CTE Program Proposal

NAME OF COLLEGE: Bakersfield College

FACULTY CONTACT: Creighton Magers

DATE: 11/19/2015

PROGRAM NAME: CompTIA Certificate of Achievement

⊠ New Program Proposal   ☐ Program Revision Proposal

TYPE OF DEGREE:
⊠ Certificate
☐ Associate of Arts
☐ Associate of Science
☐ Associate of Arts for Transfer
☐ Associate of Science for Transfer
☐ Other

ATTACHMENTS REQUIRED:
Labor/Job Market Data and Analysis
Advisory Committee Meeting Minutes
Employer Survey

A. Appropriateness to Mission

1. Statement of Program Goals and Objectives

Identify the goals and objectives of the program. For CTE programs, the statement must include the main competencies students will have achieved that are required for a specific occupation. The statement must, at a minimum, clearly indicate the specific occupations or fields the program will prepare students to enter and the basic occupational competencies students will acquire.

The CompTIA certificate of achievement is designed to offer students training in the field of Information Technology (IT). CompTIA certifications are vendor neutral and cover a broad range of information technology concepts. The certifications require students to demonstrate skills and knowledge widely sought after by the IT industry. Upon completion of the program students will have demonstrated an understanding of various information technologies and software and hardware implementations. Becoming CompTIA certified will lead to IT career opportunities, professional respect, and credibility in the IT workplace. Furthermore, skills attained via CompTIA certifications will help increase student success rates in other certification programs maintained by leading vendors like Microsoft, IBM, and Cisco

2. Catalog Description

Enter exactly as it will appear in the catalog, including program outcomes. The description must also

- *Convey the certificate's goals(s) and objectives*
- *Provide an overview of the knowledge and skills that students who complete the requirements must demonstrate (student learning outcomes)*
- *List all prerequisite skills or enrollment limitations*
- *Mention any risks, such as occupations that are inherently competitive or low-salaried and/or occupational areas where inexperienced graduates are not generally hired.*
- *For CTE programs, the description must list the potential careers students may enter upon completion.*
- *Convey what the student may expect as an outcome*

The program curriculum prepares students interested in learning computer concepts and technologies; preparing them for employment in many areas of Information Technology. Each course in the program approaches topics in a vendor-neutral (more generalized) fashion so that they can easily be applied to specific industries. The curriculum is designed to support students seeking to pass CompTIA's certification exams. CompTIA is an internationally recognized certification program for the information technology industry. Acquiring such certifications will assist students in finding employment in Information Technology and Computer Infrastructure related fields. Some of these fields include:

- Network and Systems Administrators
- Computer Network Architects
- Computer Network Support Specialists
- Computer Support Specialists
- Information Security Analysts
- Network and Computer Systems Administrators
- Information Security Analysts
- Computer Hardware Support

3. Program Requirements

The program requirements must be consistent with the catalog description. The number of units, specific course requirements and the sequence of the courses must be coherent, complete and appropriate. Display the program requirements in a table format that includes all courses required for completion of the program (core requirements and required or restricted electives), subtotal of core units, and total program units. For each course, indicate the course department number, course title, and unit value.

Display of Program Requirements

Core Courses	Title	Units
COMP B31	CompTIA Network Security - Security+	3
COMP B32	CompTIA Linux+	3
COMP B33	CompTIA Networking Technologies - Network+	3
COMP B84	CompTIA A+	4
	Total Core Courses	**13**

In addition to the core courses, the student must take at least 6 units from the following courses:

Elective Courses	Title	Units
COMP B2	Introduction to Computer Information Systems	3
COMP B10	Introduction to Programming Methodologies using Python	3
COMP B11	Programming Concepts and Methodologies I (using Java)	3
COMP B21	Database Systems – Design & Structured Query Language (SQL)	3
	Total Elective Courses	**12**

Total Units Required for Certificate	**19**

4. Background and Rationale

Given the stated goals and objectives, address the role the proposed program will fulfill in the college's mission and curriculum offerings. This discussion may include some history of the program proposal origins, a description of the program purpose, and/or the program's relevancy for the region and college.

The proposal must demonstrate a need for the program that meets the stated goals and objectives in the region the college proposes to serve with the certificate. A proposed new certificate must not cause undue competition with an existing program at another college.

The CompTIA certificate of achievement directly supports the mission of Bakersfield College which is to provide opportunities for students from diverse economic, cultural, and educational backgrounds to attain degrees and certificates, workplace skills, and preparation for transfer. It accomplishes this by being open to all students and by teaching those technology skills that are in high demand. It also addresses Bakersfield College's third Institutional Learning Outcome – "Demonstrate competency in a field of knowledge or with job-related skills."

The faculty on the Computer Science side of BMIT reevaluated our mission and programs and determined that a dramatic redesign of our curriculum responding to community needs was required. Analysis of our student population, along with the low number of certificate completions, required drastic program changes emphasizing CTE skill sets leading to recognized COAs. Earlier programs did not reflect industry trends, and as such, did not benefit student's prospects for employment -- this program reflects such industry trends. This new program is also designed to more easily measure our student and program level outcomes which in turn should allow for more responsive instructional changes that can improve outcomes.

The following statistics are indicative of the potential demand for this program:

- "Labor estimates predict some technology fields will experience growth of over 20% by the year 2020" (CompTIA 9th Annual Information Security Trends study: 500 U.S. IT and Business Executives Responsible for Security).
- "91% of hiring managers indicate CompTIA certifications are valuable in validating IT expertise, making certification the best way to demonstrate your competency and knowledge to employers (CompTIA Employer Perceptions of IT Training and Certification).

"Approved by the U.S. Department of Defense (DoD) – as one of the required certification options in the DoD 8570.01-M directive, for Information Assurance Technical Level II and Management Level I job roles."

B. Need for Program

5. Enrollment and Completer Projections

This item should address and justify the number of projected students or "annual completers" to be awarded the certificate each year after the program is fully established.

TOP code 0708		2015 -2016		2016-2017	
Course #	Course Title	Annual # Sections	Annual total Enrollment	Annual # Sections	Annual Total Enrollment
COMP B31	CompTIA Network Security - Security+	1	30	1	30
COMP B32	CompTIA Linux+	2	30	2	30
COMP B33	CompTIA Networking Technologies - Network+	1	30	1	30
COMP B84	CompTIA A+	1	30	1	30
COMP B2	Introduction to Computer Information Systems	6	180	6	180
COMP B10	Introduction to Programming Methodologies using Python	3	90	3	90
COMP B11	Programming Concepts and Methodologies I (using Java)	5	150	5	150
COMP B21	Database Systems – Design & Structured Query Language (SQL)	1	30	1	30

6. Place of Program in Curriculum/Similar Programs

Review the college's existing program inventory, then address the following questions:

- *Do any active inventory records need to be made inactive or changed in connection with the approval or the proposed program? If yes, please specify.*
- *Does the program replace any existing program(s) on the college's inventory? Provide relevant details if this program is related to the termination or scaling down of another program(s).*
- *What related programs are offered by the college?*

No active inventory records need to be made inactive or changed in connection with the approval of the proposed Certificate of Achievement program.

This program does not replace any existing program(s) on the college inventory.

The college offers the options of achieving an AD-T in Computer Science with additional course work. The college is also developing a COA in Web Development and another in Software Development.

7. Similar Programs at Other Colleges in Service Area

Describe all similar programs offered by colleges within the college service area. If the proposed program has a different emphasis than similar programs at other colleges, targets a different market, demonstrates state-of-the-art offerings, or for a number of reasons will be a stronger program, documentation and/or explanation need to be provided.

There are no similar public institution programs that duplicate this program. There are a few scattered private programs covering a subset of our proposed program. Much of their content is only offered online and we consider that content delivery method, for these specific skills, to be less beneficial to students which in turn yield lower success rates.

8. Labor Market Information and Analysis

Current labor market information and analysis, or other comparable information, must show that jobs are available for program completers within the local service area of the individual college and/or that job enhancement or promotion justifies the proposed curriculum.

Enter table, chart or narrative as a separate attachment.

9. Employer Survey

Discuss in this area, or as a separate attachment, employer input in regard to necessity of program and number of jobs available.

No formal survey done with local employers. Demand projected based on national trend data, proposals with local high schools (pathways being established), and agreement by our advisory committee.

