a>       |
| <b>Medical device engineers are changing people's lives</b>             | <a href="http://www.diversitycareers.com/articles/pro/febmar03/ct_medical.htm">http://www.diversitycareers.com/articles/pro/febmar03/ct_medical.htm</a>         | <a href="http://www.diversitycareers.com/articles/pro/febmar03/ct_medical.htm#jobs">http://www.diversitycareers.com/articles/pro/febmar03/ct_medical.htm#jobs</a>             |
| <b>Satellite engineers: still doing well</b>                            | <a href="http://www.diversitycareers.com/articles/pro/febmar03/ct_satellite.htm">http://www.diversitycareers.com/articles/pro/febmar03/ct_satellite.htm</a>     | <a href="http://www.diversitycareers.com/articles/pro/febmar03/ct_satellite.htm#jobs">http://www.diversitycareers.com/articles/pro/febmar03/ct_satellite.htm#jobs</a>         |
| <b>Data storage: essential adjunct to the computer world</b>            | <a href="http://www.diversitycareers.com/articles/pro/febmar03/tu_data.htm">http://www.diversitycareers.com/articles/pro/febmar03/tu_data.htm</a>               | <a href="http://www.diversitycareers.com/articles/pro/febmar03/tu_data.htm#jobs">http://www.diversitycareers.com/articles/pro/febmar03/tu_data.htm#jobs</a>                   |
| <b>Iowa consortium looks for diversity</b>                              | <a href="http://www.diversitycareers.com/articles/pro/febmar03/nf_iowa.htm">http://www.diversitycareers.com/articles/pro/febmar03/nf_iowa.htm</a>               |   |
| <b>Career</b>   | February/March 2003   | <a href="http://www.diversitycareers.com/articles/pro">http://www.diversitycareers.com/articles/pro</a>   |

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| Topic         | Article                       | Job Opportunities               |
|---------------|-------------------------------|---------------------------------|
| Opportunities | Companies Actively Recruiting | /febmar03/pro_jobs_febmar03.htm |

### ***Outsource/Offshore Outlook***

Some jobs are easier to outsource than others. Jobs that are more likely to be outsourced are risky for long-term employment potential. No jobs are 100% safe from outsourcing, however, as a long-term career strategy consider working in jobs with less outsourcing potential to reduce risk.

#### **Jobs with Strong Outsource/Offshore Potential**

- Application Maintenance and Enhancement
- Production Support
- System Operations
- Help Desk
- Applications Program & Analysis (design, development, unit test)
- Training, Communications, Documentation

#### **Jobs with Some Outsource/Offshore Potential**

- Network Infrastructure Services
- Project Management
- DBA, Data Architecture

#### **Jobs with Little Outsource/Offshore Potential**

- Systems Architecture
- System Integrated Testing
- Process Improvement
- Software/Technology Evaluation & Selection
- Business Analysis & Requirements Management
- Supplier Management
- Business Consulting & Relationship Management
- Strategy Development and Integration Planning

Ref: Presentation to 2003 ITAA Convocation by Jane Hollen, Xerox CIO

### ***Hot Industries***

There are several industries that are virtually insulated from outsourcing and losing jobs to the competition overseas. If you are just embarking on an IT career or looking for industries with long term potential then consider moving into the Health Care, Biotechnology, Pharmaceutical, Defense Industry (need to get security clearance), Education and Financial Services industries. Civil service careers in government agencies can be very attractive, especially for long-term career potential. In some cases training dollars and hiring bonuses are available to attract candidates from the private sector into specialty jobs like cyber security. Avue Central ([www.avuecentral.com](http://www.avuecentral.com)) is an excellent web portal that provides a fast and easy way to apply for federal employment. Although it is hard to get into technology companies (e.g. Microsoft, HP, IBM, Xerox, Dell, Lucent Technologies) these are still great places to work because these companies offer great in-house technical training programs and an environment where you can obtain valuable skills and highly marketable work experience.

### ***Interested in Jobs at Microsoft?***

People interested in jobs at Microsoft should go to their career site and register for the monthly newsletter. They will receive information and tips about the job market, the application process and skills information, etc. This is great. The other thing that is great about this is the person can set up their own profile to receive information about jobs that they are interested in on an ongoing basis. Here is the link to all this great information:

<http://www.microsoft.com/careers/>

One thing that the students will want to do while they are still IN SCHOOL is to contact a MS college recruiter. They can find this information on the college recruiting website. [www.microsoft.com/college](http://www.microsoft.com/college). They should also find the exact type of skills needed for each position as well. It is more important for them to learn this before they complete all their courses and graduate. They should also connect with our recruiters and other company's recruiters when they come to campus and find out what is needed to get a job at whatever company. They should never wait until graduation and assume that they will get a great job just because they have a degree. There is not much that a company can do to help once the person has graduated and does not have the skills that match the job openings. MCS certifications should be pursued as an add-on skill or for a new step in the persons career.

### ***Working in the Defense Industry***

There are many IT jobs that could be filled by African Americans in the Defense and Intelligence communities. The Federal Government needs to give more direct access to the security clearance administration apparatus to increase the numbers of cleared African Americans. At least half of all IT job vacancies in the Washington D.C. metro area require active clearances. The only way to obtain security clearance is through a sponsoring company.

