

IT'S ALL ABOUT CERTIFICATION - HYT 308

STUDENT HANDBOOK

WELCOME!

Prince Georges Community College Mission Statement

Prince George's Community College transforms students' lives. The college exists to educate, train, and serve our diverse populations through accessible, affordable, and rigorous learning experiences.

Information Technology Entry Program Objective

The Information Technology Entry Program (ITEP) is a comprehensive multi-phase program of Prince George's Community College that develops the skills needed to enter the demanding world of IT Support. Upon successful completion of the program, the student will be able to demonstrate practical knowledge and application of their skills, exceeding that of an Entry Level Desktop and Network IT Support Technician or Tier I Help Desk Support.

Through our comprehensive approach, the material is combined into an interconnected program, allowing the instructor and student adequate time on a specific subject such as: TCP/IP, DNS, DHCP, Wireless, IPv6 or troubleshooting.

Each student is treated and trained as an information technology support professional from day one. The student will design, build, administer and maintain a live network during the program. We can do this through the delivery method of the combined and interconnected nature of this dynamic multi-phase program.

Upon completion of the Information Technology Entry Program, and with adequate preparation in addition to the contact hours, the student should have developed the skills needed to sit for the following exams: CompTIA A+, CompTIA NET+, CompTIA SECURITY+, and Microsoft Certified Technology Specialist MCTS Configuring Windows 7.

It's All About Certification Objective

Computer certification programs are setting the standards for the Information Technology industry worldwide. Although most careers in the IT and communications fields are lucrative and lead to rapid advancement, students can move ahead even more rapidly if they have been certified. In fact, you often can earn a salary increase of 20% or more once you become certified. Nowadays, learning computer repair on your own or even having a degree in computer science just isn't enough. Companies are demanding that their IT professionals be certified as a way to measure their skills as well as computer training certification will help a computer professional get a good job and stay competitive in what is now a highly demanding Information Technology environment.

HOW TO USE THIS STUDENT GUIDE

The student guide provides students with details of course materials.

The Student Guide is intended to be used in conjunction with the Course Syllabus and Course Schedule documents. All electronic copies of all three documents are posted in the "Syllabus & Schedule" area of the Blackboard course site for this course.

Throughout this course, you should have easy access to the Student Guide, Course Syllabus and Course Schedule documents.

The Table of Contents below provides links to all of the pertinent information found in this document.

Let's get started!

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SECTION 1: COURSE INFORMATION

Course Description

Computer certification programs are setting the standards for the Information Technology industry worldwide. Although most careers in the IT and communications fields are lucrative and lead to rapid advancement, students can move ahead even more rapidly if they have been certified. In fact, you often can earn a salary increase of 20% or more once you become certified. Nowadays, learning computer repair on your own or even having a degree in computer science just isn't enough. Companies are demanding that their IT professionals be certified as a way to measure their skills as well as computer training certification will help a computer professional get a good job and stay competitive in what is now a highly demanding Information Technology environment.

Required Textbook

None.

Other Required Course Materials

Student Handbook

Required Technology Accounts

To be successful in this course, students must have access to the following technology accounts:

- Blackboard Account

Details on how to setup and access the technology accounts for this course can be found in the Course Technology Setup section of this document.

Prerequisites

The prerequisites for this course are: None

Course Meeting Schedule

This course will meet on the PGCC Largo campus location TBD. The class meeting times and room location for this course can be found on the Course Syllabus document found in the Syllabus & Schedule area of the Blackboard course site.

Course Length

This course meets for ½ day.

The course consists of:

Lecture/Class Participation: 70%

Final Exam: 20%

Attendance: 10%

Course Contact Hours

The total number of contact hours for this course is: 4.0

Course Structure

This course is designed to provide a hybrid experience, including a blend of face-to-face and online activities.

Face-to-face sessions will be held on the Largo campus location TBD. Face-to-face activities will consist of classroom participation.

Online sessions will be a blend of self-paced and group activities using Blackboard. Online activities will consist of Frequently Asked Questions and Final Exam.

Technology Requirements

Computer/internet access and mastery of basic computer skills are considered to be the student's responsibility. To be successful in this course, students must have access to:

Computer/internet access and mastery of basic computer skills are considered to be the student's responsibility. To be successful in this course, students must have access to:

- a Pentium-class or Mac computer with at least 256 MB RAM
- Broadband (DSL, Cable, FIOS) is highly recommended
- An Internet Service Provider (ISP)
- Your PGCC Owl Mail student email address
- Firefox version 22 (or higher), Chrome version 30 (or higher), or Internet Explorer 8 (or higher)
- Microsoft Word (word processing software)
- Video player and speakers for multimedia content

SECTION 2: COURSE OBJECTIVES

Objectives:

- Ability to demonstrate a working knowledge of information technology
- Validates the person's commitment to the profession
- Provides comfort to employer as to the individual's knowledge, skills, abilities and experience
- Technology Certifications

By the end of this course, students who successfully complete classroom and online activities will be able to:

Topics:

- Why is Certification Important
- Certifications
 - How to identify IT field that best fits you.

SECTION 3: COURSE SCHEDULE

The detailed Course Schedule can be found in the Syllabus & Schedule area of Blackboard.

Instructions to access Course Schedule in Blackboard:

1. Go to Blackboard course site for this course (<http://pgcconline.blackboard.com>)
2. Click on "Syllabus & Schedule" navigation button
3. Click on Course Schedule document link

SECTION 4: COURSE MODULES

Module #	Module Name	Course Objective(s) Covered	# Hours
1 & 2	It's All About Certification	Objectives: <ul style="list-style-type: none"> • Ability to demonstrate a working knowledge of information technology • Validates the person's commitment to the profession • Provides comfort to employer as to the individual's knowledge, skills, abilities and experience • Technology Certifications 	8

Technology Certifications

www.wikipedia.org

The **Computing Technology Industry Association (CompTIA)**, a non-profit trade association, was created in 1982 as the Association of Better Computer Dealers, Inc. (ABCD) by representatives of five microcomputer dealerships. Over the course of a decade, ABCD laid the groundwork for many of CompTIA's initiatives and member benefits.

ABCD later changed its name to the Computing Technology Industry Association to reflect the association's evolving role in the computer industry and in the U.S. business landscape at large. The 1990s was a period of growth as the association broadened the scope of its activities to address the needs of the expanding computer industry. Its initiatives increased to include networking, UNIX, imaging, mobile computing, and multimedia arenas. In an effort to monitor and take positions on public policy issues, the association added a full-time Director of Public Policy position. In 2010, CompTIA added a new executive director for a newly named "Creating IT Futures" Foundation, a philanthropic arm that focuses on training and certifying low-income students and adults in IT, as well as returning veterans—and helping connect them with potential employers.

CompTIA is a provider of professional certifications for the information technology (IT) industry. CompTIA chairs and manages the Initiative for Software Choice.

CompTIA administers its certification exams through Pearson VUE testing centers. In addition to certification, CompTIA also provides corporate membership.

In April 2007, CompTIA's "A+", "Network+", and "Security+" certifications became accredited by the American National Standards Institute.

In January 2010 these ANSI/ISO approved certifications fundamentally had their conditions changed from lifetime certifications to certifications that will expire every three years. Current certificate holders will still have valid certs for life, but any new certifications earned **after December 31, 2010 will expire every three year**

Professional certifications in computer technology are non-degree awards made to those who have achieved qualifications specified by a certifying authority. Depending on the particular certification, qualifications may include completing a course of study, proof of professional accomplishments, achieving a specified grade on an examination or some combination thereof. The intention is to establish that an individual holding a certification is technically qualified to hold certain types of position within the field.

Certifications, generally, need to be renewed periodically, or may be valid for a specific period (e.g. the lifetime of the product upon which the individual is certified). As a part of a complete renewal of an individual's certification, it is common for the individual to show evidence of continual learning — often termed continuing education — or earning continuing education units (CEU). Certification is often used in the professions of information technology industry.

Some certification programs are oriented toward specific technologies, and are managed by the vendors of these technologies. These certification programs are tailored to the institutions that would employ people who use these technologies.

The CompTIA A+

The **A+** certification demonstrates competency as a computer technician. Officially, CompTIA A+ certification is a vendor neutral certification that covers numerous technologies and operating systems from such vendors as Microsoft, Apple Inc., Novell and some of the Linux distributions.^[citation needed] The A+ certification exam was developed in 1993. There have been five versions of the A+ exam, the 1993, 2003, 2006, 2009 and 2012 objectives, which are broken down into two separate exams. The 2003 objectives contained the A+ Core Hardware Exam and the A+ Core Operating System Technologies Exam, and were retired on June 30, 2007. The 2006 objectives require that a candidate successfully pass the A+ Essentials and one elective: IT technician, remote support technician, or depot technician. The 2009 certification requires passing two exams: Essentials and Practical Application.

The A+ exam is intended for information technology professionals who have the equivalent of 500 hours of hands on experience. The exams are computer based and composed of multiple choice questions, of which there may be more than one correct answer. Over 800,000 people have earned the A+ credential worldwide, to date.

Topics of the Essentials/Core examination include IRQs, direct memory access, and practical computer repair, including the installation and repair of hard drives, modems, network cards, CPUs, power supplies, PDAs, and printers. The focus of the exam is not theory, but practice. Sometimes graphics are used in exam questions. Topics included in the Operating Systems Exam include memory management, configuration files, and historical operating environments rather than newer, cutting edge technologies.

In September 2006, the CompTIA A+ test was updated so that the test taker must take the CompTIA A+ Essentials (220-601) test along with one of three other tests (220-602, 220-603, or 220-604). Each of these elective exams offers candidates the opportunity to specialize their A+ certification to match their desired career path.

With the introduction of the 2006 A+ exam, candidates were offered a grace period whereby both the 2003 and 2006 versions were available. From June 2007, the 2003 version of exams was no longer available in the United States. In some countries, the grace period was extended to December 2007. The 2003 version was also extended in cases where the A+ certification exam was included in a course of study. Also, most legacy support questions have been excluded. The existing CompTIA A+ 600 series exams remain relevant and are in use by organizations and educational institutions throughout the world. The regular, non-academic English version of these exams retired in the U.S. and Canada on February 28, 2010. The educational versions of these exams (JK0-601, JK0-602, JK0-603 and JK0-604), as well as the German, Korean, Arabic, Chinese and Japanese translations of the 220-601 through 220-604 CompTIA A+ exams, remained in the market for use until August 31, 2010.

The A+ certification along with Network+ may be used to qualify as an elective for Microsoft's MCSA and MCSE certification.

In order to receive CompTIA A+ certification a candidate must pass two exams; each requiring a separate voucher doubling the price listed on the website. The first exam is CompTIA A+ Essentials, exam number 220-801. The CompTIA A+ Essentials examination measures necessary competencies for an entry-level IT professional with the equivalent knowledge of at least 500 hours of hands-on experience in the lab or field. Successful candidates will have the knowledge required to understand the fundamentals of computer technology, networking, and security, and will have the skills required to identify hardware, peripheral, networking, and security components.

Successful candidates will understand the basic functionality of the operating system and basic troubleshooting methodology, practice proper safety procedures, and will effectively interact with customers and peers. CompTIA A+ is ISO 17024 Accredited (Personnel Certification Accreditation) and, as such, undergoes regular reviews and updates to the exam objectives. Also, a candidate must pass CompTIA A+ Practical Application, exam number 220-802. The CompTIA A+ Practical Application examination measures necessary competencies for an entry-level IT professional with a working knowledge of practical use of current software and Operating System interface and features.

The Network +

Network+ is a certification that is used to measure skill as a network technician: understanding of network hardware, installation, and troubleshooting. Network+ was first launched in 1999, and exam updates followed in 2002, 2005, and 2009. The 2009 version will be retired on August 31, 2012; new objectives (the "2012 objectives") will begin to be examined in Nov/Dec 2011.