10. Explanation of Employer Relationship

Whenever a program is to be offered in close cooperation with one or more specific employers, a discussion of the relationship must be provided.

N/A

11. List of Members of Advisory Committee

This list must include advisory committee member names, job titles, and business affiliations.

Janine Kern, Chris Thornburg, Dr. Huaqing Wang, Barbara Griffith, Bob Trammel, Jeff Orton, Rick Rodriquez, Luke Hamlin, John Denison, Debbie Rodriquez (List varies by meeting)

12. Recommendation of Advisory Committee

In a separate attachment, provide minutes of the advisory committee meetings at which the program was discussed and approved, with relevant areas highlighted, as well as a summary of the advisory committee recommendations.

C. Curriculum Standards

13. Display of Proposed Sequence

First Semester	Units
COMP B84 CompTIA A+	4
COMP B33 CompTIA Networking Technologies - Network+	3
COMS B2 Introduction to Computer Information Systems **OR**	3
COMP B10 Introduction to Programming Methodologies using Python **OR**	
COMP B11 Programming Concepts and Methodologies I **OR**	
COMP B21 Database Systems – Design & Structured Query Language (SQL)	
Total	**10**

Second Semester	Units
COMP B31 CompTIA Network Security - Security+	3
COMP B32 CompTIA Linux+	3
COMS B2 Introduction to Computer Information Systems **OR**	3
COMP B10 Introduction to Programming Methodologies using Python **OR**	
COMP B11 Programming Concepts and Methodologies I **OR**	
COMP B21 Database Systems – Design & Structured Query Language (SQL)	
Total	**9**

Third Semester	Units
Total	

Fourth Semester	Units
Total	

14. Transfer Applicability (if applicable)

D. Adequate Resources and Compliance

15. Library and Learning Resources Plan

Discuss resources currently available for course support, as well as resources recommended for purchase to further support the course.

No additional resources are needed.

16. Facilities and Equipment Plan

Discuss facilities and equipment currently available for course support, as well as facilities and equipment recommended for purchase to further support the course.

No additional resources are needed, although the regular three to four year lab equipment replacement cycle should occur. This would be in conjunction with the normal replacement cycle already in existence for our computer labs.

17. Financial Support Plan

Discuss how the program, including faculty, will be funded.

No additional resources are needed.

18. Faculty Qualifications and Availability

Discuss the discipline, qualifications and availability of faculty as it relates to the proposed program.

No additional resources are needed. Courses can be taught using existing faculty who are either already teaching the curriculum and/or maintain currency with material.

19. Based on model curriculum (if applicable)

State the model curriculum on which the proposed program is based.

Core courses in the program conform to model curriculum and outcomes developed by CompTIA.

20. Licensing or Accreditation Standards

List any licensing, accreditation or certifications available to program completers.

N/A

21. Student Selection and Fees

If the program is selective, describe relevant entry criteria and the selection process for admission to the program. Specify all mandatory fees that students will incur for the program aside from the ordinary course enrollment fee.

Open to all students. No fees other than for text and enrollment.

Minutes/key points from virtual meeting with Computer Science Advisory (10/24/15)

- Overview of the curriculum redesign for Computer Science subgroup of BMIT
- Discussed the rationale of why the "reorg" and curriculum changes
    - "BMIT-COMP Group NEW PROGRAMS Doc for CSUB" document
- Delivered the Catalog text and discussed new courses
- CompTIA Discussion
    - General view that CompTIA COA looks good
    - Will we do the actual certification testing?
        - Discussed why it wasn't feasible
    - Possibility of additional CompTIA courses
    - Will we include other non-CompTIA certificates in this program and if so, will the title be confusing?
- Software Development COA
    - General view that the COA looks good
    - Will we offer additional languages and will those be included in the COA?
    - Glad that we are bring back the Systems Analysis and Design course and agree that it should be a core course, and not elective, to the COA
    - Discussion about the possibility of an internship component
- When will the program/courses become active?
    - Courses now, COAs after state approval
    - Systems analysis and design course needs to be approved before we can teach
    - Information Systems AS-T after state firms up requirements
        - May require recertifying (CID approval) of some of our existing CompTIA courses and the database/SQL course

Advisory Recommendation:
I have reviewed the Bakersfield College Computer Studies - Certificate of Achievement (CoA) for CompTIA material you forwarded to me and after the conversation with you to answer my questions, I have concluded the course material and requirements are appropriate and focused toward preparing students with the necessary knowledge and skills to meet the requirements of CompTIA certification and an entry level computer/network technician position in the general workforce. I give you my "stamp of approval" for the CoA curriculum and endorse you to move forward with its implementation.

Please let me know if you have any questions.
Rick Rodriquez

STATE OF THE IT SKILLS GAP

RESEARCH

FEBRUARY 2012

www.comptia.org

About this Research

CompTIA's *State of the IT Skills Gap* study was conducted to gain a better understanding of the IT skills in demand and identify any existing or forthcoming IT skills shortages. The objectives of this research include:

- Identify which IT skills are and will be most important to employers
- Determine how well IT staff skills align with current/future needs of employers
- Examine professional development practices

The study consists of three sections, which can be viewed independently or together as chapters of a comprehensive report.

Section 1: Background
Section 2: IT Skills Gap Causes and Trends
Section 3: Addressing IT Skills Gaps

The data for this study was collected via a quantitative online survey conducted December 15, 2011 to January 23, 2012 among 1,061 IT and business managers involved in managing IT or IT staff within their organizations. The countries covered in this study include: Canada (n=125), Japan (n=109), South Africa (n=75), United Kingdom (n=250), and the United States (n=502).

The enclosed material covers the U.S. portion of the results ONLY. The international results are presented in a separate report.

The margin of sampling error at 95% confidence for aggregate results is +/- 2.9 percentage points. For the U.S. segment of the survey, margin of sampling error is +/- 4.3 percentage points. Sampling error is larger for subgroups of the data. As with any survey, sampling error is only one source of possible error. While non-sampling error cannot be accurately calculated, precautionary steps were taken in all phases of the survey design, collection and processing of the data to minimize its influence.

CompTIA is responsible for all content contained in this series. Any questions regarding the study should be directed to CompTIA Market Research staff at research@comptia.org.

CompTIA is a member of the Marketing Research Association (MRA) and adheres to the MRA's Code of Marketing Research Standards.
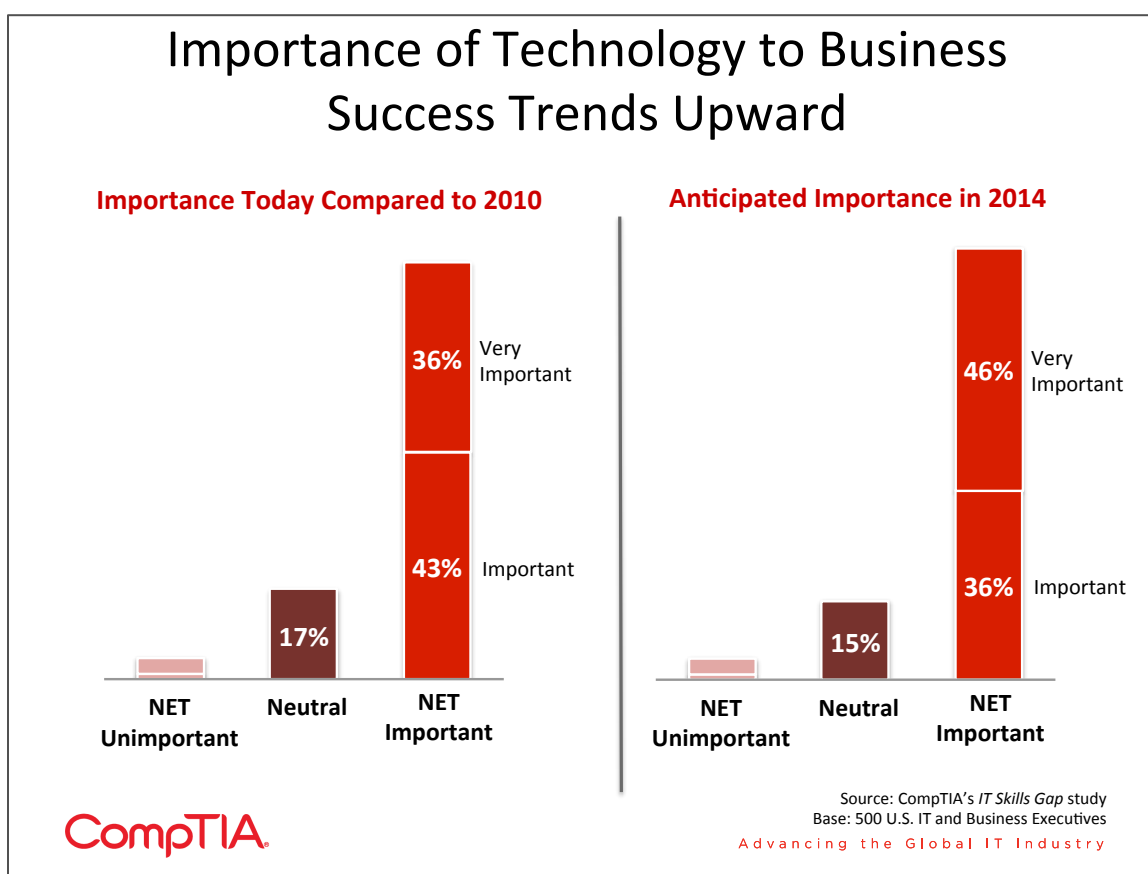
Key Points