### ***Interested in a job at Lockheed Martin?***

The August/September 2003 edition of the Diversity/Careers Magazine has a section on page 31 that covers career opportunities in the Defense Industry. See "Defense technology steps up to the Challenge" (<http://www.diversitycareers.com/articles/pro/03-augsept/defense.htm>) and Opportunities in the Defense Industry (<http://www.diversitycareers.com/articles/pro/03-augsept/defense.htm#chart>). Lockheed Martin, recent winner of the BDPA Best Companies for Blacks in Technology Award is listed as follows: Developer and manufacturer of advanced integrated technology systems. Anticipates hiring 10,000+ a year for the next five years. Typical jobs: aeronautical, software, systems, network engineers and EEs, RF designers and engineers, computer systems and network datacom analysts. Complex systems, systems integration, advanced IT. This is just one example that explains why the defense industry is considered a great prospect for BDPA members looking for career opportunities in a growth industry.

Everyone has to place their resume in the database. Once there, that information can be forwarded to folks within departments.

Two main contacts: Gregory Anderson [gregory.k.anderson@lmco.com](mailto:gregory.k.anderson@lmco.com) and Mark Peden [mark.d.peden@lmco.com](mailto:mark.d.peden@lmco.com) (Mark is VP of IS for Aeronautics).

### ***Certifications (www. NWCET.org)***

The NWCET (National Workforce Center for Emerging Technologies) plays an active role in developing practices for non-vendor specific certification in Information Technology. We are reviewing assessment

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elements appropriate to skill standards based curriculum with the goal of producing certification guidelines for use by educational institutions who desire to offer programs that provide evidence of meeting nationally validated industry standards.

### **Microsoft Certification Overview:**

MCSE (Microsoft Certified Systems Engineer). Candidates prove their expertise with desktop, server, networking component, and Microsoft BackOffice products. Four core exams and two elective exams are required to pass.

MCSE+I (Microsoft Certified Systems Engineer + Internet). MCSE candidates prove their Internet expertise. Seven core exams and two elective exams are required to pass.

MCSD (Microsoft Certified Solution Developer). The new track allows candidates to demonstrate their ability to build Web-based, distributed, and commerce applications, including solution architecture, application development, and development tool competencies. Three core exams and one elective are required to pass.

MCP (Microsoft Certified Professional). Candidates demonstrate their skills with a current Microsoft application or operating system. You must pass one exam.

MCP+I (Microsoft Certified Professional + Internet). MCP candidates prove their Internet expertise. Candidates qualify to plan security, installation and configuration of server products, implement server extensions, and manage server resources. Three core exams are required to pass.

MCP+SB (Microsoft Certified Professional + Site Building). This new credential allows candidates to prove their expertise in managing sophisticated, interactive Web sites, including databases, multimedia, and searchable content. You must pass two of three exams: Visual InterDev 6.0, Site Server 3.0 Commerce Edition, and FrontPage.

MOUS (Microsoft Office User Specialist). Microsoft plans to certify two million Microsoft Office users during the first full year of certification availability. Exams are offered for each application within the Microsoft Office Suite. The Microsoft Office Expert User exam also requires an Office integration exam.

### **Oracle Certification Overview:**

The Oracle Certified Professional Program (OCP) offers three certification tracks:

Application Developer R1 requires proficiency in Oracle core products.

Application Developer R2 includes scalability and client/server technology.

Database Administrator (DBA) includes database management, troubleshooting, and proficiency in Oracle Server architecture.

A+ Certification Overview:

A+ certification is the introductory program technicians. Network + is a company-neutral certification demonstrating expertise in networking systems.

Go to the site for Oracle Technology Network (<http://otn.oracle.com/>) There are all sorts of downloads, training materials, and technical information available

### **Novell Certification Overview:**

Novell offers these technical certification programs:

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CNE (Certified Novell Engineer). Includes system planning, managing databases, and upgrades. You may specialize in any of five tracks: NetWare 5, IntranetWare, NetWare 3, GroupWise 4, and GroupWise 5.

CNA (Certified Novell Administrator). Handles the daily maintenance and administration of Novell Networking products in a variety of institutions. You may specialize in any of five tracks: NetWare 5, IntranetWare, NetWare 3, GroupWise 4, and GroupWise 5.

CIP (Certified Internet Professional). Specializes in Internet services. The Novell certification program is designed so that qualified professionals can provide support for Novell-specific products as well as non-Novell products. Fifty percent of the program is designed to be industry generic.

### **SUN (Java) Certification Overview:**

The Sun Java certification program has of two certification tracks:

Sun Certified Java Programmer tests for candidates' basic understanding of the language.  
Sun Certified Java Developer tests candidates' ability to put together real-world applications using Java.  
Prerequisite: You must be a Sun Certified Java Programmer. You must submit an application for assessment and a \$250 fee.

### **IT Professional Certification Resources**

#### **Cisco**

<http://cisco.com/en/US/learning/index.html>  
Online Computer Training and Certification

#### **Georgia Tech**

<http://www.cc.gatech.edu/conted/unix.html>  
Unix Certificate Programs and More

#### **IBM**

<http://www-1.ibm.com/certify/index.shtml>  
Online Linux courses

#### **Microsoft**

<http://www.microsoft.com/traincert/default.asp>  
Certification for Microsoft technologies

#### **Pace University**

<http://www.wol.pace.edu/pclc/contact.html>  
UNIX/C/C++ Certificate

#### **Institute for Certification of Computing Professionals**

<http://www.iccp.org/>  
Associate Computing Professional (ACP), Certified Computing Professional (CCP)

#### **Learning Tree International**

<http://www.learningtree.com/>  
Training for CNE,CNA, MCSE,MCSD, Plus 20 Job-Function Learning Tree Certifications

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**Project Management Institute (PMI)**  
Project Management Professional (PMP)  
[http://www.pmi.org/info/PDC\\_PMPBreakingNews.asp](http://www.pmi.org/info/PDC_PMPBreakingNews.asp)

**Business Continuity**  
Certified Business Continuity Professional (CBCP), MBCP, FCBI, MCBI

### **Soft Skills**

#### **Sought After Characteristics**

Getting and keeping a job has evolved beyond having the right technical skills. This is just one component of the overall set of characteristics that companies seek. For example, in addition to having the prerequisite technical skills, to remain competitive, great organization, leadership, communications and interpersonal skills are required. There are many guides that identify the successful characteristics. Here are a few.