Topics include network hardware, connections, software, the OSI Reference model, and different protocols used in local area networks (LANs) and wide area networks (WANs). CompTIA recommends the A+ certification and nine months networking experience before sitting for the exam, but this is not required. Network+ prepares one for continuing to Microsoft certifications and Cisco certifications. A combination A+/Network+, A+/Server+, or (just) Security+ certification can fulfill the elective exam requirement of the Microsoft Certified Systems Administrator (MCSA) certification.^[4]

Security+

Security+ is a certification dealing with computer security topics such as cryptography and access control, as well as business-related topics such as disaster recovery and risk management. It was developed in 2002 to address the rise of security issues. A new and updated version, SY0-301, was released in 2011.

According to CompTIA, there are currently more than 45,000 people around the world who have earned this certification.

It is recommended that candidates have two years of security-related work experience (although not a requirement) and pass the 75 question multiple choice exam.

Exam topics includes; network security, Compliance and operational security, threats and vulnerabilities, application, data and host security, access control and identity management as well as cryptography

The Security+ exam can be applied as an elective to the *MCSA: Security* and the *MCSE: Security* specializations from Microsoft. For United States Department of Defense employees, DoDD 8570, IAT Level II certification guidelines lists Security+ as one of four choices (the others being GIAC Security Essentials Certification (GSEC), Security Certified Network Professional (SCNP), and Systems Security Certified Practitioner (SSCP))

How Valuable is Certification?

How Valuable is the A+ Certification?

The A+ certification is one of the most popular in the computer industry. That doesn't necessarily mean, however, that it's right for everyone. Should you attempt the A+?

Answer: There are varying opinions on the value of the A+ certification, which is managed by independent technical certification vendor CompTIA. Some feel that it's too easy to get and doesn't require any real experience, making it of questionable value. Others believe it's a good way to get that first job in IT.

Frequently Asked Questions

<https://extension.ucdavis.edu/certificates/faq.asp>

What is a Certificate Program?

A Certificate Program is a series of courses providing in-depth study, so you can get the most up-to-date skills and information you need to excel in your chosen field.

What is a Professional Concentration?

A Professional Concentration provides a highly focused sequence of study that can be completed in a year or less..

How is an Intensive Certificate Program different?

In an Intensive Certificate Program you complete the same number of courses as in a regular Certificate Program. The only difference is the format—intensive programs are designed to be completed in 10-16 weeks rather than two years. You attend class full-time during the day, Monday-Friday. Instead of enrolling in each course separately, you enroll in the entire Certificate Program. It is a great way to make a career change—fast.

Why take a certificate program?

All certificate courses offer academic credit, which may be applied to degree programs at colleges and universities at their discretion. Certificate courses are taught by respected leaders in their industries, so you always get practical, real-world ideas and instruction.

How will I benefit from getting a certificate?

Making the personal investment in a certificate shows your employer a serious commitment to your field and increases your value in the workplace. Achieving a certificate can give you a competitive edge in hiring and promoting situations. Some of our certificates prepare you to take accreditation exams or meet state-mandated requirements for continuing education. And, over the course of a certificate program, many students have opportunities to work closely with instructors and fellow students, providing a valuable professional network for the future.

May I apply courses from another college to a certificate?

You may substitute one course from an accredited institution for one certificate program course via articulation college/university agreement.

May I use certificate program units in a degree program?

Acceptance of our courses toward a degree is determined by the institution where you want to earn the degree. We recommend that students who wish to apply a UC Davis Extension course toward a degree at another institution should verify acceptance of the course with that institution before enrolling.

Do I have to be in a program to take certificate courses?

No, courses are open to the general public as well as certificate program enrollees. Many people take two or three courses before committing to an entire program. Others simply take courses they find interesting without ever intending to earn a certificate.

How long does it take to complete a program?

Most certificate programs take approximately two years to complete if you take one course per quarter. Intensive Certificate Programs are typically completed in 10-16 weeks of full-time study. Customized Certificate Programs may take up to five years to complete.

Why is Certification Important

Certification refers to the confirmation of certain characteristics of a person, organisation or object. This confirmation is often, but not always, provided by some form of external review, education, or assessment.

One of the most common types of certification in modern society is professional certification, where a person is certified as being able to competently complete a job or task, usually by the passing of an examination.

The purpose of any professional certification is to provide official and public recognition of an individual's competencies and capabilities in a professional subject area.

However, it is important understand that certification is not licensing or registration and does not provide legal authority to practice a profession.

What are the objectives of certification?

1. To raise the professional standards and improve the practice of cost engineering by giving special recognition by their peers to those who, in fulfilling prescribed standards of performance and conduct, have demonstrated and maintained a high level of competence and ethical practices.
2. To identify for employers, clients and the public persons with a broad knowledge of cost engineering, and capability to professionally apply the principals of total cost management.
3. To establish a program with the goal of continuous improvement for individuals cost engineering skills and professional development.
4. To clarify the skills, knowledge and standards of conduct for the practice of cost engineering.

WHY CERTIFICATION IS IMPORTANT

<http://www.itcertcouncil.org/WhyITCertification/WhyCertificationisImportant.aspx>

IT certification programs ensure the technical competence of IT professionals through a tangible measurement of skills and knowledge. Certification exams go beyond training by providing an objective measurement of a professional's knowledge and skills in a specific IT support function or technology. Certification programs establish standards for IT education and play an important role in developing a qualified workforce. Employers, IT professionals, and consumers of IT services all benefit from certification.

For IT Professionals

Getting certified is an important step in advancing your career as an IT professional. Certification provides you with a competitive advantage by showing employers that you have the right skill to get the job done. Top technology companies like Best Buy and Sharp Electronics, as well as the U.S. Department of Defense, all require certification of their employees.

Additional benefits of certification:

- Help IT professionals survive a volatile economy. In the 2009 CertMag Salary Survey, more than 85% of respondents agree that since they've become certified, there is a greater demand for their skills
- Provides career advancement opportunities. A recent IDC Survey reported that nearly 40% of certified professionals received a promotion within the first year of attaining a primary certification.
- Increases recognition and respect from managers, peers and customers. 70% of IT professionals surveyed by CertMag report that credentials give them more prestige among their colleagues.

A+ Certification

A+ certification is a vendor-neutral certification that certifies the competency of service professionals in the computer industry. It is for anyone who wants an internationally recognized credential as a competent computer service professional.

A+ Certification program is one of the largest certification worldwide. A+ Certification is developed and sponsored by the Computing Technology Industry Association (CompTIA), a global association of IT industry companies with the common goal of standardized qualifications for professionals working in the industry. Membership of CompTIA include most of the global software and hardware manufacturers such as Microsoft, IBM, Lotus, Dell, Compaq, etc.

Why is A+ the most popular and widely recognized certification for PC Repairs and maintenance?

What makes A+ Certification different from other credentials is the strong support it has received from the computer industry.

- A+ Certification is recognized and backed by all the leading manufacturers, vendors, service providers and professional bodies worldwide.
- A+ Certification is the only generic IT support qualification in the world!
- Achievement of A+ Certification shows that a person has the knowledge, skill and customer service skills necessary to successfully support PC equipment and users.
- Technical support, the focus of A+ certification, is the busiest area of IT.

Technical Requirements of A+

A+ demonstrates basic competence in supporting microcomputers. To be certified you must pass two modules: A+ Essentials AND one of following 3 exams: 220-602 (IT Technician) or 220-603 (Remote Support Technician) or 220-604 (Depot Technician).

Target Audience / Requirements for A+ Certification

A+ is possibly the most popular entry-level certification. It is usually seen as being for people with a bit of experience (6 months or less) in computer service. However, for the purpose of this discourse, let us attempt to classify the target audience for A+. The

focus is not the certification itself but what it represents. Our interest is on the acquisition and use of skills and knowledge for practical benefit. Certification validates what you have, not what you don't have.

Computer users - intense, enthusiasts

Are you a user or PC enthusiast that needs to have a better appreciation of how computers work? Are you someone who needs to know how to install your own software, assemble your systems or troubleshoot your faulty PCs? Some are lucky when they adopt the "trial and error" method, but most get their fingers burnt. You need to be equipped with standard skills and knowledge. You need to ensure that your installation and troubleshooting is done securely, skillfully and cost-effectively.

Newcomers who want to develop a career in IT and tech support.

A+ certification was specially designed for the tech support field. Technical support is the best area for a beginner to gain a good working knowledge of the basics of the IT profession. Hands-on experience gained especially in the area of problem solving is invaluable for starting an IT Career. PCs can be seen in every sphere of life now. What this means is that it is easier for a newcomer in tech support to get experience and get a foot in the door, as opportunities are virtually limitless. This is quite unlike a newcomer with skills in more complex applications that are not commonplace.

Technicians / Professionals in tech support that need a recognized validation of their skills and experience.

If you've been working in tech support for sometime and you've don't have the respect and recognition, you feel you deserve, you need to examine A+ to know if it is what you need. It is an external validation and measurement of your technical support skills and experience. Not only are you saying you are capable in Tech Support, but CompTIA, the world's largest IT trade association is confirming your level of competence.

Also as a professional on the field you might find that your experience, that is the work you do, limits your knowledge and exposure. A relevant certification program removes this limitation, by covering all standard areas in the particular field. In this way the certification increases your knowledge, augments your level of proficiency and enhances your personal productivity. A+ gives you comprehensive knowledge and skills of all key areas you need to know in tech support.

IT Professionals outside tech support that need tech support skills and certification to advance their careers.

It is possible to be an experienced Programmer and yet be unable to diagnose a faulty hard disk drive. What if you find that as an IT professional say in programming or web design, you are heavily dependent on tech support to get your job done? It may make sense for you to have standard skills and knowledge in tech support so that you can achieve results in an effective manner.

Technical Expectations: A+ Certified Professional

An A+ Certified Professional is usually expected to carry out the following tasks:

Installation and setup, Upgrading, Repairs, Troubleshooting, Maintenance of desktops, laptops, printers, and all other peripherals. Plus, you need to fully understand the network configurations and operating systems your users might be utilizing. And also the setup, training of users in the use of systems, as well as Software related tasks. Installation of software packages, upgrade and update of software, troubleshoot application and system errors, advice users on software use, train users, writing of training/user manuals, overseeing PC usage and so on.

The focus of this piece has mainly been the technical aspect of A+ as a certification for tech support. Technical support, like every career area of IT has its personality requirements, as well as opportunities and challenges. Are you are interested in developing your career along this line? It makes sense for you to also have an insight into the

associated challenges and prospects. With this you can take meaningful career decisions within the context of your career plan

Certification Benefits

<http://searchwinit.techtarget.com/answer/What-are-the-benefits-of-A-Network-MCDST-MCSA-and-Security-CompTIA-certifications>
Frequently Asked Questions

What is a Certificate Program?

A Certificate Program is a series of courses providing in-depth study, so you can get the most up-to-date skills and information you need to excel in your chosen field. These professional education programs provide a minimum of 14 units academic credit. A UC Davis Extension certificate represents a much deeper understanding of your industry beyond what a course or workshop provides. Some certificates prepare you to take accreditation exams or meet state-mandated requirements for continuing education.

What is a Professional Concentration?

A Professional Concentration provides a highly focused sequence of study that can be completed in a year or less. These shorter programs (60-139 hours) focus on one facet of your profession. A Professional Concentration requires approximately half the number of courses as a certificate program.

What is a Customized Certificate Program?

A Customized Certificate Program allows you to combine courses from up to three certificate programs to create your own unique certificate program. You must complete a minimum of 14 units of coursework.

How is an Intensive Certificate Program different?

In an Intensive Certificate Program you complete the same number of courses as in a regular Certificate Program. The only difference is the format—intensive programs are designed to be completed in 10-12 weeks rather than two years. You attend class full-time during the day, Monday-Friday. Instead of enrolling in each course separately, you enroll in the entire Certificate Program. It is a great way to make a career change—fast.

Why take a certificate program from UC Davis Extension?

Unlike some other institutions, each of our programs are UC-approved, requiring at least 140 hours of coursework. All of our certificate courses offer academic credit, which may be applied to degree programs at colleges and universities at their discretion. UC Davis Extension certificate courses are taught by respected leaders in their industries, so you always get practical, real-world ideas and instruction.

How will I benefit from getting a certificate?