- The importance of information technology to the success of companies is growing.

- Relatively few organizations report being exactly or even very close to where they want to be with technology utilization and staff skill levels.

- The top IT priorities for U.S. companies still include security, data storage, refreshing aging equipment, improving network infrastructure, and disaster recovery/business continuity. Consequently, even with the core areas of technologies, new options translate to the need for new skills.

- Beyond core IT, the emerging areas of business process automation, mobility, collaboration, virtualization and a host of other technologies will be priorities for segments of companies. Again, each of these emerging areas will require both IT staff and end users have sufficient knowledge bases and skill sets to maximize the return on technology investment.

Technology Drives Business Success

The past few years have been an incredible period in innovation. Increasingly powerful and affordable computing, inexpensive mass storage, more expansive broadband coverage, new form factors and greater know-how to put it all together have had a significant impact on the economy and society.

Technology now affects more businesses in more ways than ever before. From SMBs to large enterprises and capital-intense industries to labor-intense industries, technology routinely sits at the center of business strategy.

Importance of Technology to Business Success Trends Upward

Importance Today Compared to 2010

36% Very Important

43% Important

17% Neutral

NET Unimportant

NET Important

Anticipated Importance in 2014

46% Very Important

36% Important

15% Neutral

NET Unimportant

NET Important

Source: CompTIA's *IT Skills Gap* study
Base: 500 U.S. IT and Business Executives
Advancing the Global IT Industry

The data reveals a few nuances to the technology importance ratings. Large firms place higher levels of importance on technology compared to smaller firms: 44% very important rating for large firms (500+ employees) vs. 33% for small firms (25-99 employees) and 30% for micro firms (5-24 employees). And, as expected, companies in the IT industry vertical place more importance on technology than companies in other verticals. But even in the case of the latter, a super majority rate technology as very important or important to their success.
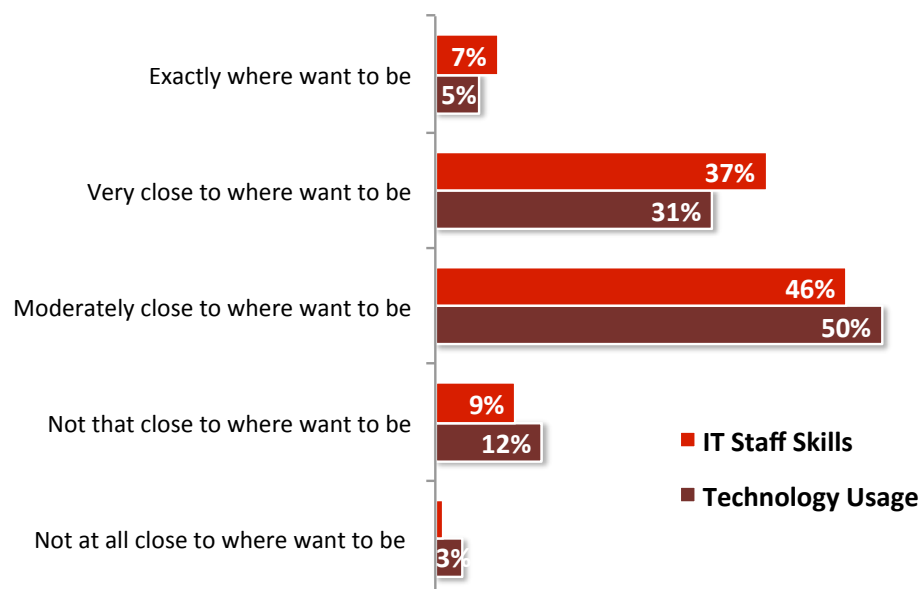
Many Organizations Not Where They Want to Be with Technology / Staff Skills

Despite the acknowledgment of technology's importance to business success, relatively few organizations are where they want to be in their use of technology. Some of this can certainly be attributable to the resource constraints facing just about every organization. Even in good times, there is never enough budget to buy every sought after piece of hardware or software.

Beyond the investment itself, challenges in execution is the other major reason many organizations are not where they want to be in their use of technology. Failure to execute can take many forms. It could be a poor purchase decision – buying the wrong technology for the wrong job. It could be a poorly executed deployment, where new technology does not optimally integrate with legacy technology. Or, it could be a failure to adapt management, business processes or company culture. Few organizations are truly agile; most must overcome hefty inertial forces to change directions. Lastly, it could be a function of knowledge and the ability to apply that knowledge to business needs.

According to the research, relatively few organizations report being exactly or even very close to where they want to be with technology utilization and staff skill levels. To put this in perceptive, according to the U.S. Economic Census there are approximately 27 million businesses in the United States (employer + non-employer businesses). The 65% of organizations rating their technologically utilization at moderately close or lower represents nearly 18 million businesses. Additionally, it translates to over 15 million businesses that rate the aggregate skill level of their IT staff as less than optimal. Even modest improvements in these two areas could yield tremendous economic benefits.

Majority of Organizations Seek to Improve Their Use of Technology and IT Staff Skills

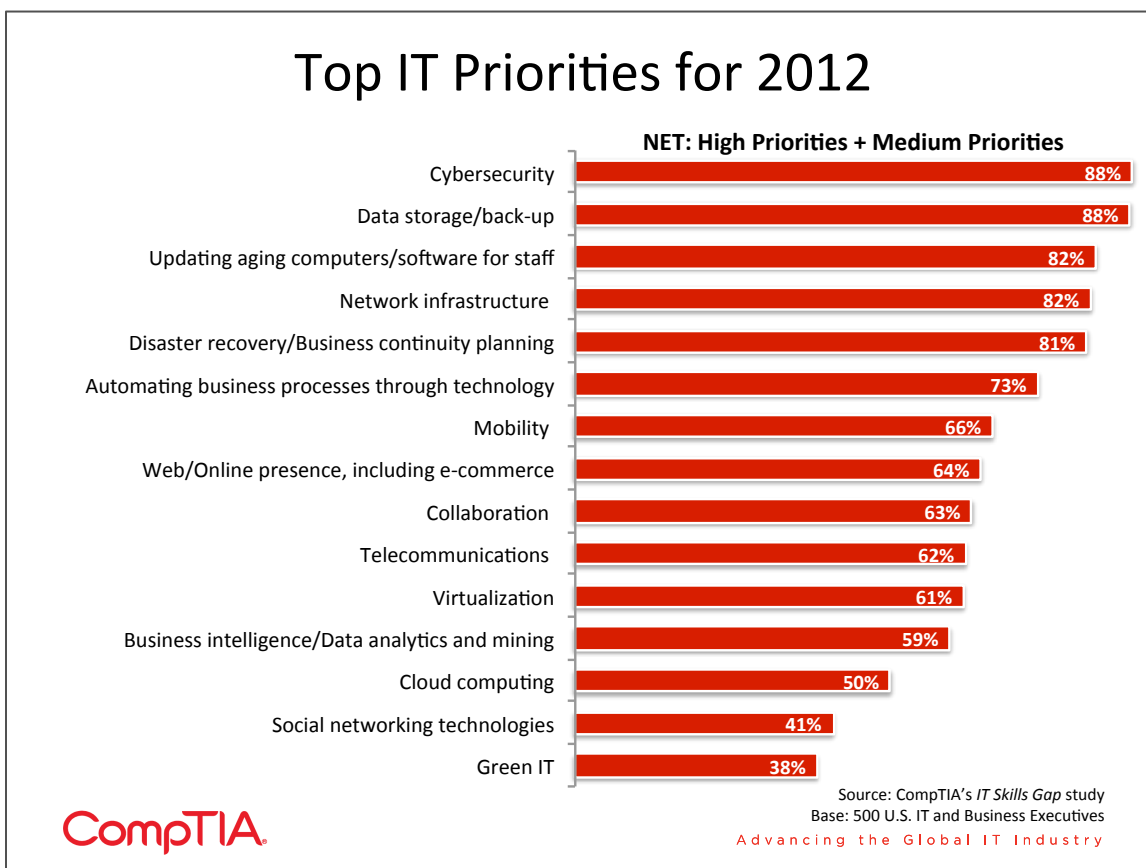|	IT Staff Skills	Technology Usage
Exactly where want to be	7%	5%
Very close to where want to be	37%	31%
Moderately close to where want to be	46%	50%
Not that close to where want to be	9%	12%
Not at all close to where want to be		3%

