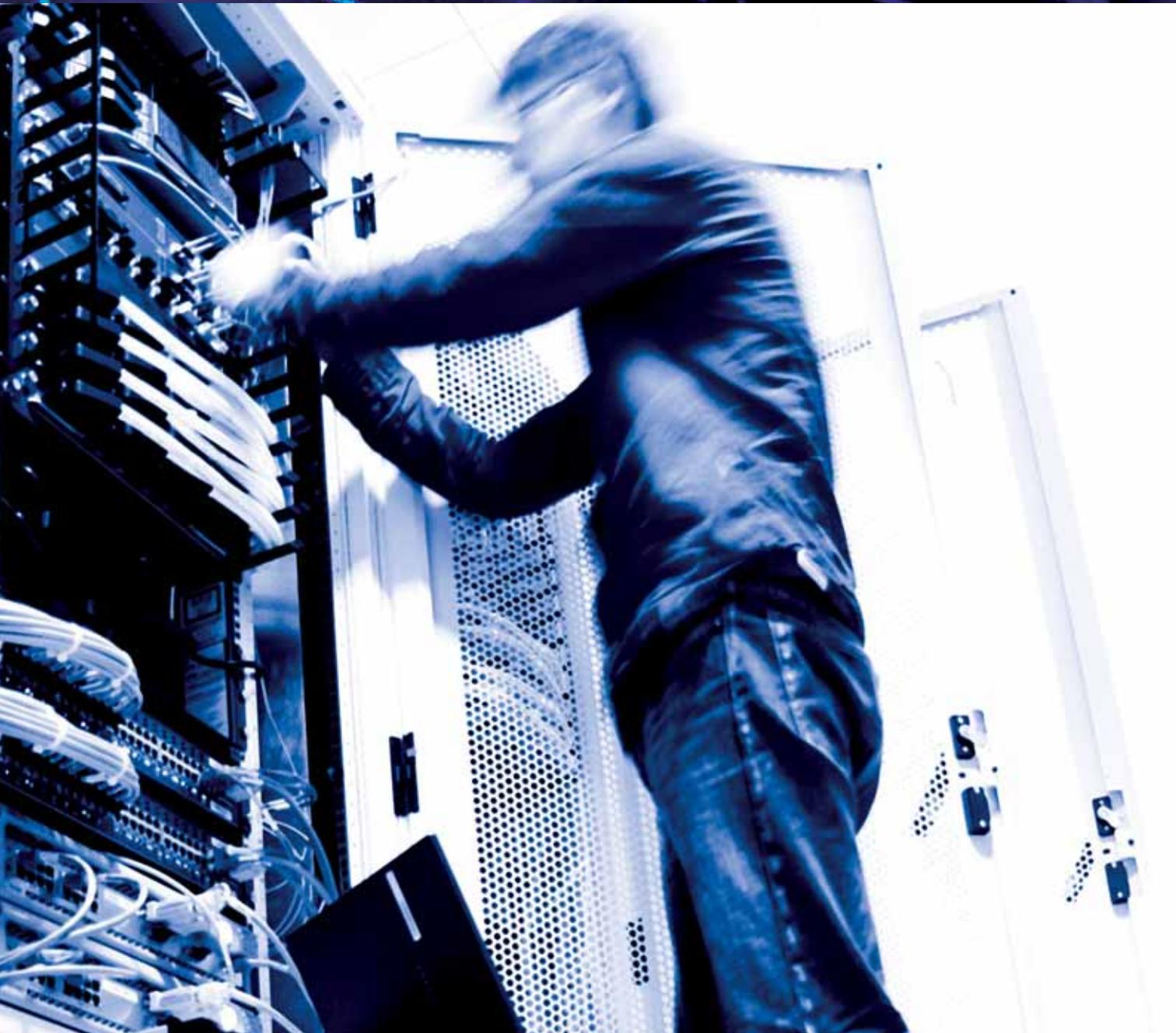


FACING THE *IT Talent Squeeze* in a networked economy

THE NEXT GENERATION
OF LEADERS



THE CISCO NETWORKING ACADEMY IS HELPING TO DEVELOP THE NEXT GENERATION OF QUALIFIED IT WORKERS AND FUTURE LEADERS IN THE FIELD.



By Peter J. Joyce

Ten years ago, Cisco began working with schools on a pilot initiative called the Cisco Networking Academy. Today, the Networking Academy program operates in more than 160 countries, comprising a network of more than 7,600 schools that teach the information technology skills essential in a global economy. Today's advances in communications technology will make the next decade an era that will be limited only by our imagination and our ability to develop qualified IT professionals. Cisco Networking Academy has partnered with educational, business, government and nonprofit organizations to deliver the services needed to grow the global IT workforce and encourage socioeconomic development in communities around the world. Over the past 10 years, the Networking Academy has demonstrated success in providing students of all ages and from all walks of life with advanced skills in networking and information technology, leading to further academic exploration and career development. Graduates have benefited from gaining in-demand skills, increasing their earning power, and advancing their education, all of which aids in the development of their countries and local economies.

Peter J. Joyce

is the workforce development manager for Cisco. He can be contacted by e-mail at pjoyce@cisco.com.

A New Human Network through Web 2.0

During the genesis of the Internet, computers were considered the sources of value and the network was viewed as a simple pipe between them. Today we are seeing an Internet-driven revolution, an entirely different level of instant and complex collaboration across the increasingly critical global human network.

This is particularly evident with the growing Web traffic from young people, who interact via instant messaging, cell phones and MySpace as they watch TV and YouTube on the Web. The world is becoming a much more networked place, and the next phase of business differentiation relies on the network for the real-time information and services that will foster rewarding customer interactions.