Making the personal investment in a certificate shows your employer a serious commitment to your field and increases your value in the workplace. Achieving a certificate can give you a competitive edge in hiring and promoting situations. Some of our certificates prepare you to take accreditation exams or meet state-mandated requirements for continuing education. And, over the course of a certificate program, many students have opportunities to work closely with instructors and fellow students, providing a valuable professional network for the future.

May I apply courses from another college to a certificate?

You may substitute one course from an accredited institution for one certificate program course, with approval of the program

manager, if the course is comparable and you earned to grade C or better. The representative can give you more information about substitutions.

May I use certificate program units in a degree program?

Acceptance of our courses toward a degree is determined by the institution where you want to earn the degree. We recommend that students who wish to apply a UC Davis Extension course toward a degree at another institution should verify acceptance of the course with that institution before enrolling.

Do I have to be in a program to take certificate courses?

No, courses are open to the general public as well as certificate program enrollees. Many people take two or three courses before committing to an entire program. Others simply take courses they find interesting without ever intending to earn a certificate.

How long does it take to complete a program?

Most certificate programs take approximately two years to complete if you take one course per quarter. Intensive Certificate Programs are typically completed in 10-12 weeks of full-time study. Customized Certificate Programs may take up to five years to complete.

The Importance of Finishing What You Started

One of the most important things we need to do is see things through to the end.

Life can be hard. Full of responsibilities. We are constantly faced with a never-ending list of things to do, more often than not our days feel like a juggling act, trying to get everything done.

Yet this is no reason for you to not complete those things that are important to you. So often I see people stopping before they get to the end of something. They put in so much time, effort, they work so hard. They're so committed, they believe in what they're doing, but before they've reached the conclusion they suddenly just give up. To me this is criminal.

There can be nothing more satisfying than to complete something we've worked so hard for. It may be building a business, it could be going through 3 years of university or perhaps it's writing a book.

Do you finish what you start? Do you have the inner strength to see through those things you start doing?

Everyone when they set out doing something new begin filled with enthusiasm, excitement, energy and belief. But can you maintain it? Of course you have the best intentions, but is that enough? Life does seem to have a habit of getting in our way. We start with enthusiasm, and lots of energy to keep going but as time goes by our zest starts to wane and it becomes harder to keep moving forward.

But to me once you start something you've got to stick with it no matter what. You've got to finish what you start. Success in what ever it is you do is very much down to self-discipline and perseverance. But there is one element that to me is absolutely key, and that is

Our inner thought process is what is behind our successes and failures, it is responsible for us completing a mission that we set out on or giving up. It's when we start to think: this is so difficult; I can't do it. Or I hate this; it's not fun anymore.

Well cut the crap. No longer allow your negative self talk to stop you in your track and prevent you from finishing what you started. When paralyzed with doubt, remind yourself that you have gone that far in the project and you can complete it if you stick with it.

Trust in your abilities and believe you can get things done. Keep taking action, you'll get it done eventually.

Summary Report for:
15-1151.00 - Computer User Support Specialists

Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or via telephone or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.

Sample of reported job titles: Information Technology Specialist (IT Specialist), Support Specialist, Computer Technician, Computer Support Specialist, Help Desk Analyst, Technical Support Specialist, Network Support Specialist, Electronic Data Processing Auditor (EDP Auditor), Network Technician, Computer Specialist

Tasks

- Oversee the daily performance of computer systems.
- Answer user inquiries regarding computer software or hardware operation to resolve problems.
- Enter commands and observe system functioning to verify correct operations and detect errors.
- Set up equipment for employee use, performing or ensuring proper installation of cables, operating systems, or appropriate software.
- Install and perform minor repairs to hardware, software, or peripheral equipment, following design or installation specifications.
- Maintain records of daily data communication transactions, problems and remedial actions taken, or installation activities.
- Read technical manuals, confer with users, or conduct computer diagnostics to investigate and resolve problems or to provide technical assistance and support.
- Refer major hardware or software problems or defective products to vendors or technicians for service.
- Develop training materials and procedures, or train users in the proper use of hardware or software.
- Confer with staff, users, and management to establish requirements for new systems or modifications.

Tools & Technology

Tools used in this occupation:

Computer tool kits

Hard disk arrays — Redundant array of independent disks RAID systems

Mainframe computers**Network analyzers****Screwdrivers**

Technology used in this occupation:

Backup or archival software — Backup and archival software; Disaster recovery software; Microsoft Volume Shadow Copy Service; Symantec LiveState

Configuration management software — Automated installation software; Deployment software; Patch management software

Data base user interface and query software — Database software; IPro software; Lucid IQ; Software asset management SAM software

Desktop communications software — CrossTec NetOp Remote Control; Remote control software; Stac Software ReachOut; Symantec pcAnywhere

Operating system software — Event log monitor software; Microsoft Windows Pre-installation Environment; Operating system monitoring software

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Skills

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Speaking — Talking to others to convey information effectively.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Time Management — Managing one's own time and the time of others.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Instructing — Teaching others how to do something.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Abilities

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Speech Clarity — The ability to speak clearly so others can understand you.

Speech Recognition — The ability to identify and understand the speech of another person.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Establishing and Maintaining Interpersonal Relationships — Developing constructive and cooperative working relationships with others, and maintaining them over time.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Telephone — How often do you have telephone conversations in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Frequency of Decision Making — How frequently is the worker required to make decisions that affect other people, the financial resources, and/or the image and reputation of the organization?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Job Zone

Title Job Zone Three: Medium Preparation Needed

Education Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.




Related Experience Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.

Job Training Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.

Job Zone Examples These occupations usually involve using communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Examples include food service managers, electricians, agricultural technicians, legal secretaries, interviewers, and insurance sales agents.

SVP Range (6.0 to < 7.0)

Education

Percentage of Respondents	Education Level Required
29 	Bachelor's degree
22 	Some college, no degree
18 	Associate's degree

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Accounting and Computer Science; Computer Hardware Technology/Technician; Computer Software Technology/Technician; Medical Office Computer Specialist/Assistant

Interests

Interest code: **RIC**

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Social — Social occupations frequently involve working with, communicating with, and teaching people. These occupations often involve helping or providing service to others.

Work Styles

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Integrity — Job requires being honest and ethical.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Persistence — Job requires persistence in the face of obstacles.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Achievement/Effort — Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.

Work Values

Relationships — Occupations that satisfy this work value allow employees to provide service to others and work with co-workers in a friendly non-competitive environment. Corresponding needs are Co-workers, Moral Values and Social Service.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest

abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Wages & Employment Trends

National

Median wages (2013) \$22.41 hourly, \$46,620 annual

Employment (2012) 548,000 employees

Projected growth (2012-2022) ■■■ Faster than average (15% to 21%)

Projected job openings (2012-2022) 196,900

Summary Report for: 15-1121.00 - Computer Systems Analysts

Analyze science, engineering, business, and other data processing problems to implement and improve computer systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, workflow, and scheduling limitations. May analyze or recommend commercially available software.

Sample of reported job titles: Systems Analyst, Programmer Analyst, Business Systems Analyst, Computer Systems Analyst, Computer Systems Consultant, Computer Analyst, Information Systems Analyst (ISA), Applications Analyst, Business Analyst, Systems Engineer

Tasks

- Expand or modify system to serve new purposes or improve work flow.
- Test, maintain, and monitor computer programs and systems, including coordinating the installation of computer programs and systems.
- Develop, document and revise system design procedures, test procedures, and quality standards.
- Provide staff and users with assistance solving computer related problems, such as malfunctions and program problems.
- Review and analyze computer printouts and performance indicators to locate code problems, and correct errors by correcting codes.
- Consult with management to ensure agreement on system principles.
- Confer with clients regarding the nature of the information processing or computation needs a computer program is to address.
- Read manuals, periodicals, and technical reports to learn how to develop programs that meet staff and user requirements.
- Coordinate and link the computer systems within an organization to increase compatibility and so information can be shared.
- Determine computer software or hardware needed to set up or alter system.

Tools & Technology

Tools used in this occupation:

Desktop computers

Mainframe computers

Notebook computers

Personal digital assistant PDAs or organizers — Personal digital assistants PDA

Technology used in this occupation:

Configuration management software — HyperSpace software; IBM Rational ClearCase; InstallShield software; Wise Solutions software

Development environment software — Advanced business application programming ABAP; C; IBM Rational Rose XDE Developer; Microsoft Visual Basic

Enterprise application integration software — IBM WebSphere; Oracle Fusion Middleware; SAP Netweaver BW; WebFOCUS software

Object or component oriented development software — C++; Distributed component object model DCOM software; Python; Rapide

Program testing software — Compatibility testing software; Defect tracking software; IBM Rational PurifyPlus; Usability testing software

Web platform development software — Allaire ColdFusion; Hypertext markup language HTML; PHP: Hypertext Preprocessor *; Ruby on Rails *

* Software developed by a government agency and/or distributed as freeware or shareware.

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Speaking — Talking to others to convey information effectively.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Programming — Writing computer programs for various purposes.

Systems Evaluation — Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Abilities

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Fluency of Ideas — The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Speech Clarity — The ability to speak clearly so others can understand you.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and

solve problems.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Evaluating Information to Determine Compliance with Standards — Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Establishing and Maintaining Interpersonal Relationships — Developing constructive and cooperative working relationships with others, and maintaining them over time.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Telephone — How often do you have telephone conversations in this job?

Spend Time Sitting — How much does this job require sitting?

Duration of Typical Work Week — Number of hours typically worked in one week.

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Time Pressure — How often does this job require the worker to meet strict deadlines?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.





Job Training Employees in these occupations usually need several years of work-related experience, on-the-job

training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
41 	Associate's degree
26 	Bachelor's degree
10 	Post-baccalaureate certificate
	

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer and Information Sciences, General; Computer Systems Analysis/Analyst

Interests

Interest code: **ICR**

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Work Styles

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Integrity — Job requires being honest and ethical.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Innovation — Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Persistence — Job requires persistence in the face of obstacles.

Work Values

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Independence — Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

Wages & Employment Trends

National

Median wages (2013) \$39.03 hourly, \$81,190 annual

Employment (2012) 521,000 employees

Projected growth (2012-2022) ■■■■ Much faster than average (22% or higher)

Projected job openings (2012-2022) 209,600

Summary Report for:
15-1142.00 - Network and Computer Systems Administrators

Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Monitor network to ensure network availability to all system users and may perform necessary maintenance to support network availability. May monitor and test Web site performance to ensure Web sites operate correctly and without interruption. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software. May supervise computer user support specialists and computer network support specialists. May administer network security measures.

Sample of reported job titles: Systems Administrator, Network Administrator, Network Engineer, Information Technology Specialist (IT Specialist), Local Area Network Administrator (LAN Administrator), Information Technology Manager (IT Manager), Information Technology Director (IT Director), Systems Engineer, Network Manager, Network Specialist

Tasks

- Maintain and administer computer networks and related computing environments including computer hardware, systems software, applications software, and all configurations.
- Perform data backups and disaster recovery operations.
- Diagnose, troubleshoot, and resolve hardware, software, or other network and system problems, and replace defective components when necessary.
- Plan, coordinate, and implement network security measures to protect data, software, and hardware.
- Configure, monitor, and maintain email applications or virus protection software.
- Operate master consoles to monitor the performance of computer systems and networks, and to coordinate computer network access and use.
- Load computer tapes and disks, and install software and printer paper or forms.
- Design, configure, and test computer hardware, networking software and operating system software.
- Monitor network performance to determine whether adjustments need to be made, and to determine where changes will need to be made in the future.
- Confer with network users about how to solve existing system problems.

Tools & Technology

Tools used in this occupation:

Cable accessories — Cable verifiers

Hard disk arrays — Redundant array of independent disks RAID systems

Network analyzers — Asynchronous transfer mode ATM analyzers; Communications analyzers; Synchronous optical network SONET analyzers; T-Birds

Punches or nail sets or drifts — Punchdown tools

Server load balancer — Load balancers

Technology used in this occupation:

Administration software — Cisco Systems CiscoWorks; Hewlett-Packard HP Network Node Manager; Network management software; SolarWinds software

Configuration management software — Application management software; Automated installation software; Microsoft Windows Sysprep; Patch and update management software

Network monitoring software — Dartware InterMapper; Ethereal; Quest Foglight; Remote monitoring software

Network security or virtual private network VPN management software — Intrusion prevention system IPS software; Network and system vulnerability assessment software; OpenService Open NerveCenter; Security incident management software

Transaction security and virus protection software — Encryption software; Honeypot; Ping Identity software; Root kit detection software

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Systems Evaluation — Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Operation Monitoring — Watching gauges, dials, or other indicators to make sure a machine is working properly.