Source: CompTIA's *IT Skills Gap* study
Base: 500 U.S. IT and Business Executives
Advancing the Global IT Industry

IT Priorities Provide Clues to Knowledge and Skill Needs

The top five IT priorities for U.S. companies today probably look a lot like priorities that may have been published five or even ten years ago. Core issues of security, data storage, refreshing aging equipment and networks have been mainstays of IT departments since the advent of IT departments. Of course, there are now new variables that make decisions regarding core elements slightly more complicated. On-premise or cloud? In-house staff or outsource? Open source or proprietary technology? And the list goes on. Consequently, even with the core areas of technologies, new options translate to the need for new skills.

Beyond core IT, the emerging areas of business process automation, mobility, collaboration, virtualization and a host of other technologies will be priorities for segments of companies (see chart on accompanying page). Again, each of these emerging areas will require both IT staff and end users have sufficient knowledge bases and skill sets to maximize the return on technology investment.

Note: given the hype surrounding cloud computing, it may seem inconsistent for it to be rated a relatively low priority in this study. Keep in mind, that many of the top-tier priorities may involve a cloud element. For example, a company needing data storage and disaster recovery may evaluate the options and settle on a cloud-based solution. Others seeking business process automation may implement a cloud-based software-as-a-service option such as SuccessFactors for HR employee management. The take-away: many CIOs and business executives first think about the problem/needs and then the solution, which in some cases will inevitably involve a cloud element.

Top IT Priorities for 2012

NET: High Priorities + Medium Priorities

Priority	Percentage
Cybersecurity	88%
Data storage/back-up	88%
Updating aging computers/software for staff	82%
Network infrastructure	82%
Disaster recovery/Business continuity planning	81%
Automating business processes through technology	73%
Mobility	66%
Web/Online presence, including e-commerce	64%
Collaboration	63%
Telecommunications	62%
Virtualization	61%
Business intelligence/Data analytics and mining	59%
Cloud computing	50%
Social networking technologies	41%
Green IT	38%

Source: CompTIA's *IT Skills Gap* study
Base: 500 U.S. IT and Business Executives

Advancing the Global IT Industry

Top Ten IT Priorities by Company Size

NET: High Priorities + Medium Priorities

Micro Firms (5-24 employees)

91%	Data storage/back-up
87%	Cybersecurity
78%	Network infrastructure
77%	Updating aging computers/software
76%	Disaster recovery/Business continuity
73%	Web/Online presence, including e-commerce
71%	Business process automation
67%	Mobility
63%	Collaboration (e.g. web/video conferencing)
60%	Business intelligence/Data analytics and mining

Small Firms (25-99 employees)

86%	Updating aging computers/software
85%	Data storage/back-up
85%	Cybersecurity
80%	Disaster recovery/Business continuity
80%	Network infrastructure
70%	Business process automation
67%	Web/Online presence, including e-commerce
63%	Mobility
56%	Collaboration (e.g. web/video conferencing)
52%	Telecommunications (e.g. VoIP, UC)

Medium Firms (100-499 employees)

90%	Cybersecurity
87%	Data storage/back-up
84%	Network infrastructure
82%	Updating aging computers/software
82%	Disaster recovery/Business continuity
73%	Business process automation
67%	Virtualization
66%	Telecommunications (e.g. VoIP, UC)
65%	Collaboration (e.g. web/video conferencing)
61%	Mobility

Large Firms (500+ employees)

92%	Cybersecurity
89%	Data storage/back-up
89%	Disaster recovery/Business continuity
87%	Network infrastructure
86%	Updating aging computers/software
81%	Business process automation
79%	Virtualization
76%	Telecommunications (e.g. VoIP, UC)
75%	Business intelligence/Data analytics and mining
74%	Mobility

Advancing the Global IT Industry

Methods Organizations Use to Manage the IT Function

Managing the IT function	Micro Firms	Small Firms	Medium Firms	Large Firms
Formal IT department with dedicated IT staff	35%	50%	87%	87%
Informally with other staff that are not part of a formal IT department	42%	41%	28%	21%
Occasional use of an outside IT firm/tech consultant for specific projects or work	39%	39%	41%	42%
Outsourcing of a function via an on-going contract with an outside IT firm (managed IT services)	22%	15%	15%	25%

Micro firm = 5-24 employees
Small firm = 25-99 employees
Medium firm = 100-499 employees
Large firm = 500+ employees

Advancing the Global IT Industry

State of the IT Skills Gap: Section 1

CompTIA.

www.comptia.org

***CompTIA Certification Paths and Job Prospects

According to the U.S. Bureau of Labor and Statistics, the availability of IT jobs is projected to grow by 17% through 2022.

Our digital world is expanding so quickly that it's creating IT jobs and openings faster than the right people can be found to fill them. Indeed.com estimates that there are almost 2,000,000 unfilled IT jobs globally in a variety of industries. Which IT career path is right for you? Find out which direction matches your interests with our Certification Roadmap.

A CompTIA certification gets you ahead of the crowd immediately: Not only can you count on the skills you earned, you also validate your knowledge. Having a certification in your hand boosts your resume and is an increasingly compelling credential when you're applying for a job. Certified IT respondents are more likely to hold CompTIA certifications than any other.
Source: http://certification.comptia.org/ExploreCareers/careerpaths.aspx

91% of employers believe IT certifications play a key role in the hiring process and that IT certifications are a reliable predictor of a successful employee.
Source: http://certification.comptia.org/docs/default-source/downloadablefiles/hr-perceptions-of-it-training-and-certification.pdf?sfvrsn=2

See Attached Files**: LaborInfo-hr-perceptions-of-it-training-and-certification.pdf** & **LaborInfo-CompTIA-ITSkillsGap-study.pdf**

***Bureau of Labor Statistics Occupational Outlook Handbook figures for professions related to the Certificate of Achievement

Computer and Information Research Scientists	Computer and information research scientists invent and design new approaches to computing technology and find innovative uses for existing technology. They study and solve complex problems in computing for business, medicine, science, and other fields.	Doctoral or professional degree	$102,190

	Computer Network Architects	Computer network architects design and build data communication networks, including local area networks (LANs), wide area networks (WANs), and intranets. These networks range from a small connection between two offices to a multinational series of globally distributed communications systems.	Bachelor's degree	$91,000
	Computer Programmers	Computer programmers write code to create software programs. They turn the program designs created by software developers and engineers into instructions that a computer can follow.	Bachelor's degree	$74,280
	Computer Support Specialists	Computer support specialists provide help and advice to people and organizations using computer software or equipment. Some, called computer network support specialists, support information technology (IT) employees within their organization. Others, called computer user support specialists, assist non-IT users who are having computer problems.	See How to Become One	$48,900
	Computer Systems Analysts	Computer systems analysts study an organization's current computer systems and procedures and design information systems solutions to help the organization operate more efficiently and effectively. They bring business and information technology (IT) together by understanding the needs and limitations of both.	Bachelor's degree	$79,680
	Database Administrators	Database administrators (DBAs) use specialized software to store and organize data, such as financial information and customer shipping records. They make sure that data are available to users and are secure from unauthorized access.	Bachelor's degree	$77,080
	Information Security Analysts	Information security analysts plan and carry out security measures to protect an organization's computer networks and systems. Their responsibilities are continually expanding as the number of cyberattacks increase.	Bachelor's degree	$86,170