#### **9 Breakthrough Strategies You Need to Succeed**

Technical Competence  
Taking Initiative  
Self Management  
Networking  
Perspective  
Teamwork  
Followership  
Communication  
Diversity

From *How to Be a Star At Work: 9 Breakthrough Strategies You Need to Succeed* by Robert E. Kelley  
**12 Leadership Assets**

Harness the Power of *Coaching*  
Exhibit an Affirmative *Attitude and Purposeful Behavior*  
Ride the Crests of *Change*  
*Communicate* in a Dynamic, Essential, and Effective Manner  
Prize *Diversity*  
Excel in *Performance*  
Exercise your *Teamwork*  
Surf the waves of *Technology*  
Command your *Time Management*  
Eternalize a Life of *Service*  
Calibrate your *Work/Life Equation*  
Crystallize Your *Personal and Professional Framework*

From *Due North! Strengthen Your Leadership Assets™* by Jylla Moore Foster

#### **P.I.E. – A Formula for Success**

There are three elements important to players who want to fine tune their skill and move up in their profession. They must:

- § Perform exceptionally well.
- § Cultivate the proper image.
- § Manage their exposure so the right people will know them.

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Each of the three P.I.E. elements carries a different weight in upward mobility. All three are essential to promotion but they have different roles and weights relative to their impact on long term success. The breakdown is as follows:

- § Performance = 10%
- § Image = 30%
- § Exposure = 60%

From Empowering Yourself by Harvey J. Coleman

### ***BDPA Career Development Services***

#### **BDPA Career Coaching Service**

BDPA announced the introduction of a free career coaching service, staffed by BDPA volunteers, that has been put in place to support our BDPA members looking to advance their careers in Information Technology. To request career coaching services, please join the BDPA Job Search Advice yahoo group by sending the following information to [BDPA-JobSeekerAdvice-owner@yahoogroups.com](mailto:BDPA-JobSeekerAdvice-owner@yahoogroups.com)

- BDPA Membership ID
- Contact Information
  - § Name
  - § Address
  - § Phone
  - § Cell
  - § Email
- Current Resume

BDPA continues to work aggressively to help its members out pace the competition by instituting additional career development programs, not just for the IT Professional, but for our BDPA Entrepreneurs as well. BDPA members are encouraged to take advantage of these member services.

#### **BDPA Career Center**

BDPA offers its members a unique opportunity to secure a job and enhance their career. Companies looking to tap into the BDPA talent pool of highly qualified IT professionals are anxious to make contact with BDPA members. If you are BDPA member, please submit your resume to the BDPA Career Center at <http://www.bdpa.org/careercenter>. This is how you can distinguish yourself from the competition. Subscriber companies can also post jobs in the BDPA Career Center.

#### **BDPA Job Postings and Job Seeker Advice**

If you are actively looking for a job or just interested in staying abreast of the job market, you can subscribe to the BDPA-Jobs yahoo group at <http://groups.yahoo.com/group/BDPA-Jobs/> to get your free copy of the National BDPA Job Hunt Guide and regular job postings for Hot Jobs in IT.\

#### ***BDPA Occupation Codes***

The following codes are used by BDPA to track employment and unemployment statistics provided the U.S Department of Labor (DOL), Bureau of Labor Statistics (BLS). These are the relevant occupations from the List of Standard Occupational Classification (SOC) at [http://www.bls.gov/oes/2001/oes\\_stru.htm](http://www.bls.gov/oes/2001/oes_stru.htm).

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11-3021 Computer and Information Systems Managers  
11-9041 Engineering Managers  
13-1073 Training and Development Specialists  
15-1011 Computer and Information Scientists, Research  
15-1021 Computer Programmers  
15-1031 Computer Software Engineers, Applications  
15-1032 Computer Software Engineers, Systems Software  
15-1041 Computer Support Specialists  
15-1051 Computer Systems Analysts  
15-1061 Database Administrators  
15-1071 Network and Computer Systems Administrators  
15-1081 Network Systems and Data Communications Analysts  
17-2061 Computer Hardware Engineers  
17-2071 Electrical Engineers  
17-2072 Electronics Engineers, Except Computer  
17-3023 Electrical and Electronic Engineering Technicians  
25-1021 Computer Science Teachers, Postsecondary  
25-1032 Engineering Teachers, Postsecondary  
27-3042 Technical Writers  
41-9031 Sales Engineers  
43-9011 Computer Operators  
43-9021 Data Entry Keyers  
43-9022 Word Processors and Typists  
43-9031 Desktop Publishers  
49-2011 Computer, Automated Teller, and Office Machine Repairers  
49-2022 Telecommunications Equipment Installers and Repairers, Except Line Installers  
49-9052 Telecommunications Line Installers and Repairers  
51-4012 Numerical Tool and Process Control Programmers