Programming — Writing computer programs for various purposes.

Abilities

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Speech Recognition — The ability to identify and understand the speech of another person.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Telephone — How often do you have telephone conversations in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Spend Time Sitting — How much does this job require sitting?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
Not available	Bachelor's degree
Not available	Associate's degree
Not available	Post-secondary certificate

Interests

Interest code: **IRC**

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Enterprising — Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

Work Styles

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Integrity — Job requires being honest and ethical.

Self Control — Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Persistence — Job requires persistence in the face of obstacles.

Work Values

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Support — Occupations that satisfy this work value offer supportive management that stands behind employees. Corresponding needs are Company Policies, Supervision: Human Relations and Supervision: Technical.

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Wages & Employment Trends

National

Median wages (2013) \$35.58 hourly, \$74,000 annual

Employment (2012) 366,000 employees

Projected growth (2012-2022) ■■■ Average (8% to 14%)

Projected job openings (2012-2022) 100,500

Summary Report for:
15-1122.00 - Information Security Analysts

Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses.

Sample of reported job titles: Information Technology Specialist, Data Security Administrator, Information Security Analyst, Information Security Officer, Computer Specialist, Information Security Specialist, Information Systems Security Analyst, Computer Security Specialist, Information Security Manager, Information Technology Security Analyst

Tasks

- Encrypt data transmissions and erect firewalls to conceal confidential information as it is being transmitted and to keep out tainted digital transfers.
- Develop plans to safeguard computer files against accidental or unauthorized modification, destruction, or disclosure and to meet emergency data processing needs.
- Review violations of computer security procedures and discuss procedures with violators to ensure violations are not repeated.
- Monitor use of data files and regulate access to safeguard information in computer files.
- Monitor current reports of computer viruses to determine when to update virus protection systems.
- Modify computer security files to incorporate new software, correct errors, or change individual access status.
- Perform risk assessments and execute tests of data processing system to ensure functioning of data processing activities and security measures.
- Confer with users to discuss issues such as computer data access needs, security violations, and programming changes.
- Train users and promote security awareness to ensure system security and to improve server and network efficiency.
- Coordinate implementation of computer system plan with establishment personnel and outside vendors.

Tools & Technology

Tools used in this occupation:

Desktop computers

Mainframe computers

Network analyzers — Local area network LAN analyzers

Notebook computers

Protocol analyzers

Technology used in this occupation:

Authentication server software — Akoura SmartToken; Diameter *; IBM Tivoli Identity Management TIM; Remote authentication dial-in user service RADIUS software

Internet directory services software — Active directory software; Berkeley Internet Domain Name BIND software; Domain name system DNS software; Network directory services software

Network monitoring software — Cisco Systems CiscoWorks; Hewlett-Packard HP OpenView software; Quest BigBrother; Sun Microsystems NetManage

Network security or virtual private network VPN management software — Intrusion prevention system IPS software; Network and system vulnerability assessment software; Network security auditing software; Snort intrusion detection technology

Transaction security and virus protection software — Honeypot; Ping Identity software; Stack smashing protection SSP software; Symantec Norton Antivirus

* Software developed by a government agency and/or distributed as freeware or shareware.

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Speaking — Talking to others to convey information effectively.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Time Management — Managing one's own time and the time of others.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Abilities

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Speech Clarity — The ability to speak clearly so others can understand you.

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Evaluating Information to Determine Compliance with Standards — Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Monitor Processes, Materials, or Surroundings — Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Telephone — How often do you have telephone conversations in this job?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Spend Time Sitting — How much does this job require sitting?

Impact of Decisions on Co-workers or Company Results — How do the decisions an employee makes impact the results of co-workers, clients or the company?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.




Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
65 	Bachelor's degree
19 	Post-baccalaureate certificate ?
10 	Post-secondary certificate ?

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer and Information Sciences, General; Computer and Information Systems Security; Computer Systems Analysis/Analyst; Computer Systems Networking and Telecommunications; Information Science/Studies

Interests

Interest code: **CIR**

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Work Styles

Integrity — Job requires being honest and ethical.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Persistence — Job requires persistence in the face of obstacles.

Self Control — Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Work Values

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Independence — Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

Support — Occupations that satisfy this work value offer supportive management that stands behind employees. Corresponding needs are Company Policies, Supervision: Human Relations and Supervision: Technical.

Related Occupations

Wages & Employment Trends

National

Median wages (2013) \$42.59 hourly, \$88,590 annual

Employment (2012) 75,000 employees

Projected growth (2012-2022) ■■■■ Much faster than average (22% or higher)

Projected job openings (2012-2022) 39,200

Summary Report for:
15-1133.00 - Software Developers, Systems Software

Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software. Apply principles and techniques of computer science, engineering, and mathematical analysis.

Sample of reported job titles: Developer, Infrastructure Engineer, Network Engineer, Publishing Systems Analyst, Senior Software Engineer, Software Architect, Software Developer, Software Engineer, Systems Coordinator, Systems Engineer

Tasks

- Modify existing software to correct errors, to adapt it to new hardware, or to upgrade interfaces and improve performance.
- Develop or direct software system testing or validation procedures.
- Direct software programming and development of documentation.
- Consult with customers or other departments on project status, proposals, or technical issues, such as software system design or maintenance.
- Analyze information to determine, recommend, and plan installation of a new system or modification of an existing system.
- Consult with engineering staff to evaluate interface between hardware and software, develop specifications and performance requirements, or resolve customer problems.
- Design or develop software systems, using scientific analysis and mathematical models to predict and measure outcome and consequences of design.
- Prepare reports or correspondence concerning project specifications, activities, or status.
- Confer with data processing or project managers to obtain information on limitations or capabilities for data processing projects.
- Store, retrieve, and manipulate data for analysis of system capabilities and requirements.

Tools & Technology

Tools used in this occupation:

Central processing unit CPU processors — Graphics processing unit GPU; Multi-core central processing unit CPU

Computer servers — Application servers

High end computer servers — Directory servers

Integrated circuit testers — In circuit emulators ICE; Logic analyzers

Mainframe computers

Technology used in this occupation:

Data base management system software — Computer Associates integrated data management system CA-IDMS; Distributed database management software; Microsoft SQL Server; MySQL software

Development environment software — C; Embedded systems development software; IBM Rational Rose XDE Developer D93; Microsoft Visual Basic

Object or component oriented development software — C++; Document Object Model DOM Scripting; Python; Simple API for XML SAX

Operating system software — Microsoft Windows; UNIX; VxWorks software; Win CE

Program testing software — Defect tracking software; Fault testing software; IBM Rational PurifyPlus; Unit testing software

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Skills

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Speaking — Talking to others to convey information effectively.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Mathematics — Using mathematics to solve problems.

Social Perceptiveness — Being aware of others' reactions and understanding why they react as they do.

Coordination — Adjusting actions in relation to others' actions.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Abilities

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Speech Recognition — The ability to identify and understand the speech of another person.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Spend Time Sitting — How much does this job require sitting?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Duration of Typical Work Week — Number of hours typically worked in one week.

Telephone — How often do you have telephone conversations in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
77	Bachelor's degree
17	Master's degree
4	Associate's degree

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer and Information Sciences, General; Computer Engineering, General; Computer Science; Information Science/Studies

Engineering — Computer Engineering Technologies/Technicians, Other; Computer Engineering, General

Interests

Interest code: **ICR**

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Work Styles

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Innovation — Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.

Independence — Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

Persistence — Job requires persistence in the face of obstacles.

Integrity — Job requires being honest and ethical.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Work Values

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Recognition — Occupations that satisfy this work value offer advancement, potential for leadership, and are often considered prestigious. Corresponding needs are Advancement, Authority, Recognition and Social Status.

Wages & Employment Trends

National

Median wages (2013) \$48.75 hourly, \$101,410 annual

Employment (2012) 405,000 employees

Projected growth (2012-2022) ■■■ Faster than average (15% to 21%)

Projected job openings (2012-2022) 134,700



Summary Report for: 15-1199.09 - Information Technology Project Managers

Plan, initiate, and manage information technology (IT) projects. Lead and guide the work of technical staff. Serve as liaison between business and technical aspects of projects. Plan project stages and assess business implications for each stage. Monitor progress to assure deadlines, standards, and cost targets are met.

Sample of reported job titles: IT Manager, IT Project Manager, Manager of IT, Program Manager, Project Manager, Project Manager/Team Coach, Senior Lead Project Manager, Senior Project Leader/Team Lead, Technical Project Lead (Project Manager), Transition Program Manager

Tasks

- Manage project execution to ensure adherence to budget, schedule, and scope.
- Develop or update project plans for information technology projects including information such as project objectives, technologies, systems, information specifications, schedules, funding, and staffing.
- Monitor or track project milestones and deliverables.
- Confer with project personnel to identify and resolve problems.
- Develop and manage work breakdown structure (WBS) of information technology projects.
- Submit project deliverables, ensuring adherence to quality standards.
- Prepare project status reports by collecting, analyzing, and summarizing information and trends.
- Direct or coordinate activities of project personnel.
- Establish and execute a project communication plan.
- Assign duties, responsibilities, and spans of authority to project personnel.

Tools & Technology

Tools used in this occupation:

Computer servers — Application servers; Web servers

High capacity removable media drives — Universal serial bus USB flash drives

Mobile phones — Smartphones

Notebook computers — Laptop computers

Special purpose telephones — Multi-line telephone systems

Technology used in this occupation:

Data base user interface and query software — IBM DB2; Microsoft Access; QSM SLIM Suite; Xplanner *

Development environment software — Common business oriented language COBOL; CruiseControl *; SmartBear Software Automated Build Studio; Tigris Cabie *

Enterprise resource planning ERP software — Clarity Systems IBM Clarity; Collaborative application lifecycle management ALM software; Project.net *; Vitria M3O Operational Intelligence

Pattern design software — MatchWare MindView; Mind mapping software; MPI Micro Planner X-Pert; NovaMind Merlin Project Manager

Project management software — Atlassian JIRA; Microsoft Project; Wrike; Zoho Projects

* Software developed by a government agency and/or distributed as freeware or shareware.

Knowledge

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Coordination — Adjusting actions in relation to others' actions.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Speaking — Talking to others to convey information effectively.

Time Management — Managing one's own time and the time of others.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Management of Personnel Resources — Motivating, developing, and directing people as they work, identifying the best people for the job.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Abilities

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Speech Recognition — The ability to identify and understand the speech of another person.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Speech Clarity — The ability to speak clearly so others can understand you.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Work Activities

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Scheduling Work and Activities — Scheduling events, programs, and activities, as well as the work of others.

Coordinating the Work and Activities of Others — Getting members of a group to work together to accomplish tasks.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and

solve problems.

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Developing and Building Teams — Encouraging and building mutual trust, respect, and cooperation among team members.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Telephone — How often do you have telephone conversations in this job?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Duration of Typical Work Week — Number of hours typically worked in one week.

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Coordinate or Lead Others — How important is it to coordinate or lead others in accomplishing work activities in this job?

Spend Time Sitting — How much does this job require sitting?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.





Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
84 	Bachelor's degree
10 	Post-baccalaureate certificate 
6 	Master's degree

Interests

Interest code: EC

Enterprising — Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Work Styles

Leadership — Job requires a willingness to lead, take charge, and offer opinions and direction.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Persistence — Job requires persistence in the face of obstacles.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Integrity — Job requires being honest and ethical.

Achievement/Effort — Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Work Values

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Independence — Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Wages & Employment Trends

National

Median wages data collected from **Computer Occupations, All Other**.

Employment data collected from **Computer Occupations, All Other**.

Industry data collected from **Computer Occupations, All Other**.

Median wages (2013) \$39.59 hourly, \$82,340 annual

Employment (2012) 206,000 employees

Projected growth (2012-2022) ■■■ Slower than average (3% to 7%)

Projected job openings (2012-2022) 40,200

Summary Report for:

11-3021.00 - Computer and Information Systems Managers

Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming.