	Network and Computer Systems Administrators	Computer networks are critical parts of almost every organization. Network and computer systems administrators are responsible for the day-to-day operation of these networks.	Bachelor's degree	$72,560
	Software Developers	Software developers are the creative minds behind computer programs. Some develop the applications that allow people to do specific tasks on a computer or other device. Others develop the underlying systems that run the devices or control networks.	Bachelor's degree	$93,350
	Web Developers	Web developers design and create websites. They are responsible for the look of the site. They are also responsible for the site's technical aspects, such as performance and capacity, which are measures of a website's speed and how much traffic the site can handle. They also may create content for the site.	Associate's degree	$62,500

Network and Systems Administrators:
Source: http://www.bls.gov/ooh/computer-and-information-technology/network-and-computer-systems-administrators.htm

Summary

Administrators maintain network LANs, WANs, and intranets.

Quick Facts: Network and Computer Systems Administrators

2012 Median Pay	$72,560 per year $34.88 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2012	366,400
Job Outlook, 2012-22	12% (As fast as average)
Employment Change, 2012-22	42,900

What Network and Computer Systems Administrators Do

Computer networks are critical parts of almost every organization. Network and computer systems administrators are responsible for the day-to-day operation of these networks.

Work Environment

Network and computer systems administrators work with the physical computer networks of a variety of organizations and therefore are employed in many industries.

How to Become a Network and Computer Systems Administrator

Although some employers require a postsecondary certificate, most require a bachelor's degree in a field related to computer or information science.

Pay

The median annual wage for network and computer systems administrators was $72,560 in May 2012.

Job Outlook

Employment of network and computer systems administrators is projected to grow 12 percent from 2012 to 2022, about as fast as the average for all occupations. Growth will be highest at firms that provide cloud computing technology.

Similar Occupations

Compare the job duties, education, job growth, and pay of network and computer systems administrators with similar occupations.

Computer Network Architects:
Source: http://www.bls.gov/ooh/computer-and-information-technology/computer-network-architects.htm

Summary

Computer network architects create the internal networks all workers within organizations use.

Quick Facts: Computer Network Architects

2012 Median Pay	$91,000 per year $43.75 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	5 years or more
On-the-job Training	None
Number of Jobs, 2012	143,400
Job Outlook, 2012-22	15% (Faster than average)
Employment Change, 2012-22	20,900

What Computer Network Architects Do

Computer network architects design and build data communication networks, including local area networks (LANs), wide area networks (WANs), and intranets. These networks range from a small connection between two offices to a multinational series of globally distributed communications systems.

Work Environment

Most computer network architects work full time. More than a quarter worked more than 40 hours per week in 2012.

How to Become a Computer Network Architect

Most computer network architects have a bachelor's degree in a computer-related field. They usually need experience in a related occupation also.

Pay

The median annual wage for computer network architects was $91,000 in May 2012.

Job Outlook

Employment of computer network architects is projected to grow 15 percent from 2012 to 2022, faster than the average for all occupations. Demand for computer network architects will increase as firms continue to expand their use of wireless and mobile networks.

Similar Occupations

Compare the job duties, education, job growth, and pay of computer network architects with similar occupations.

Computer Support Specialists:
Source: http://www.bls.gov/ooh/computer-and-information-technology/computer-support-specialists.htm

Summary

Some computer support specialists, called help-desk technicians, assist non-IT users who are having computer problems.

Quick Facts: Computer Support Specialists

2012 Median Pay	$48,900 per year $23.51 per hour
Entry-Level Education	See How to Become One
Work Experience in a Related Occupation None	
On-the-job Training	See How to Become One
Number of Jobs, 2012	722,400
Job Outlook, 2012-22	17% (Faster than average)
Employment Change, 2012-22	123,000

What Computer Support Specialists Do

Computer support specialists provide help and advice to people and organizations using computer software or equipment. Some, called computer network support specialists, support information technology (IT) employees within their organization. Others, called computer user support specialists, assist non-IT users who are having computer problems.

Work Environment

Most computer support specialists have full-time work schedules; however, many do not work typical 9-to-5 jobs. Because computer support is important for businesses, many support specialists must be available 24 hours a day.

How to Become a Computer Support Specialist

Because of the wide range of skills used in different computer support jobs, there are many paths into the occupation. A bachelor's degree is required for some computer support specialist positions, but an associate's degree or postsecondary classes may be enough for others.

Pay

In May 2012, the median annual wage for computer network support specialists was $59,090. The median annual wage for computer user support specialists was $46,420 in May 2012.

Job Outlook

Employment of computer support specialists is projected to grow 17 percent from 2012 to 2022, faster than the average for all occupations. More support services will be needed as organizations upgrade their computer equipment and software.

Similar Occupations

Compare the job duties, education, job growth, and pay of computer support specialists with similar occupations.

Information Security Analysts:
Source: http://www.bls.gov/ooh/computer-and-information-technology/information-security-analysts.htm

Summary

Information security analysts work to protect a company's computer systems.

Quick Facts: Information Security Analysts

2012 Median Pay	$86,170 per year $41.43 per hour

Quick Facts: Information Security Analysts

Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	Less than 5 years
On-the-job Training	None
Number of Jobs, 2012	75,100
Job Outlook, 2012-22	37% (Much faster than average)
Employment Change, 2012-22	27,400

What Information Security Analysts Do

Information security analysts plan and carry out security measures to protect an organization's computer networks and systems. Their responsibilities are continually expanding as the number of cyberattacks increase.

Work Environment

Most information security analysts work for computer companies, consulting firms, and business and financial companies.

How to Become an Information Security Analyst

Most information security analysts have a bachelor's degree in a computer-related field. They also usually need experience in a related occupation.

Pay

The median annual wage for information security analysts was $86,170 in May 2012.

Job Outlook

Employment of information security analysts is projected to grow 37 percent from 2012 to 2022, much faster than the average for all occupations. Demand for information security analysts is expected to be very high as these analysts will be needed to come up with innovative solutions to prevent hackers from stealing critical information or creating havoc on computer networks.

Similar Occupations

Compare the job duties, education, job growth, and pay of information security analysts with similar occupations.

Network and Computer Systems Administrators:
Source: http://www.bls.gov/ooh/computer-and-information-technology/network-and-computer-systems-administrators.htm

Summary

Administrators maintain network LANs, WANs, and intranets.

Quick Facts: Network and Computer Systems Administrators

2012 Median Pay	$72,560 per year $34.88 per hour
Entry-Level Education	Bachelor's degree
Work Experience in a Related Occupation	None
On-the-job Training	None
Number of Jobs, 2012	366,400
Job Outlook, 2012-22	12% (As fast as average)
Employment Change, 2012-22	42,900

What Network and Computer Systems Administrators Do

Computer networks are critical parts of almost every organization. Network and computer systems administrators are responsible for the day-to-day operation of these networks.

Work Environment

Network and computer systems administrators work with the physical computer networks of a variety of organizations and therefore are employed in many industries.

How to Become a Network and Computer Systems Administrator

Although some employers require a postsecondary certificate, most require a bachelor's degree in a field related to computer or information science.

Pay

The median annual wage for network and computer systems administrators was $72,560 in May 2012.

Job Outlook

Employment of network and computer systems administrators is projected to grow 12 percent from 2012 to 2022, about as fast as the average for all occupations. Growth will be highest at firms that provide cloud computing technology.

Similar Occupations

Compare the job duties, education, job growth, and pay of network and computer systems administrators with similar occupations.

***State of California Employment Development Department Occupation Profiles

Computer Network Support Specialists:
Source: http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=network&careerID=&menuChoice=&geogArea=0601000000&soccode=151152&search=Explore+Occupation

Computer Network Support Specialists
(SOC Code : 15-1152)
in California

Analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption. Excludes "Network and Computer Systems Administrators" (15-1142) and "Computer Network Architects" (15-1143).