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### BDPA IT Job Counts

#### BDPA IT Job Counts (Total)

| 2000  | 2001  | 2002   | 2003-Q1 | 2003-Q2 | 2003-Q3 | Delta  | Occupation   |
|-------|-------|--------|---------|---------|---------|--------|--|
| 228   | 316   | 323    | 318     | 332     | 354     | 126    | Computer and Information Systems Managers  |
| 835   | 734   | 682    | 739     | 701     | 712     | -123   | Computer and Information Scientists, Research  |
| 745   | 689   | 630    | 527     | 526     | 555     | -190   | Computer Programmers   |
| 739   | 745   | 715    | 768     | 732     | 765     | 26     | Computer Software Engineers, Applications  |
| 350   | 355   | 353    | 361     | 316     | 310     | -40    | Computer Support Specialists   |
| 54    | 66    | 84     | 82      | 70      | 62      | 8      | Database Administrators  |
| 154   | 185   | 179    | 223     | 195     | 130     | -24    | Network and Computer Systems Administrators  |
| 305   | 353   | 328    | 321     | 362     | 403     | 98     | Network Systems and Data Communications Analysts   |
| 83    | 87    | 95     | 117     | 72      | 106     | 23     | Operations Research Analysts   |
| 83    | 100   | 76     | 86      | 96      | 126     | 43     | Computer Hardware Engineers  |
| 444   | 385   | 385    | 369     | 386     | 349     | -95    | Electrical Engineers   |
| 62    | 79    | 60     | 65      | 65      | 42      | -20    | Technical Writers  |
| 30    | 30    | 37     | 53      | 38      | 47      | 17     | Sales Engineers  |
| 13    | 10    | 5      | 6       | 7       | 6       | -7     | Desktop Publishers   |
| 4,125 | 4,134 | 3,952  | 4,035   | 3,898   | 3,967   | -158   | (Source: Current Population Survey) Table 1. Employed and experienced unemployed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity |
|       | 0.22% | -4.40% | 2.10%   | -3.40%  | 1.77%   | -3.83% | Percent Change   |
|       | 9     | -182   | 83      | -137    | 69      | -158   | Delta  |

#### BDPA IT Job Counts (African Americans)

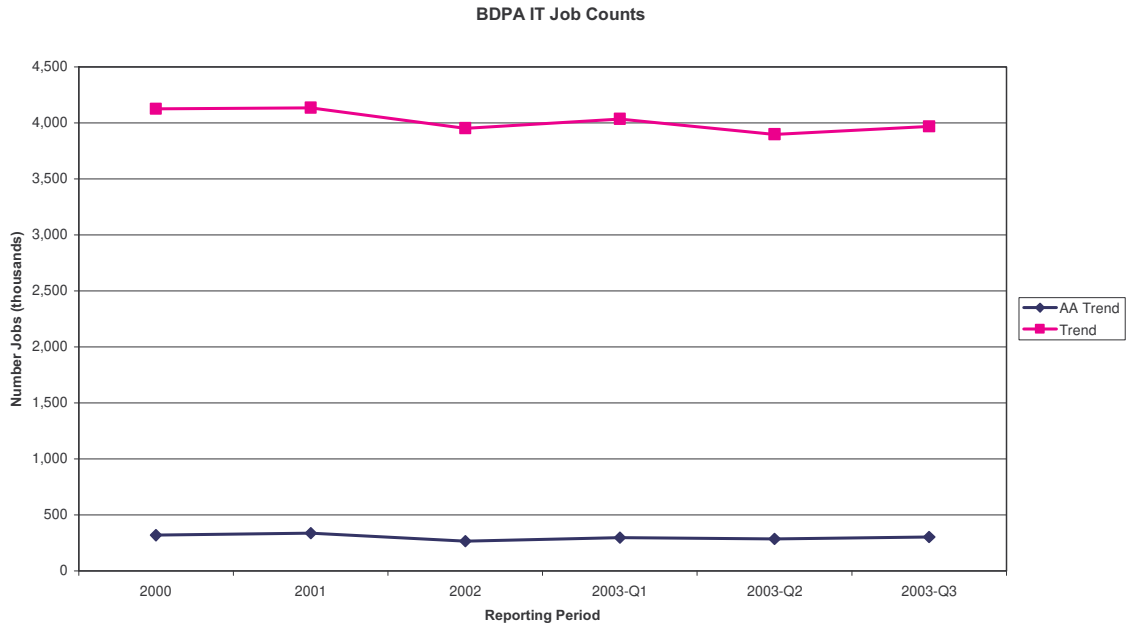
| 2000 | 2001  | 2002    | 2003-Q1 | 2003-Q2 | 2003-Q3 | Delta  | Occupation   |
|------|-------|---------|---------|---------|---------|--------|--|
| 8    | 23    | 21      | 8       | 19      | 20      | 12     | Computer and Information Systems Managers  |
| 84   | 70    | 55      | 71      | 76      | 78      | -6     | Computer and Information Scientists, Research  |
| 60   | 46    | 31      | 39      | 42      | 40      | -20    | Computer Programmers   |
| 54   | 60    | 37      | 44      | 38      | 45      | -9     | Computer Software Engineers, Applications  |
| 45   | 45    | 41      | 50      | 34      | 37      | -8     | Computer Support Specialists   |
| 2    | 6     | 8       | 8       | 2       | 1       | -1     | Database Administrators  |
| 12   | 13    | 5       | 23      | 13      | 14      | 2      | Network and Computer Systems Administrators  |
| 22   | 33    | 31      | 17      | 34      | 33      | 11     | Network Systems and Data Communications Analysts   |
| 9    | 8     | 10      | 10      | 10      | 7       | -2     | Operations Research Analysts   |
| 3    | 8     | 6       | 8       | 0       | 9       | 6      | Computer Hardware Engineers  |
| 19   | 17    | 16      | 18      | 14      | 14      | -5     | Electrical Engineers   |
| 1    | 8     | 2       | 2       | 2       | 1       | 0      | Technical Writers  |
| 0    | 0     | 2       | 0       | 1       | 3       | 3      | Sales Engineers  |
| 0    | 2     | 0       | 0       | 0       | 1       | 1      | Desktop Publishers   |
| 319  | 339   | 265     | 298     | 285     | 303     | -16    | (Source: Current Population Survey) Table 1. Employed and experienced unemployed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity |
|      | 6.27% | -21.83% | 12.45%  | -4.36%  | 6.32%   | -5.02% | Percent Change   |
|      | 20    | -74     | 33      | -13     | 18      | -16    | Delta  |

# BDPA 2004 JOB OUTLOOK

## VERSION 2.0



### BDPA IT Job Counts Chart



## Appendices

### *ITAA Outlook*

The Information Technology Association of America (ITAA) released two reports in May of 2003: 1) Report of the ITAA Blue Ribbon Panel of IT Diversity and 2) 2003 Workforce Survey. BDPA sat on the ITAA Blue Ribbon Panel and contributed insight into the African American IT Workforce. BDPA also presented at the National IT Workforce Convocation and facilitated a workshop with Fleet Boston Financial and Catalyst on the topic of “Attracting Women and Minorities into IT Careers”.