Sample of reported job titles: Information Technology Manager (IT Manager), Information Technology Director (IT Director), Information Systems Director (IS Director), Data Processing Manager, MIS Director (Management Information Systems Director), Information Systems Manager (IS Manager), Information Systems Supervisor (IS Supervisor), Computing Services Director, Director of Application Development, Technical Services Manager

Tasks

- Review project plans to plan and coordinate project activity.
- Manage backup, security and user help systems.

- Develop and interpret organizational goals, policies, and procedures.
- Develop computer information resources, providing for data security and control, strategic computing, and disaster recovery.
- Consult with users, management, vendors, and technicians to assess computing needs and system requirements.
- Stay abreast of advances in technology.
- Meet with department heads, managers, supervisors, vendors, and others, to solicit cooperation and resolve problems.
- Provide users with technical support for computer problems.
- Recruit, hire, train and supervise staff, or participate in staffing decisions.
- Evaluate data processing proposals to assess project feasibility and requirements.

Tools & Technology

Tools used in this occupation:

Computer servers — File servers; Mid-range computers; Netware servers; Web servers

High end computer servers — Workstations

Network interface cards — Network interface cards NIC

Punches or nail sets or drifts — Punchdown tools

Teleconference equipment — Teleconferencing equipment

Technology used in this occupation:

Customer relationship management CRM software — Microsoft Business Contact Manager; Microsoft Dynamics CRM; Oracle Siebel Server Sync; Performance Solutions Technology ManagePro

Development environment software — C; K2 Business Process Automation; Microsoft Visual Basic; Progress OpenEdge ABL

Enterprise resource planning ERP software — Infor ERP Baan; Microsoft Dynamics AX; Microsoft Dynamics NAV; Oracle E-Business Suite

Object or component oriented development software — Borland Paradox; C++; Microsoft SQL Server Reporting Services SSRS; Practical extraction and reporting language Perl

Web platform development software — Hypertext markup language HTML; JavaScript; Progress WebSpeed Workshop; Ruby on Rails *

* Software developed by a government agency and/or distributed as freeware or shareware.

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Production and Processing — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Personnel and Human Resources — Knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.

Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.

Skills

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Coordination — Adjusting actions in relation to others' actions.

Speaking — Talking to others to convey information effectively.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Social Perceptiveness — Being aware of others' reactions and understanding why they react as they do.

Abilities

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Speech Clarity — The ability to speak clearly so others can understand you.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Establishing and Maintaining Interpersonal Relationships — Developing constructive and cooperative working relationships with others, and maintaining them over time.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Developing and Building Teams — Encouraging and building mutual trust, respect, and cooperation among team members.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Evaluating Information to Determine Compliance with Standards — Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

Guiding, Directing, and Motivating Subordinates — Providing guidance and direction to subordinates, including setting performance standards and monitoring performance.

Interpreting the Meaning of Information for Others — Translating or explaining what information means and how it can be used.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Telephone — How often do you have telephone conversations in this job?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Spend Time Sitting — How much does this job require sitting?

Impact of Decisions on Co-workers or Company Results — How do the decisions an employee makes impact the results of co-workers, clients or the company?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

There are 2 recognized apprenticeable specialties associated with this occupation:

IT Project Manager; IT Project Manager

Education

Percentage of Respondents	Education Level Required
Not available	Bachelor's degree
Not available	Master's degree
Not available	Some college, no degree

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer and Information Sciences, General; Computer Science; Information Science/Studies; Management Information Systems, General

Interests

Interest code: **ECl**

Enterprising — Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Work Styles

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Integrity — Job requires being honest and ethical.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Independence — Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

Leadership — Job requires a willingness to lead, take charge, and offer opinions and direction.

Concern for Others — Job requires being sensitive to others' needs and feelings and being understanding and helpful on the job.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Work Values

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Support — Occupations that satisfy this work value offer supportive management that stands behind employees. Corresponding needs are Company Policies, Supervision: Human Relations and Supervision: Technical.

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Wages & Employment Trends

National

Median wages (2013) \$59.59 hourly, \$123,950 annual

Employment (2012) 333,000 employees

Projected growth (2012-2022) ■■■ Faster than average (15% to 21%)

Projected job openings (2012-2022) 97,100

Summary Report for:
15-1141.00 - Database Administrators

Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. May plan, coordinate, and implement security measures to safeguard computer databases.

Sample of reported job titles: Database Administrator (DBA), Database Analyst, Database Administration Manager, Database Coordinator, Database Programmer, Information Systems Manager, Management Information Systems Director (MIS Director), Programmer Analyst, Systems Manager

Tasks

- Test programs or databases, correct errors and make necessary modifications.
- Modify existing databases and database management systems or direct programmers and analysts to make changes.
- Plan, coordinate and implement security measures to safeguard information in computer files against accidental or unauthorized damage, modification or disclosure.
- Work as part of a project team to coordinate database development and determine project scope and limitations.
- Write and code logical and physical database descriptions and specify identifiers of database to management system or direct others in coding descriptions.
- Train users and answer questions.
- Specify users and user access levels for each segment of database.
- Approve, schedule, plan, and supervise the installation and testing of new products and improvements to computer systems such as the installation of new databases.
- Review project requests describing database user needs to estimate time and cost required to accomplish project.
- Develop standards and guidelines to guide the use and acquisition of software and to protect vulnerable information.

Tools & Technology

Tools used in this occupation:

Hard disk arrays — Redundant array of independent disks RAID systems

Hard disk drives

Mainframe computers

Notebook computers

Tape arrays — Tape libraries

Technology used in this occupation:

Backup or archival software — Acronis Recovery Expert; BMC Software Control-M software; Legato NetWorker; Oracle Data Guard

Data base management system software — Microsoft SQL Server; MySQL software; Quest Central; Sybase Replication Server

Metadata management software — Data mapping software; Data modeling software; IBM Rational Data Architect; Visual Paradigm DB Visual ARCHITECT

Object or component oriented development software — C++; Microsoft Visual C# .NET; Practical extraction and reporting language Perl; Sybase PowerBuilder

Operating system software — DOS shell script; Microsoft Windows; Shell script; UNIX

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Clerical — Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.

Skills

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Operations Analysis — Analyzing needs and product requirements to create a design.

Speaking — Talking to others to convey information effectively.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Abilities

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the

problem, only recognizing there is a problem.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Near Vision — The ability to see details at close range (within a few feet of the observer).

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Speech Clarity — The ability to speak clearly so others can understand you.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Provide Consultation and Advice to Others — Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Telephone — How often do you have telephone conversations in this job?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled

conditions?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Spend Time Sitting — How much does this job require sitting?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

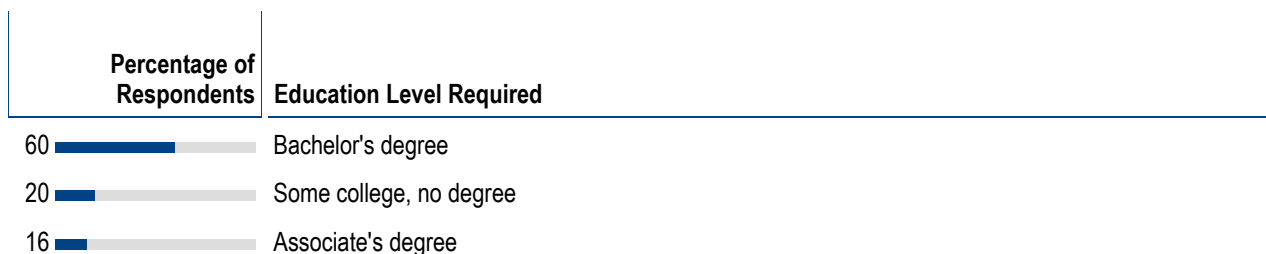
Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education



This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer and Information Sciences, General; Computer and Information Systems Security; Computer Systems Analysis/Analyst; Management Information Systems, General

Interests

Interest code: **CI**

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Work Styles

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Integrity — Job requires being honest and ethical.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Persistence — Job requires persistence in the face of obstacles.

Innovation — Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.

Achievement/Effort — Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.

Work Values

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Support — Occupations that satisfy this work value offer supportive management that stands behind employees. Corresponding needs are Company Policies, Supervision: Human Relations and Supervision: Technical.

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Wages & Employment Trends

National

Median wages (2013) \$37.75 hourly, \$78,520 annual

Employment (2012) 119,000 employees

Projected growth (2012-2022) ■■■ Faster than average (15% to 21%)

Projected job openings (2012-2022) 40,300

Summary Report for:
15-1142.00 - Network and Computer Systems Administrators

Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Monitor network to ensure network availability to all system users and may perform necessary maintenance to support network availability. May monitor and test Web site performance to ensure Web sites operate correctly and without interruption. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software. May supervise computer user support specialists and computer network support specialists. May administer network security measures.

Sample of reported job titles: Systems Administrator, Network Administrator, Network Engineer, Information Technology Specialist (IT Specialist), Local Area Network Administrator (LAN Administrator), Information Technology Manager (IT Manager), Information Technology Director (IT Director), Systems Engineer, Network Manager, Network Specialist

Tasks

- Maintain and administer computer networks and related computing environments including computer hardware, systems software, applications software, and all configurations.
- Perform data backups and disaster recovery operations.
- Diagnose, troubleshoot, and resolve hardware, software, or other network and system problems, and replace defective components when necessary.
- Plan, coordinate, and implement network security measures to protect data, software, and hardware.
- Configure, monitor, and maintain email applications or virus protection software.
- Operate master consoles to monitor the performance of computer systems and networks, and to coordinate computer network access and use.
- Load computer tapes and disks, and install software and printer paper or forms.
- Design, configure, and test computer hardware, networking software and operating system software.

- Monitor network performance to determine whether adjustments need to be made, and to determine where changes will need to be made in the future.
- Confer with network users about how to solve existing system problems.

Tools & Technology

Tools used in this occupation:

Cable accessories — Cable verifiers

Hard disk arrays — Redundant array of independent disks RAID systems

Network analyzers — Asynchronous transfer mode ATM analyzers; Communications analyzers; Synchronous optical network SONET analyzers; T-Birds

Punches or nail sets or drifts — Punchdown tools

Server load balancer — Load balancers

Technology used in this occupation:

Administration software — Cisco Systems CiscoWorks; Hewlett-Packard HP Network Node Manager; Network management software; SolarWinds software

Configuration management software — Application management software; Automated installation software; Microsoft Windows Sysprep; Patch and update management software

Network monitoring software — Dartware InterMapper; Ethereal; Quest Foglight; Remote monitoring software

Network security or virtual private network VPN management software — Intrusion prevention system IPS software; Network and system vulnerability assessment software; OpenService Open NerveCenter; Security incident management software

Transaction security and virus protection software — Encryption software; Honeypot; Ping Identity software; Root kit detection software

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or

approaches to problems.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Systems Evaluation — Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Operation Monitoring — Watching gauges, dials, or other indicators to make sure a machine is working properly.

Programming — Writing computer programs for various purposes.

Abilities

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Speech Recognition — The ability to identify and understand the speech of another person.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Telephone — How often do you have telephone conversations in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Spend Time Sitting — How much does this job require sitting?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.


Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

There are 2 recognized apprenticeable specialties associated with this occupation:
Network Support Technician; Information Technology Specialist

Education

Percentage of Respondents	Education Level Required
Not available	Bachelor's degree
Not available	Associate's degree
Not available	Post-secondary certificate
	

Interests

Interest code: **IRC**

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Enterprising — Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

Work Styles

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Integrity — Job requires being honest and ethical.

Self Control — Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Persistence — Job requires persistence in the face of obstacles.

Work Values

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Support — Occupations that satisfy this work value offer supportive management that stands behind employees. Corresponding needs are Company Policies, Supervision: Human Relations and Supervision: Technical.