Employers are usually looking for candidates with a Associate degree .

Occupational Wages   [Top]

| Area | Year | Period | Hourly Mean | Hourly by Percentile | | |
				25th	Median	75th
California	2015	1st Qtr	$37.49	$27.64	$35.84	$46.08

View Wages for All Areas About Wages

Occupational Projections of Employment (also called "Outlook" or "Demand")   [Top]

| Area | Estimated Year-Projected Year | Employment | | Employment Change | | Annual Avg Openings |
		Estimated	Projected	Number	Percent	
California	2012 - 2022	18,200	20,100	1,900	10.4	470

View Projections for All Areas About Projections

Job Openings from JobCentral National Labor Exchange   [Top]

Enter a Zip Code [   ]   Find a Zip code in California

Within
 miles of Zip Code.

Industries Employing This Occupation (click on Industry Title to View Employers List)   [Top]

Industry Title	Number of Employers in State of California	Percent of Total Employment for Occupation in State of California
Computer Systems Design and Rel Services	8,925	19.2%
Wired Telecommunications Carriers	703	4.9%
Colleges and Universities	2,386	4.5%
Scientific Research and Development Svc	5,697	4.4%
Management of Companies and Enterprises	973	4.2%
Employment Services	6,027	4.0%
Commercial Goods Merchant Wholesalers	6,304	3.3%
Elementary and Secondary Schools	17,270	3.0%
Accounting and Bookkeeping Services	22,950	2.8%
General Medical and Surgical Hospitals	1,772	2.5%
Software Publishers	236	2.0%
Electronic Instrument Manufacturing	1,064	2.0%
Data Processing and Related Services	4,178	2.0%
Depository Credit Intermediation	9,672	1.9%
Management & Technical Consulting Svc	26,763	1.5%
Architectural and Engineering Services	20,344	1.3%
Office Administrative Services	1,878	1.1%
Other Information Services	3,268	1.0%
Junior Colleges	189	1.0%

About Staffing Patterns

Training Programs (click on title for more information)
Program Title
Computer and Information Systems Security/Information Assura
Computer Programming/Programmer, General
Computer Science.
Computer Support Specialist
Computer Systems Analysis/Analyst

About Training & Apprenticeships

Data for Tasks not available.

More Tasks for Computer Network Support Specialists

Data for Skills not available.

More Skills for Computer Network Support Specialists

Data for Tasks not available.

More Abilities for Computer Network Support Specialists

Top Work Values (Aspects of this job that create satisfaction.)
Achievement - Occupations that satisfy this work value are results oriented and allow employees to use their strongest abilities, giving them a feeling of accomplishment.
Support - Occupations that satisfy this work value offer supportive management that stands behind employees.

More Work Values for Computer Network Support Specialists

Top Interests (The types of activities someone in this job would like.)
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.
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.

Information Security Analysts:
Source:

Information Security Analysts
(SOC Code : 15-1122)
in California

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. Excludes "Computer Network Architects" (15-1143).

Employers are usually looking for candidates with a Bachelor's degree .

Occupational Wages [Top]

Area	Year	Period	Hourly Mean	Hourly by Percentile		
				25th	Median	75th
California	2015	1st Qtr	$51.77	$39.86	$51.27	$61.93

View Wages for All Areas   About Wages

Occupational Projections of Employment (also called "Outlook" or "Demand") [Top]

Area	Estimated Year-Projected Year	Employment		Employment Change		Annual Avg Openings
		Estimated	Projected	Number	Percent	
California	2012 - 2022	8,200	11,500	3,300	40.2	450

View Projections for All Areas   About Projections

Job Openings from JobCentral National Labor Exchange [Top]

Enter a Zip Code [ ]   Find a Zip code in California

Within
 miles of Zip Code.

Industries Employing This Occupation (click on Industry Title to View Employers List) [Top]

Industry Title	Number of Employers in State of California	Percent of Total Employment for Occupation in State of California

[Computer Systems Design and Rel Services](#)	8,925	20.1%
[Depository Credit Intermediation](#)	9,672	15.1%
[Data Processing and Related Services](#)	4,178	4.6%
[Colleges and Universities](#)	2,386	4.2%
[Insurance Carriers](#)	5,273	2.1%
[Software Publishers](#)	236	2.0%
[Electronic Instrument Manufacturing](#)	1,064	1.9%
[Electronic Shopping & Mail-Order Houses](#)	2,153	1.9%
[Scientific Research and Development Svc](#)	5,697	1.8%
[General Medical and Surgical Hospitals](#)	1,772	1.7%
[Accounting and Bookkeeping Services](#)	22,950	1.6%
[Architectural and Engineering Services](#)	20,344	1.6%
[Aerospace Product & Parts Manufacturing](#)	283	1.4%
[Security & Commodity Investment Activity](#)	1,184	1.3%

[About Staffing Patterns](#)

Data for Training Programs not available.

[About Training & Apprenticeships](#)

About This Occupation (from O*NET - The Occupation Information Network)   [Top]

Top Tasks (Specific duties and responsibilities of this job.)

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.

More Tasks for Information Security Analysts

Top Skills used in this Job

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.

More Skills for Information Security Analysts

Top Abilities (Attributes of the person that influence performance in this job.)

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

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.

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

More Abilities for Information Security Analysts

Top Work Values (Aspects of this job that create satisfaction.)
Working Conditions - Occupations that satisfy this work value offer job security and good working conditions.
Support - Occupations that satisfy this work value offer supportive management that stands behind employees.

[More Work Values for Information Security Analysts](#)

Top Interests (The types of activities someone in this job would like.)
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.
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.

[More Interests for Information Security Analysts](#)

Alternate Titles
Computer Security Specialists; Data Security Administrators; Information Security Engineers; Information Security Officers; Information Security Specialists; Information Systems Security Analysts; and Information Technology Security Analysts

Computer and Information Systems Managers:
Source: http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=security&careerID=&menuChoice=&geogArea=0601000000&soccode=113021&search=Explore+Occupation

Computer and Information Systems Managers
(SOC Code : 11-3021)
in California

Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming. Exclude "Computer Specialists" (15-1011 through 15-1099).

Employers are usually looking for candidates with a Work experience, plus bachelor's or higher degree .

Occupational Wages   [Top]

Area	Year	Period	Hourly Mean	Hourly by Percentile		
				25th	Median	75th
California	2015	1st Qtr	$77.35	$56.50	$72.99	N/A

Occupational Projections of Employment (also called "Outlook" or "Demand")

Area	Estimated Year-Projected Year	Employment		Employment Change		Annual Avg Openings
		Estimated	Projected	Number	Percent	
California	2012 - 2022	46,800	57,200	10,400	22.2	1,690

Job Openings from JobCentral National Labor Exchange

Enter a Zip Code [   ]   Find a Zip code in California

Within
 miles of Zip Code.

Industries Employing This Occupation (click on Industry Title to View Employers List)

Industry Title	Number of Employers in State of California	Percent of Total Employment for Occupation in State of California
Computer Systems Design and Rel Services	8,925	20.2%
Management of Companies and Enterprises	973	6.7%
Software Publishers	236	6.0%
Other Information Services	3,268	5.9%
Computers and Peripheral Equipment	480	5.7%
Management & Technical Consulting Svc	26,763	3.0%
Scientific Research and Development Svc	5,697	2.6%
Electronic Instrument Manufacturing	1,064	2.5%
Colleges and Universities	2,386	2.1%
Semiconductor and Electronic Components	1,693	2.1%
Aerospace Product & Parts Manufacturing	283	1.8%
Architectural and Engineering Services	20,344	1.6%

[Depository Credit Intermediation](#)	9,672	1.6%
[Commercial Goods Merchant Wholesalers](#)	6,304	1.5%
[General Medical and Surgical Hospitals](#)	1,772	1.3%
[Data Processing and Related Services](#)	4,178	1.2%
[Insurance Carriers](#)	5,273	1.2%
[Accounting and Bookkeeping Services](#)	22,950	1.0%
[Communications Equipment Manufacturing](#)	404	1.0%
[Office Administrative Services](#)	1,878	1.0%

[About Staffing Patterns](#)

Training Programs (click on title for more information)   [Top]
Program Title
[Computer and Information Sciences, General](#)
[Computer and Information Systems Security/Information Assura](#)
[Computer Science.](#)
[Information Resources Management/CIO Training](#)
[Information Science/Studies](#)

[About Training & Apprenticeships](#)

About This Occupation (from O*NET - The Occupation Information Network)   [Top]
Top Tasks (Specific duties and responsibilities of this job.)
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.
Control operational budget and expenditures.