Here are a few salient points from the two reports. The reports in their entirety are available for free download at [www.ita.org](http://www.ita.org).

- Racial minorities and women made few inroads into high tech employment between 1996 and 2002, based on data from the U.S. Bureau of Labor Statistics' Current Population Surveys.
- The groups (women and minorities in the IT workforce) still are underrepresented in the IT workforce as compared to their representation in the whole U.S. workforce. Women comprised 46.6% of the U.S. workforce and African Americans represented 10.9% of the U.S. workforce in 2002.
- “While our findings are not encouraging, we only need to look at the pipeline of qualified applicants for high tech positions for an explanation. Women and minorities earn significantly fewer undergraduate degrees in computer science and engineering than their representation in the U.S. population. Until our education system produces more qualified candidates, these percentages of IT workers are not likely to improve significantly,” said ITAA President Harris N. Miller.
- “Stronger commitment to diversity at the CEO level is the key to broadening the IT workforce,” said Panel Chairman Robert Knowling, Chief Executive Officer, New York Leadership Academy. “Our panel also believes that an increased focus on mentoring and stronger partnerships between traditionally minority-serving colleges and universities are important solutions companies can adopt.”
- Demand for hiring IT workers has reached an historic low of only 493,000 positions over the next 12 months – down from 1.6 million at the start of 2000 and less than one-half of the predicted 1.1 million positions needed at the start of 2002. Sixty-seven percent of those interviewed said they thought hiring demand would stay the same or decline over the next twelve months.
- Companies are also moving more positions overseas, with 12% of IT companies and 3% of non-IT companies saying they have already opened up overseas operations. Large IT companies were most likely to say they've made this move – 22% have already moved work offshore.
- IT companies in the Midwest and West are most likely to send jobs overseas.
- For non-IT companies, both hiring and terminations were down roughly 25% in the last twelve months.
- IT companies appear to be more likely to cut wages than non-IT companies.

### *Department of Labor (DOL) Outlook*

All organizations today rely on computer and information technology to conduct business and operate more efficiently. Often, however, these institutions do not have the resources to effectively implement new technologies or satisfy their changing needs. When this happens, they turn to the computer and data processing services industry to meet their specialized needs on a contract or customer basis.

Firms may enlist the services of one of over 178,000 establishments in the computer and data processing services industry for help with a particular project or problem, such as setting up a secure website or establishing a marketplace online. Alternatively, they may choose to “outsource” one or more activities, such as the management of their entire data center or help-desk support, to a computer and data processing services firm.

Occupations in the computer and data processing services industry require varying levels of education. The level of education and type of training required depend on employers’ needs. One factor affecting these needs is changes in technology. As demonstrated by the current demand for workers with skills related to the Internet, employers often scramble to find workers capable of implementing “hot” new technologies. Another factor driving employers’ needs is the timeframe within which a project must be completed.

The computer and data processing services industry has grown dramatically over the past decade and wage and salary employment is expected to grow about 86 percent by the year 2010, making this the fastest growing industry in the U.S. economy. Given the rate at which the computer and data processing services industry is expected to grow and the increasing complexity of technology available, job opportunities will be excellent for most workers. The best opportunities will be for professional and related occupations, reflecting their rapid growth and the continuing demand for higher level skills to keep up with changes in technology.

An increasing reliance on information technology, combined with falling prices of computers and related hardware, means that individuals and organizations will continue to turn to computer and data processing service firms to maximize the return on their investments in equipment and to fulfill their growing computing needs. Such needs include the expansion of electronic commerce, a growing reliance on the Internet, faster and more efficient internal and external communication, and the development of new technologies and applications. With increasing global competition and rising costs, organizations must be able to obtain and manage the latest information in order to make business decisions.

Within the industry, projected growth varies by sector. Among the fastest growing sectors should be client-server applications, consulting and integration services, prepackaged software, and end-user support. The demand for networking and the need to integrate new technologies will drive the demand for consulting and integration. Advances in software technology and expanding Internet usage will increase the need for software support and services. Prepackaged software has historically grown very rapidly, and will continue to grow as individuals and establishments try to capitalize on the latest improvements. Demand for support services should spur growth in areas such as help-desk outsourcing. And, as more individuals and organizations are conducting business electronically, the importance of maintaining system and network security will increase.

New growth areas will continue to arise from rapidly evolving technologies and business forces. The rate at which the Internet has expanded demonstrates the potential effects of as yet unknown technological developments and the tremendous room for growth. The expansion of the Internet and the proliferation of websites have created a demand for a wide variety of new products and related services, including Internet and Web software, online services, Internet design services, website development, and a range of specialized consulting. Yet, the way the Internet is used is constantly changing, and so are the products, services, and personnel required to support new applications. Expanding electronic commerce, for example, has changed the way companies transact business, enabling markets to expand and an increasing array of services to be provided to customers. Business-to-business commerce is automating many steps in the transaction of business between companies, allowing many firms involved to operate more efficiently. And as the amount of computer-stored information grows, organizations will continue to look for ways to tap the full potential of their vast stores of data. Demand

for an even wider array of services should increase as companies continue to expand their capabilities, integrate new technologies, and develop new applications.