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Wages & Employment Trends

National

Median wages (2013) \$35.58 hourly, \$74,000 annual

Employment (2012) 366,000 employees

Projected growth (2012-2022) ■■■ Average (8% to 14%)

Projected job openings (2012-2022) 100,500

Summary Report for:
15-1134.00 - Web Developers

Design, create, and modify Web sites. Analyze user needs to implement Web site content, graphics, performance, and capacity. May integrate Web sites with other computer applications. May convert written, graphic, audio, and video components to compatible Web formats by using software designed to facilitate the creation of Web and multimedia content.

Sample of reported job titles: Webmaster, Web Designer, Web Developer

Tasks

- Design, build, or maintain web sites, using authoring or scripting languages, content creation tools, management tools, and digital media.
- Perform or direct web site updates.
- Write, design, or edit web page content, or direct others producing content.
- Confer with management or development teams to prioritize needs, resolve conflicts, develop content criteria, or choose solutions.
- Back up files from web sites to local directories for instant recovery in case of problems.
- Identify problems uncovered by testing or customer feedback, and correct problems or refer problems to appropriate personnel for correction.
- Evaluate code to ensure that it is valid, is properly structured, meets industry standards and is compatible with browsers, devices, or operating systems.
- Maintain understanding of current web technologies or programming practices through continuing education, reading, or participation in professional conferences, workshops, or groups.
- Analyze user needs to determine technical requirements.
- Develop or validate test routines and schedules to ensure that test cases mimic external interfaces and address all browser and device types.

Tools & Technology

Tools used in this occupation:

Computer servers — Application servers; Web servers

Desktop computers

High capacity removable media drives — Universal serial bus USB flash drives

Notebook computers — Laptop computers

Personal computers

Technology used in this occupation:

Application server software — JBoss Application Server; Oracle Application Server

Development environment software — Android *; C; Microsoft Visual Basic; Subversion *

Graphics or photo imaging software — Adobe Systems Adobe After Effects; Adobe Systems Adobe Fireworks; Adobe

Systems Adobe Illustrator; Adobe Systems Adobe Photoshop software

Object or component oriented development software — Apple Cocoa; C++; Microsoft ActiveX; Python

Web platform development software — Hypertext markup language HTML; JavaScript; Microsoft Commerce Server; Ruby on Rails *

* Software developed by a government agency and/or distributed as freeware or shareware.

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Skills

Programming — Writing computer programs for various purposes.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Operations Analysis — Analyzing needs and product requirements to create a design.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Speaking — Talking to others to convey information effectively.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Abilities

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Speech Recognition — The ability to identify and understand the speech of another person.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Selective Attention — The ability to concentrate on a task over a period of time without being distracted.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Work Context

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Electronic Mail — How often do you use electronic mail in this job?

Spend Time Sitting — How much does this job require sitting?

Telephone — How often do you have telephone conversations in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Spend Time Making Repetitive Motions — How much does this job require making repetitive motions?

Importance of Repeating Same Tasks — How important is repeating the same physical activities (e.g., key entry) or mental activities (e.g., checking entries in a ledger) over and over, without stopping, to performing this job?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Job Zone

Title Job Zone Three: Medium Preparation Needed

Education Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree.

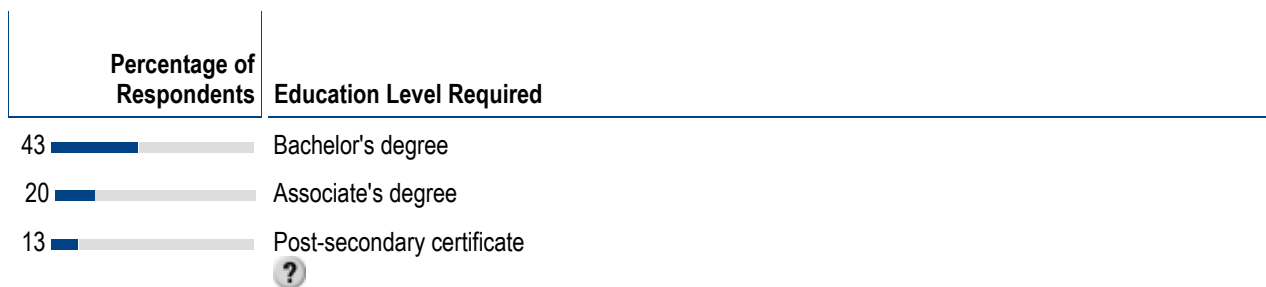
Related Experience Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.

Job Training Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.

Job Zone Examples These occupations usually involve using communication and organizational skills to coordinate, supervise, manage, or train others to accomplish goals. Examples include food service managers, electricians, agricultural technicians, legal secretaries, interviewers, and insurance sales agents.

SVP Range (6.0 to < 7.0)

Education



Interests

Interest code: **CIR**

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Artistic — Artistic occupations frequently involve working with forms, designs and patterns. They often require self-expression and the work can be done without following a clear set of rules.

Work Styles

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Integrity — Job requires being honest and ethical.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Achievement/Effort — Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Innovation — Job requires creativity and alternative thinking to develop new ideas for and answers to work-related problems.

Work Values

Independence — Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Wages & Employment Trends

National

Median wages (2013) \$30.37 hourly, \$63,160 annual

Employment (2012) 141,000 employees

Projected growth (2012-2022) ■■■ Faster than average (15% to 21%)

Projected job openings (2012-2022) 50,700



Summary Report for:
15-1199.08 - Business Intelligence Analysts

Produce financial and market intelligence by querying data repositories and generating periodic reports. Devise methods for identifying data patterns and trends in available information sources.

Sample of reported job titles: Business Intelligence Analyst; Business Intelligence Manager; Commercial Intelligence Manager; Competitive Intelligence Analyst; Consultant, Strategic Business and Technology Intelligence; Director of Enterprise Strategy; Director of Market Intelligence; Director, Global Intelligence; Intelligence Analyst; Manager, Market Intelligence

Tasks

- Analyze competitive market strategies through analysis of related product, market, or share trends.
- Synthesize current business intelligence or trend data to support recommendations for action.
- Communicate with customers, competitors, suppliers, professional organizations, or others to stay abreast of industry or business trends.
- Manage timely flow of business intelligence information to users.
- Collect business intelligence data from available industry reports, public information, field reports, or purchased sources.
- Identify and analyze industry or geographic trends with business strategy implications.
- Analyze technology trends to identify markets for future product development or to improve sales of existing products.
- Generate standard or custom reports summarizing business, financial, or economic data for review by executives, managers, clients, and other stakeholders.
- Identify or monitor current and potential customers, using business intelligence tools.
- Maintain or update business intelligence tools, databases, dashboards, systems, or methods.

Tools & Technology

Tools used in this occupation:

Computer servers — Storage servers

High end computer servers — Data warehouse appliances

Laser fax machine — Laser facsimile machines

Photocopiers

Scanners

Technology used in this occupation:

Analytical or scientific software — Rogue Wave Software IMSL Numerical Libraries; SAS software; Statistical analysis software

Data base management system software — Microsoft SQL Server; Oracle procedural language/structured query language PL/SQL; Oracle software; Relational database software

Data base reporting software — Panorama NovaView; SAP BusinessObjects Crystal Reports; SAP BusinessObjects software; SiSense Prism

Data base user interface and query software — IBM DB2; Microsoft Access; Oracle Essbase; Transact-SQL

Data mining software — Data warehouse software; Informatica Data Explorer; SAP Netweaver Business Warehouse

Knowledge

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.

Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Speaking — Talking to others to convey information effectively.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Time Management — Managing one's own time and the time of others.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Abilities

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Speech Clarity — The ability to speak clearly so others can understand you.

Speech Recognition — The ability to identify and understand the speech of another person.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Work Activities

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Establishing and Maintaining Interpersonal Relationships — Developing constructive and cooperative working relationships with others, and maintaining them over time.

Interpreting the Meaning of Information for Others — Translating or explaining what information means and how it can be used.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Spend Time Sitting — How much does this job require sitting?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Duration of Typical Work Week — Number of hours typically worked in one week.

Telephone — How often do you have telephone conversations in this job?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.




Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
58 	Bachelor's degree
33 	Master's degree
4 	Some college, no degree

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer Programming, Specific Applications

Interests

Interest code: **IEC**

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Enterprising — Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Work Styles

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Integrity — Job requires being honest and ethical.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Persistence — Job requires persistence in the face of obstacles.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Independence — Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

Leadership — Job requires a willingness to lead, take charge, and offer opinions and direction.

Work Values

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Recognition — Occupations that satisfy this work value offer advancement, potential for leadership, and are often considered prestigious. Corresponding needs are Advancement, Authority, Recognition and Social Status.

Wages & Employment Trends

National

Median wages data collected from **Computer Occupations, All Other**.

Employment data collected from **Computer Occupations, All Other**.

Industry data collected from **Computer Occupations, All Other**.

Median wages (2013) \$39.59 hourly, \$82,340 annual

Employment (2012) 206,000 employees

Projected growth (2012-2022) ■■■■ Slower than average (3% to 7%)

Projected job openings (2012-2022) 40,200

Summary Report for: 15-1143.00 - Computer Network Architects

Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning. May also design network and computer security measures. May research and recommend network and data communications hardware and software.

Tasks

- Adjust network sizes to meet volume or capacity demands.
- Communicate with customers, sales staff, or marketing staff to determine customer needs.
- Communicate with system users to ensure accounts are set up properly or to diagnose and solve operational problems.
- Coordinate installation of new equipment.
- Coordinate network operations, maintenance, repairs, or upgrades.
- Coordinate network or design activities with designers of associated networks.

- Design, build, or operate equipment configuration prototypes, including network hardware, software, servers, or server operation systems.
- Design, organize, and deliver product awareness, skills transfer, or product education sessions for staff or suppliers.
- Determine specific network hardware or software requirements, such as platforms, interfaces, bandwidths, or routine schemas.
- Develop and implement solutions for network problems.

Tools & Technology

Tools used in this occupation:

Computer servers — Domain name servers DNS; File servers; Mail transport servers; Network-attached storage NAS equipment

Network analyzers — Asynchronous transfer mode ATM analyzers; Network connectivity testers; Synchronous optical network SONET analyzers; Wide area network WAN analyzers

Network channel or data service units — Channel banks; Network channel service units CSU or data service units DSU

Network switches — Computer network switches; Local area network LAN switches; Voice switches; Wide area network WAN switches

Server load balancer — Load balancers; Network server load balancers

Technology used in this occupation:

Administration software — Element management software; Netreo OmniCenter; Riverbed Technology software; SolarWinds software

Network monitoring software — Ethereal; Ipswitch WhatsUp Gold; Packet analysis software; Symantec Intruder Alert

Network operating system enhancement software — Cisco Systems CiscoWorks LAN Management Solution; Network, server and operating system optimization software; Silver Peak software; Wide area network WAN optimization software

Network security or virtual private network VPN management software — Intrusion prevention system IPS software; Network and system vulnerability assessment software; Virtual private network VPN software; Websense Data Loss Prevention

Switch or router software — Border Gateway Protocol BGP; Cisco Systems Cisco Web Cache Communication Protocol WCCP; Transparent Interconnection of Lots of Links TRILL; Virtual Router Redundancy Protocol VRRP

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Skills

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Operations Analysis — Analyzing needs and product requirements to create a design.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Speaking — Talking to others to convey information effectively.

Systems Evaluation — Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Abilities

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Speech Clarity — The ability to speak clearly so others can understand you.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Fluency of Ideas — The ability to come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).

Speech Recognition — The ability to identify and understand the speech of another person.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Thinking Creatively — Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions.

Organizing, Planning, and Prioritizing Work — Developing specific goals and plans to prioritize, organize, and accomplish your work.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Telephone — How often do you have telephone conversations in this job?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Structured versus Unstructured Work — To what extent is this job structured for the worker, rather than allowing the worker to determine tasks, priorities, and goals?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Spend Time Sitting — How much does this job require sitting?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer and Information Sciences, General; Computer and Information Systems Security; Computer Systems Analysis/Analyst; Computer Systems Networking and Telecommunications

Interests

Interest code: **ICE**

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Enterprising — Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Work Styles

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Integrity — Job requires being honest and ethical.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Persistence — Job requires persistence in the face of obstacles.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Independence — Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

Work Values

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Independence — Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

Wages & Employment Trends

National

Median wages (2013) \$45.85 hourly, \$95,380 annual

Employment (2012) 143,000 employees

Projected growth (2012-2022) ■■■ Faster than average (15% to 21%)

Projected job openings (2012-2022) 43,500

Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses.