[More Tasks for Computer and Information Systems Managers](#)

Top Skills used in this Job

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.

More Skills for Computer and Information Systems Managers

Top Abilities (Attributes of the person that influence performance in this job.)

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.

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).

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

More Abilities for Computer and Information Systems Managers

Top Work Values (Aspects of this job that create satisfaction.)

Working Conditions - Occupations that satisfy this work value offer job security and good working conditions.

Support - Occupations that satisfy this work value offer supportive management that stands behind employees.

[More Work Values for Computer and Information Systems Managers](#)

Top Interests (The types of activities someone in this job would like.)
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.

[More Interests for Computer and Information Systems Managers](#)

Alternate Titles
Information Systems Directors; Management Information Systems Directors; Information Technology Directors; Information Technology Managers; Data Processing Managers; Directors of Application Development; Technical Services Managers; Directors of Data Operations; Information Technology Systems Directors; and Management Information Systems Managers.

Network and Computer Systems Administrator:
Source: http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=security&careerID=&menuChoice=&geogArea=0601000000&soccode=151142&search=Explore+Occupation

Network and Computer Systems Administrators
(SOC Code : 15-1142)
in California

Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet system or a segment of a network system. Maintain network hardware and software. Monitor network to ensure network availability to all system users and perform necessary maintenance to support network availability. May supervise other network support and client server specialists and plan, coordinate, and implement network security measures. Exclude "Computer Support Specialists" (15-1041).

Employers are usually looking for candidates with a Bachelor's degree .

Occupational Wages   [Top]

Area	Year	Period	Hourly Mean	Hourly by Percentile		
				25th	Median	75th
California	2015	1st Qtr	$43.12	$32.17	$41.68	$53.00

Occupational Projections of Employment (also called "Outlook" or "Demand")   [Top]

Area	Estimated Year-Projected Year	Employment		Employment Change		Annual Avg Openings
		Estimated	Projected	Number	Percent	
California	2012 - 2022	40,700	47,600	6,900	17.0	1,330

Job Openings from JobCentral National Labor Exchange   [Top]

Enter a Zip Code [   ]   Find a Zip code in California

Within
 miles of Zip Code.

Industries Employing This Occupation (click on Industry Title to View Employers List)   [Top]

Industry Title	Number of Employers in State of California	Percent of Total Employment for Occupation in State of California
Computer Systems Design and Rel Services	8,925	15.5%
Management of Companies and Enterprises	973	7.4%
Colleges and Universities	2,386	3.6%
Management & Technical Consulting Svc	26,763	3.4%
Data Processing and Related Services	4,178	3.2%
Employment Services	6,027	3.0%
Other Information Services	3,268	2.7%
Elementary and Secondary Schools	17,270	2.6%
Scientific Research and Development Svc	5,697	2.4%
Wired Telecommunications Carriers	703	2.4%
Architectural and Engineering Services	20,344	2.3%
Software Publishers	236	2.3%
Commercial Goods Merchant Wholesalers	6,304	1.8%

Legal Services	48,844	1.7%
General Medical and Surgical Hospitals	1,772	1.6%
Insurance Carriers	5,273	1.4%
Semiconductor and Electronic Components	1,693	1.3%
Offices of Physicians	48,143	1.2%
Electronic Instrument Manufacturing	1,064	1.2%
Accounting and Bookkeeping Services	22,950	1.2%
Depository Credit Intermediation	9,672	1.1%
Insurance Agencies, Brokerages & Support	32,073	1.1%
Office Administrative Services	1,878	1.0%
Motion Picture and Video Industries	5,810	1.0%

About Staffing Patterns

Training Programs (click on title for more information)   [Top]
Program Title
Computer and Information Sciences, General
Computer and Information Systems Security/Information Assura
Network and System Administration/Administrator

About Training & Apprenticeships

Data for Tasks not available.

More Tasks for Network and Computer Systems Administrators , More Tasks for Computer Security Specialists

---

Data for Skills not available.

More Skills for Network and Computer Systems Administrators , More Skills for Computer Security Specialists

---

Data for Tasks not available.

More Abilities for Network and Computer Systems Administrators , More Abilities for Computer Security Specialists

Data for Work Values not available.

[More Work Values for Network and Computer Systems Administrators](), [More Work Values for Computer Security Specialists]()

Data for Interests not available.

[More Interests for Network and Computer Systems Administrators](), [More Interests for Computer Security Specialists]()

Alternate Titles
Information Technology (IT) Directors; IT Managers; IT Specialists; Local Area Network (LAN) Administrators; Network Administrators; Network Engineers; Network Managers; Network Specialists; Systems Administrators; and Systems Engineers

Computer and Office Machine Repairers:
Source: http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=computer+technician&careerID=&menuChoice=&geogArea=0601000000&soccode=492011&search=Explore+Occupation

Computer and Office Machine Repairers
(SOC Code : 49-2011)
in California

Repair, maintain, or install computers, word processing systems, automated teller machines, and electronic office machines, such as duplicating and fax machines.

Employers are usually looking for candidates with Post secondary vocational training .

Occupational Wages   [Top]

Area	Year	Period	Hourly Mean	Hourly by Percentile		
				25th	Median	75th
California	2015	1st Qtr	$21.26	$15.51	$20.06	$26.04

[View Wages for All Areas]() [About Wages]()

Occupational Projections of Employment (also called "Outlook" or "Demand")   [Top]

Area	Estimated Year-Projected Year	Employment		Employment Change		Annual Avg Openings
		Estimated	Projected	Number	Percent	
California	2012 - 2022	14,900	15,000	100	0.7	320

Job Openings from JobCentral National Labor Exchange   [Top]

Enter a Zip Code ☐   Find a Zip code in California

Within
 miles of Zip Code.

Industries Employing This Occupation (click on Industry Title to View Employers List)   [Top]

Industry Title	Number of Employers in State of California	Percent of Total Employment for Occupation in State of California
Electronics and Appliance Stores	19,392	17.4%
Commercial Goods Merchant Wholesalers	6,304	16.0%
Computer Systems Design and Rel Services	8,925	9.7%
Electronic Markets and Agents/Brokers	2,347	5.8%
Office Supply, Stationery & Gift Stores	8,366	4.5%
Employment Services	6,027	2.1%
Agriculture, Forestry, Fishing & Hunting	8,417	1.7%
Computers and Peripheral Equipment	480	1.5%
Elementary and Secondary Schools	17,270	1.5%

About Staffing Patterns

Training Programs (click on title for more information)   [Top]
Program Title
Business Machine Repair
Computer Installation and Repair Technology/Technician

About Training & Apprenticeships

About This Occupation (from O*NET - The Occupation Information Network)   [Top]
Top Tasks (Specific duties and responsibilities of this job.)

Converse with customers to determine details of equipment problems.
Reassemble machines after making repairs or replacing parts.
Travel to customers` stores or offices to service machines or to provide emergency repair service.
Reinstall software programs or adjust settings on existing software to fix machine malfunctions.
Advise customers concerning equipment operation, maintenance, or programming.
Assemble machines according to specifications, using hand or power tools and measuring devices.
Test new systems to ensure that they are in working order.
Operate machines to test functioning of parts or mechanisms.
Maintain records of equipment maintenance work or repairs.
Install and configure new equipment, including operating software or peripheral equipment.

More Tasks for Computer, Automated Teller, and Office Machine Repairers

---

Top Skills used in this Job
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.
Repairing - Repairing machines or systems using the needed tools.
Equipment Maintenance - Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
Reading Comprehension - Understanding written sentences and paragraphs in work related documents.
Speaking - Talking to others to convey information effectively.
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.
Time Management - Managing one`s own time and the time of others.
Troubleshooting - Determining causes of operating errors and deciding what to do about it.