Given the increasingly widespread use of information technologies and the overall rate of growth expected for the entire industry, most occupations should grow very rapidly, although some much faster than others. As firms continue to install sophisticated computer networks, set up Internet and Intranet sites, and engage in electronic commerce, the most rapid growth will occur among computer specialists such as computer software engineers, systems analysts, and network and computer systems administrators. This group of workers also includes computer support specialists needed to provide technical assistance, support, and advice to customers and users. Rapid growth also is expected among computer hardware engineers and computer and information systems managers. Employment of computer repairers also will grow rapidly due to increasing dependence of business and residential customers on computers and sophisticated office machines.

Employment of programmers should continue to expand, but more slowly than that of other occupations, as the proportion of programmers decreases in relation to computer software engineers and other computer specialists. Employment of administrative support occupations, including data entry and information processing workers, also is expected to grow more slowly than the rest of the industry. And, as client-server environments and automation continue to increase productivity, automated operating packages and robotic equipment should continue to reduce the need for computer operators.

Ref: Occupational Outlook Handbook, 2002-03 Edition (<http://www.bls.gov/oco/cg/cgs033.htm>)

## Job Categories

### *Information Technology Career Clusters (NWCET)*

#### **Database Development and Administration**

As a database administrator, you will first gather data to determine user requirements. You may also gather the information to design reports and forms so users can create data queries and interpret the results. You'll determine needed changes either to new systems or existing systems as they grow, and test everything before it's put into operation. To keep data secure and protected from catastrophic events, you create security procedures and implement backup and recovery processes. You need to be creative in your approach to problems and willing to help everyone get the data they need while maintaining system security and reliability.

#### **Sample Job Titles**

- Data Administrator
- Data Analyst
- Data Architect
- Data Management Associate
- Data Modeler
- Data Modeling Specialist
- Database Administration Associate
- Database Administrator
- Database Analyst
- Database Developer
- Database Manager
- Database Modeler
- Database Security Expert

# BDPA 2004 JOB OUTLOOK

## VERSION 2.0



DSS (Decision Support Services)  
Knowledge Architect  
Senior Database Administrator  
Senior Systems Analyst  
Systems Administrator  
Systems Analyst  
Tester

### **Digital Media**

Information only has value when someone wants to read it. A riveting presentation is vital to getting your company's message across whether you're creating a hot web site, a training video or designing the latest computer game. As a digital media specialist you bring ideas to life. Before you jump in, you estimate costs and the length of the job and determine whether to call in additional help from inside or outside your company. You want the best tools to design and format your presentation, but the size of the project and budget sometimes put limits on how far you can go. When designing, you determine the look and feel, select colors and create a visually appealing layout. The tools you use change at an incredible pace, so you're constantly learning about the latest developments, often through vendor-sponsored training and user education meetings. "Mindshare," the attention customers pay to your company's name and products, is often determined by the visions you create through your sound and images.

### **Sample Job Titles**

2D/3D Artist  
Animator  
Audio/Video Engineer  
Designer  
Media Specialist  
Media/Instructional Designer  
Multimedia Author  
Multimedia Authoring Specialist  
Multimedia Developer  
Multimedia Specialist  
Producer  
Production Assistant  
Programmer  
Streaming Media Specialist  
Virtual Reality Specialist  
Web Designer  
Web Producer  
Web Specialist

### **Enterprise Systems Analysis and Integration**

As society increasingly depends on information technology for commerce, education, communication and entertainment, the smooth functioning and proper interaction of complex information technology systems become increasingly important. The increase in e-business and digital commerce will put even more emphasis on the inter-operability, usability and security of separate systems. Technician-level persons will install necessary software, program databases and configure networks to allow efficient and secure transactions among computer systems. Professional opportunities exist for persons with technical backgrounds plus business computer science education to perform high-level design and system integration functions either as a member of the enterprise team or as a consultant.

# BDPA 2004 JOB OUTLOOK

## VERSION 2.0



### Sample Job Titles

Application Integrator  
Business Continuity Analyst  
Cross-Enterprise Integrator  
Data Systems Designer  
Data Systems Manager  
Data Warehouse Designer  
E-Business Specialist  
Electronic Transactions Implementer  
Information Systems Architect  
Information Systems Planner  
Systems Analyst  
Systems Architect  
Systems Integrator

### **Network Design and Administration**

Network technicians make sure the network hardware and software are operating properly so people in your organization get the information they need when they need it. Using cable, fiber optics or even wireless communications, you connect users to your company's computer system. You will thoroughly understand networking technology for local area networks (LANs), and for connecting to larger networks and the Internet. You learn to quickly identify, document and solve problems. Because you work with the users all the time, you know the needs of your company and can recommend improvements based on user needs and technology advances. You will probably need to keep measurements on how the network is performing—charting network usage and downtime to help plan for the future. You document the network configuration and prepare backup plans and procedures. You will be responsible for adding users, making sure they have access to the files and network-connected equipment they need, while maintaining security and confidentiality of other files and data. You install upgrades with a minimum of disruption.