Sample of reported job titles: Information Technology Specialist, Data Security Administrator, Information Security Analyst, Information Security Officer, Computer Specialist, Information Security Specialist, Information Systems Security Analyst, Computer Security Specialist, Information Security Manager, Information Technology Security Analyst

Tasks

- Encrypt data transmissions and erect firewalls to conceal confidential information as it is being transmitted and to keep out tainted digital transfers.
- Develop plans to safeguard computer files against accidental or unauthorized modification, destruction, or disclosure and to meet emergency data processing needs.
- Review violations of computer security procedures and discuss procedures with violators to ensure violations are not repeated.
- Monitor use of data files and regulate access to safeguard information in computer files.
- Monitor current reports of computer viruses to determine when to update virus protection systems.
- Modify computer security files to incorporate new software, correct errors, or change individual access status.
- Perform risk assessments and execute tests of data processing system to ensure functioning of data processing activities and security measures.
- Confer with users to discuss issues such as computer data access needs, security violations, and programming changes.
- Train users and promote security awareness to ensure system security and to improve server and network efficiency.
- Coordinate implementation of computer system plan with establishment personnel and outside vendors.

Tools & Technology

Tools used in this occupation:

Desktop computers

Mainframe computers

Network analyzers — Local area network LAN analyzers

Notebook computers

Protocol analyzers

Technology used in this occupation:

Authentication server software — Akoura SmartToken; Diameter *; IBM Tivoli Identity Management TIM; Remote authentication dial-in user service RADIUS software

Internet directory services software — Active directory software; Berkeley Internet Domain Name BIND software; Domain name system DNS software; Network directory services software

Network monitoring software — Cisco Systems CiscoWorks; Hewlett-Packard HP OpenView software; Quest BigBrother; Sun

Microsystems NetManage

Network security or virtual private network VPN management software — Intrusion prevention system IPS software; Network and system vulnerability assessment software; Network security auditing software; Snort intrusion detection technology

Transaction security and virus protection software — Honeypot; Ping Identity software; Stack smashing protection SSP software; Symantec Norton Antivirus

* Software developed by a government agency and/or distributed as freeware or shareware.

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Telecommunications — Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Education and Training — Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Public Safety and Security — Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Customer and Personal Service — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Speaking — Talking to others to convey information effectively.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most

appropriate one.

Time Management — Managing one's own time and the time of others.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Abilities

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Speech Clarity — The ability to speak clearly so others can understand you.

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Evaluating Information to Determine Compliance with Standards — Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Monitor Processes, Materials, or Surroundings — Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Telephone — How often do you have telephone conversations in this job?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Spend Time Sitting — How much does this job require sitting?

Impact of Decisions on Co-workers or Company Results — How do the decisions an employee makes impact the results of co-workers, clients or the company?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.



SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
65	Bachelor's degree

65  Bachelor's degree

19  Post-baccalaureate certificate


10  Post-secondary certificate


This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer and Information Sciences, General; Computer and Information Systems Security; Computer Systems Analysis/Analyst; Computer Systems Networking and Telecommunications; Information Science/Studies

Interests

Interest code: **CIR**

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Work Styles

Integrity — Job requires being honest and ethical.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Persistence — Job requires persistence in the face of obstacles.

Self Control — Job requires maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Work Values

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Independence — Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

Support — Occupations that satisfy this work value offer supportive management that stands behind employees. Corresponding needs are Company Policies, Supervision: Human Relations and Supervision: Technical.

Wages & Employment Trends

National

Median wages (2013) \$42.59 hourly, \$88,590 annual

Employment (2012) 75,000 employees

Projected growth (2012-2022) ■■■■ Much faster than average (22% or higher)

Projected job openings (2012-2022) 39,200

Summary Report for:
15-1199.01 - Software Quality Assurance Engineers and Testers

Develop and execute software test plans in order to identify software problems and their causes.

Sample of reported job titles: Quality Assurance Analyst (QA Analyst), Quality Assurance Director (QA Director), Software Quality Assurance Engineer (SQA Engineer), Software Quality Engineer, Product Assurance Engineer, Software Test Engineer

Tasks

- Design test plans, scenarios, scripts, or procedures.
- Test system modifications to prepare for implementation.
- Develop testing programs that address areas such as database impacts, software scenarios, regression testing, negative testing, error or bug retests, or usability.
- Document software defects, using a bug tracking system, and report defects to software developers.
- Identify, analyze, and document problems with program function, output, online screen, or content.
- Monitor bug resolution efforts and track successes.
- Create or maintain databases of known test defects.
- Plan test schedules or strategies in accordance with project scope or delivery dates.
- Participate in product design reviews to provide input on functional requirements, product designs, schedules, or potential problems.
- Review software documentation to ensure technical accuracy, compliance, or completeness, or to mitigate risks.

Tools & Technology

Tools used in this occupation:

Computer servers — Application servers

Desktop computers

Integrated circuit testers — In circuit emulators ICE; Logic analyzers

Mainframe computers — Mainframe operating systems; Supercomputers

Notebook computers — Laptop computers

Technology used in this occupation:

Development environment software — Apache Ant; C; JetBrains IntelliJ IDEA; Microsoft Visual Basic

Object or component oriented development software — Acresto InstallAnywhere; Apple Cocoa; C++; Practical extraction and reporting language Perl

Operating system software — Microsoft Windows; UNIX; VMWare Workstation; Wind River Systems VxWorks

Program testing software — JUnit; TestNG; Watir *_; YourKit Java Profiler

Web platform development software — Apache Tomcat; JavaScript; Microsoft ASP.NET; Ruby on Rails *

Knowledge

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Engineering and Technology — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Speaking — Talking to others to convey information effectively.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Monitoring — Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

Programming — Writing computer programs for various purposes.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Quality Control Analysis — Conducting tests and inspections of products, services, or processes to evaluate quality or performance.

Systems Evaluation — Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Abilities

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Near Vision — The ability to see details at close range (within a few feet of the observer).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Speech Recognition — The ability to identify and understand the speech of another person.

Work Activities

Interacting With Computers — Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Processing Information — Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data.

Documenting/Recording Information — Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Evaluating Information to Determine Compliance with Standards — Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.

Identifying Objects, Actions, and Events — Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

Making Decisions and Solving Problems — Analyzing information and evaluating results to choose the best solution and solve problems.

Establishing and Maintaining Interpersonal Relationships — Developing constructive and cooperative working relationships with others, and maintaining them over time.

Work Context

Electronic Mail — How often do you use electronic mail in this job?

Face-to-Face Discussions — How often do you have to have face-to-face discussions with individuals or teams in this job?

Indoors, Environmentally Controlled — How often does this job require working indoors in environmentally controlled conditions?

Telephone — How often do you have telephone conversations in this job?

Spend Time Sitting — How much does this job require sitting?

Work With Work Group or Team — How important is it to work with others in a group or team in this job?

Contact With Others — How much does this job require the worker to be in contact with others (face-to-face, by telephone, or otherwise) in order to perform it?

Freedom to Make Decisions — How much decision making freedom, without supervision, does the job offer?

Importance of Being Exact or Accurate — How important is being very exact or highly accurate in performing this job?

Importance of Repeating Same Tasks — How important is repeating the same physical activities (e.g., key entry) or mental activities (e.g., checking entries in a ledger) over and over, without stopping, to performing this job?

Job Zone

Title Job Zone Four: Considerable Preparation Needed

Education Most of these occupations require a four-year bachelor's degree, but some do not.




Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education

Percentage of Respondents	Education Level Required
64 	Bachelor's degree
14 	Associate's degree
9 	Master's degree

Interests

Interest code: **ICR**

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

Work Styles

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Integrity — Job requires being honest and ethical.

Adaptability/Flexibility — Job requires being open to change (positive or negative) and to considerable variety in the workplace.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Persistence — Job requires persistence in the face of obstacles.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Stress Tolerance — Job requires accepting criticism and dealing calmly and effectively with high stress situations.

Achievement/Effort — Job requires establishing and maintaining personally challenging achievement goals and exerting effort toward mastering tasks.

Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Work Values

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

Independence — Occupations that satisfy this work value allow employees to work on their own and make decisions. Corresponding needs are Creativity, Responsibility and Autonomy.

Wages & Employment Trends

National

Median wages data collected from **Computer Occupations, All Other**.

Employment data collected from **Computer Occupations, All Other**.

Industry data collected from **Computer Occupations, All Other**.

Median wages (2013) \$39.59 hourly, \$82,340 annual

Employment (2012) 206,000 employees

Projected growth (2012-2022) ■■■ Slower than average (3% to 7%)

Projected job openings (2012-2022) 40,200

Summary Report for:
15-1199.08 - Business Intelligence Analysts

Produce financial and market intelligence by querying data repositories and generating periodic reports. Devise methods for identifying data patterns and trends in available information sources.

Sample of reported job titles: Business Intelligence Analyst; Business Intelligence Manager; Commercial Intelligence Manager; Competitive Intelligence Analyst; Consultant, Strategic Business and Technology Intelligence; Director of Enterprise Strategy; Director of Market Intelligence; Director, Global Intelligence; Intelligence Analyst; Manager, Market Intelligence

Tasks

- Analyze competitive market strategies through analysis of related product, market, or share trends.
- Synthesize current business intelligence or trend data to support recommendations for action.
- Communicate with customers, competitors, suppliers, professional organizations, or others to stay abreast of industry or business trends.
- Manage timely flow of business intelligence information to users.
- Collect business intelligence data from available industry reports, public information, field reports, or purchased sources.
- Identify and analyze industry or geographic trends with business strategy implications.
- Analyze technology trends to identify markets for future product development or to improve sales of existing products.
- Generate standard or custom reports summarizing business, financial, or economic data for review by executives, managers, clients, and other stakeholders.
- Identify or monitor current and potential customers, using business intelligence tools.
- Maintain or update business intelligence tools, databases, dashboards, systems, or methods.

Tools & Technology

Tools used in this occupation:

Computer servers — Storage servers

High end computer servers — Data warehouse appliances

Laser fax machine — Laser facsimile machines

Photocopiers

Scanners

Technology used in this occupation:

Analytical or scientific software — Rogue Wave Software IMSL Numerical Libraries; SAS software; Statistical analysis software

Data base management system software — Microsoft SQL Server; Oracle procedural language/structured query language

PL/SQL; Oracle software; Relational database software

Data base reporting software — Panorama NovaView; SAP BusinessObjects Crystal Reports; SAP BusinessObjects software; SiSense Prism

Data base user interface and query software — IBM DB2; Microsoft Access; Oracle Essbase; Transact-SQL

Data mining software — Data warehouse software; Informatica Data Explorer; SAP Netweaver Business Warehouse

Knowledge

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.

Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Speaking — Talking to others to convey information effectively.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Time Management — Managing one's own time and the time of others.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options

and implement solutions.

Abilities

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Speech Clarity — The ability to speak clearly so others can understand you.

Speech Recognition — The ability to identify and understand the speech of another person.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Work Activities

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Establishing and Maintaining Interpersonal Relationships — Developing constructive and cooperative working relationships with others, and maintaining them over time.

Interpreting the Meaning of Information for Others — Translating or explaining what information means and how it can be used.

Analyzing Data or Information — Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.

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Job Zone

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Education Most of these occupations require a four-year bachelor's degree, but some do not.

Related Experience A considerable amount of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

Job Training Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Job Zone Examples Many of these occupations involve coordinating, supervising, managing, or training others. Examples include accountants, sales managers, database administrators, teachers, chemists, environmental engineers, criminal investigators, and special agents.

SVP Range (7.0 to < 8.0)

Education



This occupation may require a background in the following science, technology, engineering, and mathematics (STEM) educational disciplines:

Computer Science — Computer Programming, Specific Applications

Interests

Interest code: **IEC**

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Enterprising — Enterprising occupations frequently involve starting up and carrying out projects. These occupations can involve leading people and making many decisions. Sometimes they require risk taking and often deal with business.

Conventional — Conventional occupations frequently involve following set procedures and routines. These occupations can include working with data and details more than with ideas. Usually there is a clear line of authority to follow.