More Skills for Computer, Automated Teller, and Office Machine Repairers

---

Top Abilities (Attributes of the person that influence performance in this job.)
Oral Comprehension - The ability to listen to and understand information and ideas presented through spoken words and sentences.

More Abilities for Computer, Automated Teller, and Office Machine Repairers

---

Top Work Values (Aspects of this job that create satisfaction.)

Support - Occupations that satisfy this work value offer supportive management that stands behind employees.
Independence - Occupations that satisfy this work value allow employees to work on their own and make decisions.

[More Work Values for Computer, Automated Teller, and Office Machine Repairers](#)

Top Interests (The types of activities someone in this job would like.)
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.

CompTIA®

5 Reasons Why Employers Look for IT Certifications

"The person with the certification is the one that is going to get hired."

- Robert Blanchard, Director of Support Services
  Aspen Skiing Services Co.

There are more than half a million IT job openings in the US alone.

Ever wonder what employers are looking for as they read through hundreds of resumes?

How do I get my resume to stand out?

What qualifications do I need to get an IT job?

What will get me noticed?

Where should I start?

CompTIA spoke with over 400 companies to get the inside scoop on why employers look for IT certifications when hiring for open positions.

Source: Burning Glass Technologies

91[%] of employers believe IT certifications play a key role in the hiring process and that **IT certifications are a reliable predictor of a successful employee.**

Here are 5 reasons why:

1. Certifications help employers fill open positions.

2. Most companies have IT staff that hold certifications.

3. Certified IT pros make great employees.

4. IT certifications are growing in importance.

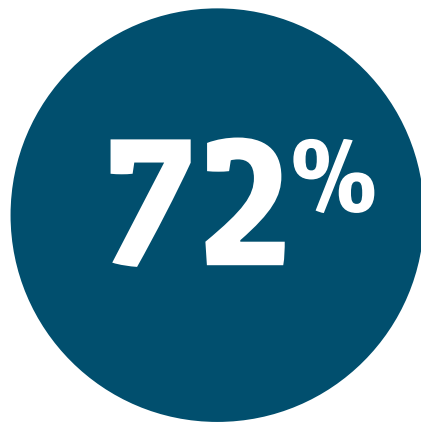5. Training alone is not enough.

Certifications Help Employers Fill Open Positions

93% of employers said finding the right IT pro to fill job openings is a major challenge.

Certifications help prove you have the knowledge and skills needed to get the job done...

93% | ...and since 93% of HR professionals say they value IT certifications, this type of credential will really stand out to your future employer.
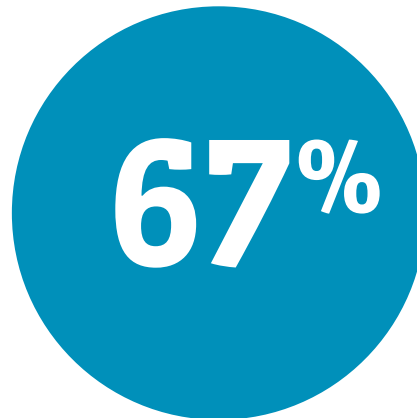
92% | 92% of HR professionals have a certification in their own field. This proves the person looking at your resume sees certification as an important credential.

- Certifications make it easier to help find the right IT pro. By including IT certifications as a requirement in job listings, employers reduce the number of unqualified resumes they receive.

72%

72% of employers require IT certifications for certain job openings.

67% of employers use certifications to measure a candidate's willingness to work hard and meet a goal.

67%

60%

60% of employers use certifications to confirm subject matter expertise.

Certifications make a great first impression.

Employers overwhelmingly agree that certified IT pros make the ideal job candidate.

95% agree that IT certifications provide a baseline set of knowledge for certain IT positions.

92% believe IT certifications help to ensure credibility of IT employees.

92% said IT certified individuals receive higher starting salaries than those without IT certifications.

91% think IT certifications save time and resources in evaluating a potential IT job candidate.

90% said IT certifications enable IT employees to learn faster once starting a job.

Most Companies Have IT Staff That Hold Certifications

Research shows certified employees are:

- More confident.
- More knowledgeable.
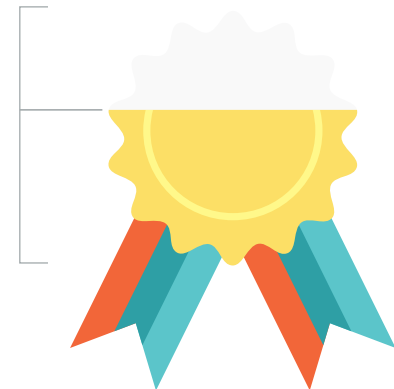- Reach job proficiency quicker.
- Are more reliable.
- Perform at a higher level.

"Experience has shown that employees hired with certifications work smarter and stay at their position longer."

● Over half of organizations already have certified IT professionals on staff.

Source: *CompTIA HR Perception of IT Training and Certification Study: 2015*

Certified IT Pros Make Great Employees

Employers agree that certified employees perform better and earn more recognition as compared to non-certified staff. From the perspective of an employer:

90% agree IT-certified invidiuals are more likely to be promoted than those without IT certifications.

89% think IT-certified individuals tend to perform better than non-IT-certified individuals in similar job roles.

89% believe certified employees are more likely to stay with their organization than non-certified IT staff.
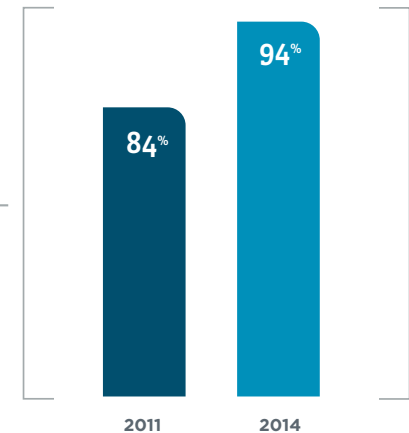
88% say that IT-certified employees are rewarded (bonus and pay increase) for obtaining IT certifications.

Source: *CompTIA HR Perception of IT Training and Certification Study: 2015*

IT Certifications Are Growing In Importance

- Employers increasingly recognize the importance of IT certifications. 94% of HR managers expect IT certification to grow in importance over the next two years as compared to only 84% two years ago.

84% 2011

94% 2014

"Certification is a good baseline validation of what was learned that can be looked at against employee's performance post certification."
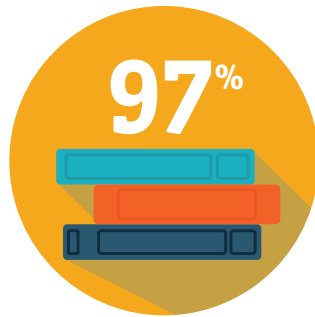
Training Alone Is Not Enough

Employers agree that you need a certification to validate your skills. 88% of employers believe it's important to **test after training** to confirm knowledge gains.

98%

cite at least one specific benefit of certification testing rather than training by itself, such as:

- Better validation of knowledge learned / skills.

- Increased value / credibility of the training.

- Increased / improved knowledge.

- Demonstration of abilities.

- Skills and knowledge retained for a longer period of time.

97% of employers value certification enough to provide support for IT employees obtaining IT certification.

97%

"Offering training and certification allows us to demonstrate commitment to our staff. We get much more out of the money we spend in those areas than we would if we simply passed that money along in salary increases."

–BAYCREST CENTRE FOR GERIATRIC CARE

Types of support employers provide to IT staff pursuing IT certification

37% provide training at work.

36% pay for all certification and training expenses.

34% offer paid time off for taking the certification exam.

31% offer paid time off for studying/ training.

Source: *CompTIA HR Perception of IT Training and Certification Study: 2015*

Expect success with IT certifications.

With the **number of open IT positions expected to increase by 17%** by 2022, it's inevitable that IT certifications will continue to play a significant role in the hiring process.

17%

Getting yourself certified is the best way to future proof your IT career.

Source: U.S. Bureau of Labor Statistics – Occupational Employment Statistics

Wondering where to start?

CompTIA is with you every step of the way.

1 Choose a certification

2 Choose a training option

3 Get familiar with the exam

4 Register and take the exam

5 You're CompTIA certified!

Visit **Certification.CompTIA.org** for more information.