### Sample Job Titles

Communications Analyst  
Data Communications Analyst  
Information Systems Administrator  
Information Systems Operator  
Information Technology Engineer  
Network Administrator  
Network Analyst  
Network Architect  
Network Engineer  
Network Manager  
Network Operations Analyst  
Network Security Analyst  
Network Specialist  
Network Technician  
Network Transport Administrator  
PC Support Specialist  
PC Systems Support Lead  
PC Network Engineer  
Systems Administrator  
Systems Engineer  
Technical Support Specialist  
User Support Specialist

### **Programming/Software Engineering**

Computer programmers design and create software. You may analyze, design, develop, test and maintain computer and Internet-based applications. Possibly you'll write specialized applications or make custom programs to satisfy a user's particular needs. Not all programmers write code all day. You may evaluate the project requirements, participate in design meetings, determine the best solution to a problem or feature and develop detailed design specifications. You use development tools and programming languages in creating and testing the software. You must also be good at documenting your work so others will know what you did and how. And of course, you have to test your work with real users to make sure it's free of errors and meets specifications.

#### **Sample Job Titles**

Applications Analyst  
Applications Engineer  
Business Analyst  
Computer Engineer  
Data Modeler  
Operating System  
Designer/Engineer  
Operating System  
Programmer/Analyst  
Program Manager  
Programmer  
Programmer/Analyst  
Project Lead  
Software Applications Specialist  
Software Architect  
Software Design Engineer  
Software Design Engineer  
and Tester  
Software Development Engineer  
Software Engineer  
Software QA Specialist  
Software Tester  
Systems Analyst  
Systems Administrator  
Test Engineer  
Tester

### **Technical Support**

As a technical support representative, you are a vital part of the contact between customers and your company. Educating users is part of your job, as well as solving hardware or software operation and application problems. Experience with the problems users face in daily operation is a valuable asset. When a problem occurs, you listen carefully, ask the appropriate questions to gather needed information and then take steps to solve it. Dealing directly with customer issues, you are one of the best sources of information on the product, and are consulted for information about what customers want and what gives them the most trouble. You may start out on the help desk, walking users through the steps required to solve a problem over the telephone. As your experience and training increase, you may work with hardware and software installation and configuration.

# BDPA 2004 JOB OUTLOOK

## VERSION 2.0



### **Sample Job Titles**

Analyst  
Call Center Support Representative  
Content Manager  
Customer Liaison  
Customer Service Representative  
Customer Support Professional  
Help Desk Specialist  
Help Desk Technician  
Maintenance Technician  
PC Support Specialist  
PC Systems Coordinator  
Product Support Engineer  
Sales Support Technician  
Senior Systems Analyst  
Systems Analyst  
Technical Account Manager  
Technical Support Engineer  
Technical Support Representative  
Testing Engineer

### **Technical Writing**

As a technical writer, you make technical information easily understood. Technical manuals, detailed specifications, online help, web content and training materials are just a few examples of the documents you create. You define the audience and purpose of your document; determine the technical level, tone and organization; and choose your document's delivery method (print or electronic). You are accurate. You thoroughly research your subject by interviewing experts and users, and testing the product you're writing about. You use page layout or word processing programs to create your documents and design graphics. Your creativity, communication skills and ability to understand and simplify complex material are valuable assets to your readers and to your future.

### **Sample Job Titles**

Desktop Publisher  
Document Specialist  
Documentation Specialist  
Editor  
Electronic Publications Specialist  
Electronic Publisher  
Instructional Designer  
Online Publisher  
Technical Communicator  
Technical Editor  
Technical Publications Manager  
Technical Writer

### **Web Development and Administration**

You will play a vital role in your company's presence on the world wide web. You may use web page development software to create or change web pages, inserting text content, graphics and interactive modules that are often supplied by others in your organizational team. Before you start, you will probably talk to the many stakeholders in your company who depend on the organization's web presence. You'll also look at successful models and research software tools to help design the look, feel and navigation. In some organizations you may be responsible for making sure the web pages and updates get installed, and work with the hardware associated with the web pages.

### **Sample Job Titles**

Web Administrator  
Web Architect  
Web Designer  
Web Page Developer  
Web Producer  
Web Site Developer  
Web Specialist  
Webmaster

### **CareerBuilder.com**

AS/400  
Business Analysis  
Consulting  
Data Warehousing  
Database  
Desktop Support  
ERP  
Entry Level  
Executive  
Internet/E-commerce  
Legacy Systems  
Management  
Network  
Operations  
Project Management  
Quality Assurance  
System Architect/Design  
Technical Writing  
Training  
Unix  
Unix Administration  
Web Development  
Windows Development

### **Department of Labor (DOL)**

**Links to:** Tasks | Knowledge | Skills | Abilities | Work Activities | Work Context | Job Zone | Interests | Work Values | Related Occupations | Wages & Employment

Communication Equipment Mechanics, Installers, and Repairers  
(<http://online.onetcenter.org/report?r=0&id=725>)  
Computer and Information Scientists, Research (<http://online.onetcenter.org/report?r=0&id=1203>)  
Computer and Information Systems Managers (<http://online.onetcenter.org/report?r=0&id=16>)  
Computer Hardware Engineers (<http://online.onetcenter.org/report?r=0&id=1210>)  
Computer Programmers (<http://online.onetcenter.org/report?r=0&id=196>)  
Computer Security Specialists (<http://online.onetcenter.org/report?r=0&id=93>)  
Computer Software Engineers, Applications (<http://online.onetcenter.org/report?r=0&id=1204>)  
Computer Software Engineers, Systems Software (<http://online.onetcenter.org/report?r=0&id=1205>)  
Computer Specialists, All Other (<http://online.onetcenter.org/report?r=0&id=1441>)  
Computer Support Specialists (<http://online.onetcenter.org/report?r=0&id=195>)  
Computer Systems Analysts (<http://online.onetcenter.org/report?r=0&id=192>)