Work Styles

Analytical Thinking — Job requires analyzing information and using logic to address work-related issues and problems.

Integrity — Job requires being honest and ethical.

Attention to Detail — Job requires being careful about detail and thorough in completing work tasks.

Persistence — Job requires persistence in the face of obstacles.

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Dependability — Job requires being reliable, responsible, and dependable, and fulfilling obligations.

Cooperation — Job requires being pleasant with others on the job and displaying a good-natured, cooperative attitude.

Initiative — Job requires a willingness to take on responsibilities and challenges.

Independence — Job requires developing one's own ways of doing things, guiding oneself with little or no supervision, and depending on oneself to get things done.

Leadership — Job requires a willingness to lead, take charge, and offer opinions and direction.

Work Values

Achievement — Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment. Corresponding needs are Ability Utilization and Achievement.

Working Conditions — Occupations that satisfy this work value offer job security and good working conditions. Corresponding needs are Activity, Compensation, Independence, Security, Variety and Working Conditions.

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Wages & Employment Trends

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Projected growth (2012-2022) ■■■■ Slower than average (3% to 7%)

Projected job openings (2012-2022) 40,200



Summary Report for:
15-1199.07 - Data Warehousing Specialists

Design, model, or implement corporate data warehousing activities. Program and configure warehouses of database information and provide support to warehouse users.

This title represents an occupation for which data collection is currently underway.

Tasks

- Design, implement, or operate comprehensive data warehouse systems to balance optimization of data access with batch loading and resource utilization factors, according to customer requirements.
- Develop data warehouse process models, including sourcing, loading, transformation, and extraction.
- Create or implement metadata processes and frameworks.
- Create plans, test files, and scripts for data warehouse testing, ranging from unit to integration testing.
- Create supporting documentation, such as metadata and diagrams of entity relationships, business processes, and process flow.
- Design and implement warehouse database structures.
- Develop and implement data extraction procedures from other systems, such as administration, billing, or claims.
- Develop or maintain standards, such as organization, structure, or nomenclature, for the design of data warehouse elements, such as data architectures, models, tools, and databases.
- Implement business rules via stored procedures, middleware, or other technologies.
- Map data between source systems, data warehouses, and data marts.

Tools & Technology

Tools used in this occupation:

Computer servers — Storage servers

High end computer servers — Data warehouse appliances

Mainframe computers

Notebook computers — Laptop computers

Special purpose telephones — Multi-line telephone systems

Technology used in this occupation:

Data base management system software — Microsoft SQL Server; Oracle software; SAP Sybase IQ; Talendforge *

Data base reporting software — IBM Netezza TwinFin; Oracle Business Intelligence Discoverer; Oracle SQL Loader; SAP BusinessObjects software

Data base user interface and query software — Microsoft Access; Structured query language SQL; Teradata BTEQ; Transact SQL

Data mining software — Rapid-I RapidMiner *; SAP NetWeaver Business Warehouse; Teradata Parallel Transporter; Teradata T pump

Metadata management software — Altova MapForce; Apatar *; Oracle Warehouse Builder; SAS Data Integration Server

Interests

Interest code: **IC**

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Data mining software — Rapid-I RapidMiner *; SAP NetWeaver Business Warehouse; Teradata Parallel Transporter; Teradata Tump

Metadata management software — Altova MapForce; Apatar *; Oracle Warehouse Builder; SAS Data Integration Server

* Software developed by a government agency and/or distributed as freeware or shareware.

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Summary Report for:
15-1199.08 - Business Intelligence Analysts

Produce financial and market intelligence by querying data repositories and generating periodic reports. Devise methods for identifying data patterns and trends in available information sources.

Sample of reported job titles: Business Intelligence Analyst; Business Intelligence Manager; Commercial Intelligence Manager; Competitive Intelligence Analyst; Consultant, Strategic Business and Technology Intelligence; Director of Enterprise Strategy; Director of Market Intelligence; Director, Global Intelligence; Intelligence Analyst; Manager, Market Intelligence

Tasks

- Analyze competitive market strategies through analysis of related product, market, or share trends.
- Synthesize current business intelligence or trend data to support recommendations for action.
- Communicate with customers, competitors, suppliers, professional organizations, or others to stay abreast of industry or business trends.
- Manage timely flow of business intelligence information to users.
- Collect business intelligence data from available industry reports, public information, field reports, or purchased sources.
- Identify and analyze industry or geographic trends with business strategy implications.
- Analyze technology trends to identify markets for future product development or to improve sales of existing products.
- Generate standard or custom reports summarizing business, financial, or economic data for review by executives, managers, clients, and other stakeholders.
- Identify or monitor current and potential customers, using business intelligence tools.
- Maintain or update business intelligence tools, databases, dashboards, systems, or methods.

Tools & Technology

Tools used in this occupation:

Computer servers — Storage servers

High end computer servers — Data warehouse appliances

Laser fax machine — Laser facsimile machines

Photocopiers

Scanners

Technology used in this occupation:

Analytical or scientific software — Rogue Wave Software IMSL Numerical Libraries; SAS software; Statistical analysis software

Data base management system software — Microsoft SQL Server; Oracle procedural language/structured query language PL/SQL; Oracle software; Relational database software

Data base reporting software — Panorama NovaView; SAP BusinessObjects Crystal Reports; SAP BusinessObjects software; SiSense Prism

Data base user interface and query software — IBM DB2; Microsoft Access; Oracle Essbase; Transact-SQL

Data mining software — Data warehouse software; Informatica Data Explorer; SAP Netweaver Business Warehouse

Knowledge

English Language — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Sales and Marketing — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

Administration and Management — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Economics and Accounting — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.

Communications and Media — Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

Skills

Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

Reading Comprehension — Understanding written sentences and paragraphs in work related documents.

Active Learning — Understanding the implications of new information for both current and future problem-solving and decision-making.

Speaking — Talking to others to convey information effectively.

Judgment and Decision Making — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

Systems Analysis — Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

Time Management — Managing one's own time and the time of others.

Writing — Communicating effectively in writing as appropriate for the needs of the audience.

Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

Abilities

Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.

Written Comprehension — The ability to read and understand information and ideas presented in writing.

Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.

Oral Expression — The ability to communicate information and ideas in speaking so others will understand.

Speech Clarity — The ability to speak clearly so others can understand you.

Speech Recognition — The ability to identify and understand the speech of another person.

Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

Written Expression — The ability to communicate information and ideas in writing so others will understand.

Category Flexibility — The ability to generate or use different sets of rules for combining or grouping things in different ways.

Work Activities

Getting Information — Observing, receiving, and otherwise obtaining information from all relevant sources.

Communicating with Supervisors, Peers, or Subordinates — Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Updating and Using Relevant Knowledge — Keeping up-to-date technically and applying new knowledge to your job.

Establishing and Maintaining Interpersonal Relationships — Developing constructive and cooperative working relationships with others, and maintaining them over time.

Interpreting the Meaning of Information for Others — Translating or explaining what information means and how it can be used.

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Job Zone

Title Job Zone Four: Considerable Preparation Needed

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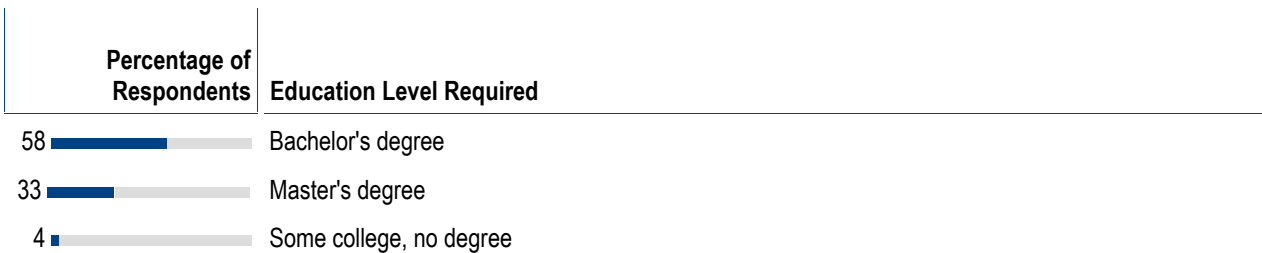
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Computer certification programs are setting the standards for the Information Technology industry worldwide. Although most careers in the IT and communications fields are lucrative and lead to rapid advancement, students can move ahead even more rapidly if they have been certified. In fact, you often can earn a salary increase of 20% or more once you become certified. Nowadays, learning computer repair on your own or even having a degree in computer science just isn't enough. Companies are demanding that their IT professionals be certified as a way to measure their skills as well as to guarantee that they can perform their jobs successfully. In short, computer training certification will help a computer professional get a good job and stay competitive in what is now a highly demanding Information Technology environment.

Benefits of certification to the Professional include:

- Ability to demonstrate a working knowledge of information technology
- Validates the person's commitment to the profession
- Offers a career differentiator, enhanced credibility and marketability
- Provides access to valuable resources, such as continuing education, peer networking and idea exchange

Benefits of certification for the Organization include:

- Establishes a standard of best practices for the organization
- Provides the organization with staff that have demonstrated a broad knowledge in information technology and sound professional judgment
- Provides access to a network of global industry and subject matter experts
- Provides comfort to employer as to the individual's knowledge, skills, abilities and experience

~~Technology Certifications~~

- The CompTIA A+
- The Network +
- Security+

Why is Certification Important

What are the objectives of certification?

For IT Professionals

Certification Benefits

Frequently Ask Questions

The Importance of Finishing What You Started

SECTION 5: ASSIGNMENT DESCRIPTIONS AND RUBRICS

Course Assignment Descriptions

Not applicable

Assignment Submission Instructions

Not applicable

SECTION 6: COURSE POLICIES

Grading Policy

The detailed Grading Policy can be found on the Course Syllabus in Blackboard.

Instructions to access Course Syllabus in Blackboard:

1. Go to Blackboard course site for this course (<http://pgcconline.blackboard.com>)
2. Click on “Syllabus & Schedule” navigation button
3. Click on Course Syllabus document link

Attendance Policy

[ADD policy details, if applicable – or – N/A]

Late Work Policy

[ADD policy details, if applicable – or – N/A]

Participation Policy

[ADD policy details, if applicable – or – N/A]

Extra Credit Policy

[ADD policy details, if applicable – or – N/A]

Plagiarism Policy

At Prince George’s Community College, cheating is the act of obtaining or attempting to obtain credit for academic work through the use of any dishonest, deceptive, or fraudulent means.

Plagiarism is a form of cheating. At Prince George’s Community College, plagiarism is the use of distinctive ideas or works belonging to another person without providing adequate acknowledgement of that person’s contribution.

Source: PGCC Student Handbook

[ADD additional Course Policies, as necessary]

SECTION 7: COURSE TECHNOLOGY SETUP

Below are instructions to setup and access the technology tools used in this course.

Owl Mail (<http://mail.students.pgcc.edu>)

Owl Mail is the college's student email system. Your instructor will use Owl Mail account HarrisKW@PGCC.edu . To be successful in this course, you should check your Owl Mail account regularly.

To activate your Owl Mail account, follow the directions at <http://live.pgcc.edu/>.

If you already have an active Owl Mail account, you may access your Owl Mail account at <http://mail.students.pgcc.edu>.

Blackboard (<http://pgcconline.blackboard.com>)

Blackboard is a web based program that serves as the college's online classroom. In this course, you will use Blackboard to access the eModules, Announcements, Grade Book, Faculty Information and Quicklinks

Instructions to login to Blackboard:

SECTION 8: TECHNOLOGY QUICKLINKS

Below are url links to the technology tools used in this course:

Owl Mail <http://mail.students.pgcc.edu>

Blackboard <http://pgcconline.blackboard.com>

SECTION 9: STUDENT SUPPORT

Technical Support

For technical support in this course, contact instructor.

Disability Support Services

Students requesting academic accommodations are required to contact the College's Disability Support Services Office (B-124) or call (301) 546-0838 (voice) or (301) 546-0122 (TTY) to establish eligibility for services and accommodations. Students with documented disabilities should discuss the matter privately with their instructors at the beginning of the semester and provide a copy of the completed Student/Faculty Accommodation Form.