Database Administrators (<http://online.onetcenter.org/report?r=0&id=1559>)  
Desktop Publishers (<http://online.onetcenter.org/report?r=0&id=893>)  
Electrical Engineers (<http://online.onetcenter.org/report?r=0&id=112>)  
Electronics Engineers, Except Computer (<http://online.onetcenter.org/report?r=0&id=113>)  
Network and Computer Systems Administrators (<http://online.onetcenter.org/report?r=0&id=1206>)  
Network Systems and Data Communications Analysts (<http://online.onetcenter.org/report?r=0&id=198>)  
Numerical Tool and Process Control Programmers (<http://online.onetcenter.org/report?r=0&id=197>)  
Sales Engineers (<http://online.onetcenter.org/report?r=0&id=427>)  
Sales Representatives, Services, All Other (<http://online.onetcenter.org/report?r=0&id=1127>)  
Technical Writers (<http://online.onetcenter.org/report?r=0&id=354>)  
Training and Development Managers (<http://online.onetcenter.org/report?r=0&id=4>)

### *Educator's Website for Information Technology ([www.ewit.org](http://www.ewit.org))*

#### **Network Systems**

##### **Network Design and Administration:**

- Communications Analyst \* Data Communications Analyst \* Information Systems Administrator \* Information Systems Operator \* Information Technology Engineer
- **Network:** Administrator \* Analyst \* Architect \* Engineer \* Manager \* Operations Analyst \* Security Analyst \* Specialist \* Technician \* Transport Administrator
- PC Support Specialist \*
- **Systems:** Administrator \* Engineer \* Support Lead
- Technical Support Specialist \* User Support Specialist
- Telecommunications Network Technician

#### **Information Support and Services**

##### **Database Development and Administration:**

- **Data:** Administrator \* Analyst \* Architect \* Management Associate \* Modeler \* Modeling Specialist
- **Database:** Administration Associate \* Administrator \* Analyst \* Developer \* Manager \* Modeler \* Security Expert \* DSS (Decision Support Services) \* Knowledge Architect
- **Senior:** Database Administrator \* Systems Analyst
- **Systems:** Administrator \* Analyst
- Tester

##### **Technical Writer:**

- Desktop Publisher \* Document Specialist \* Documentation Specialist \* Editor
- **Electronic** Publications Specialist \* Publisher
- Instructional Designer, Online Publisher
- **Technical** Communicator \* Editor \* Publications Manager \* Writer

##### **Technical Support:**

- Analyst \* Call Center Support Representative \* Content Manager
- **Customer:** Liaison \* Service Representative \* Service Professional
- **Help Desk:** Specialist \* Technician
- Maintenance Technician \* PC Support Specialist \* PC Systems Coordinator \* Product Support Engineer \* Sales Support Technician \* Systems Analyst
- **Technical:** Account Manager \* Support Engineer \* Support Representative
- Testing Engineer

##### **Enterprise Systems Analysis and Integration:**

- Application Integrator \* Business Continuity Analyst \* Cross-Enterprise Integrator
- **Data:** Systems Designer \* Systems Manager \* Warehouse Designer
- E-Business Specialist \* Electronic Transactions Implementer
- **Information Systems:** Architect \* Planner
- **Systems:** Analyst \* Architect \* Integrator

### Interactive Media

#### Digital Media:

- 2D/3D Artist \* Animator \* Audio/Video Engineer \* Designer \* Media Specialist \* Media/Instructional Designer
- **Multimedia:** Author \* Authoring Specialist \* Developer \* Specialist
- Producer \* Production Assistant \* Programmer \* Streaming Media Specialist \* Virtual Reality Specialist
- **Web:** Designer \* Producer \* Specialist

#### Web Development and Administration:

- **Web:** Administrator \* Architect \* Designer \* Page Developer \* Producer \* Site Developer \* Specialist
- Webmaster

### Programming and Software Development

#### Programming / Software Engineering:

- **Applications:** Analyst \* Engineer
- Business Analyst \* Computer Engineer \* Data Modeler
- **Operating System:** Designer/Engineer \* Programmer Analyst
- Program Manager \* Programmer \* Programmer/Analyst \* Project Lead
- **Software Applications:** Specialist \* Architect \* Design Engineer \* Development Engineer \* Engineer \* QA Specialist \* Tester
- **Systems:** Analyst \* Administrator
- Test Engineer \* Tester

### Cluster knowledge and skills

Academic Foundations  
Communications  
Problem Solving and Critical Thinking  
Information Technology Applications  
Systems  
Safety, Health and Environmental  
Leadership and Teamwork  
Ethics and Legal Responsibilities  
Employability and Career Development  
Technical Skills

### *Functional Job Titles*

#### Management Level

CIO/Vice President  
IS Director  
Manager, Sys. Analysis & Prog.  
Manager, Sys. Prog./Tech. Support  
Network Manager LAN/WAN  
Sys. Analyst/Prog./Proj. Leader  
Database Admin. Manager  
Manager Telecommunications  
E-Commerce Director  
Data Center Manager  
PC Work Station Manager

#### Professional Staff

Senior Software Engineer  
Software Engineer  
Sr. Database Analyst/Admin  
Post Y2K Analyst

# BDPA 2004 JOB OUTLOOK

## VERSION 2.0

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Object-Oriented/GUI Developer  
WWW/Internet Developer  
Network Administrator LAN/WAN  
Sr. Systems Analyst Programmer  
Systems Analyst Programmer  
Sr. Systems Admin./Unix  
Sr. Client Server Prog./Analyst  
Client Server Prog./Analyst  
Sr. Mid/MF Programmer Analyst  
Mid/MF Programmer Analyst  
Telecommunications Specialist  
PC Applications Specialist  
Quality Assurance Analyst  
Security Specialist

Ref: H1-VISA.com Salary Survey ([http://h1-visa.com/general1/salary\\_survey.html](http://h1-visa.com/general1/salary_survey.html))