Those who question the future growth of this communication technology and its effectiveness need only to look at the amount of digital information being created today. It took more than 200 years for the U.S. Library of Congress to build its collection of millions of books, recordings, photographs, maps and manuscripts. The digital equivalent of that same information is now created every 15 minutes—and this is just the beginning.

Although Yahoo! has already indexed many billions of Web pages, more pages are hidden behind corporate firewalls or in private databases. By some estimates, this “dark Web” is 500 times the size of the Internet as we know it. IBM estimates that by 2010, the amount of digital information is expected to double every 11 hours. In a little more than two years, worldwide Internet traffic will hit 9 exabytes per month. That is the equivalent of 9 quintillion typed characters, enough for 4 trillion novels. This is nearly two times the number of letters you’d need to write down all the words ever spoken. And that’s only the virtual Web.

We are seeing now that everything physical will eventually be connected to everything else. A decade after the introduction of the World Wide Web, the number of computing devices connected to the Internet had grown to 100 million. By 2010, that number will probably reach 14 billion. Just about all the early inhabitants of the Internet were computers, but the mix is now shifting to other devices such as cell phones, PDAs and set-top boxes. Wireless access will be everywhere—integrating personal communication and computing devices, connecting home and business networks and providing ubiquitous access.

The Squeeze

Meeting the opportunities ahead will require a technically skilled workforce, both for development and deployment. This is true on a global scale for not only technology companies, but also true for the schools, hospitals, businesses and other institutions that will use technology around the world.

The technology industry is experiencing a squeeze for talent. The U.S. Bureau of Labor Statistics has identified computer-based jobs as one of the hottest areas of growth, and those involving specific skill sets—such as systems analysis, database administration and computer science—will be some of the fastest-growing occupations through 2012, with growth rates anywhere from 40 to 70 percent in the United States alone. At least 1.5 million additional IT field

professionals will be needed by the end of this year. Adding to the talent squeeze is the retirement of approximately 70 million baby boomers that will leave the workforce over the next 15 years. With only 40 million new workers coming in, this will make the shortage of computer-skilled employees even more dramatic. Canada, Europe, the Middle East and Asia foresee similar retirement rates.

Ever since the dotcom bust in the United States there’s been a steep drop-off in the number of students pursuing science and engineering degrees. The number of newly declared computer science majors has actually declined by 32 percent over the last four years. Even more concerning, is that many women and underrepresented minorities are not even considering science and engineering programs as a field of interest.

There are a couple of reasons for this problem. One is a myth, believed by parents, students and high school guidance counselors, that computer science and engineering jobs are all being outsourced to China and India. This is absolutely not the case. According to a government study, the voluntary attrition in the United States has outpaced the number of outsourced jobs to emerging nations. Furthermore, for every job outsourced from the United States, nine U.S. jobs are created. The global competition for skills and jobs is escalating, especially in computer science, math and engineering. According to the Council on Competitiveness, about 70,000 of the 1 million U.S. college graduates each year earn engineering degrees. China and India produce 6.4 million graduates a year, nearly 1 million of whom are in engineering.

U.S. educators and industry leaders must advance the nation’s competitiveness by keeping the innovation pipeline fortified with fresh ideas and talent. Technological advancements depend on encouraging top students to be the next researchers, developers and problem solvers. A critical part of this mission is a stronger commitment from corporate leadership to work closely with schools at multiple levels, helping to prepare students for the workforce.

Learning Pathways in Upstate New York

Many jobs in the technology industry require some postsecondary education. It has become critical to develop clear and seamless education pathways from high school to graduate school to corporate training. These pathways should allow for various entry and exit points depending on an individual’s position and career goals. Too many institutions still operate in isolation or are tentatively connected to each other by paper-thin agreements. In upstate New York, for example, a number of high schools, community colleges and four-year colleges participating in the Networking Academy are changing old models and showing what is possible. Since the schools teach the same Networking Academy curriculum, working relationships between the schools have evolved over time.

Not only are there articulation agreements among them, but the instructors and administrators have established deep working relationships through Cisco training opportunities and industry-related events as well. Rensselaer Polytechnic Institute (RPI) has hosted meetings and conferences for instructors from the academies in the region. Schenectady High School has hosted school team

competitions and career days. Alfred University has conducted regular training for instructors. While agreements have been made by schools to accept courses and credits from the others, it is the relationships that make the difference. The most important outcome of this collaboration has been an increase in interest from students, as they are able to see career pathways and related education opportunities. Students have also taken advantage of the relationships among the schools to transfer their studies to other learning institutions and to continue their career pursuits.

Regional Change: The California Regional Consortium for Engineering Advances in Technological Education

The California Regional Consortium for Engineering Advances in Technological Education (CREATE) project is a joint effort of six community colleges and high-tech employers aimed at developing a regional approach to workforce preparation and training. The center is graduating its first cohort of information technology students, who enrolled both online and on-site at the California State University, Channel Islands. As a Cisco Networking Academy training center, CREATE offers instructor training for Cisco networking courses. CREATE's workshops improve the instructional skills of teachers who deliver Networking Academy courses in the community college setting. CREATE is not just training teachers to teach the courses, but is also developing them professionally. These teachers are learning how to create structured lessons, address various learning styles and motivate their students while teaching rigorous content.

CREATE's technology courses provide pathways into degree programs at various four-year institutions in the region, including five California State University campuses. Since 1999, CREATE has helped educate 22,546 students, developed and implemented 30 new degree programs and 105 new courses, and facilitated more than a million dollars in additional funding through innovative industry and college partnerships.

The CREATE colleges and their partners

act as demonstration sites for regional technical workshops that test new curricula, enhance the delivery of instruction to underrepresented student populations, and conduct innovative professional development programs. A total of 17,735 students have completed at least one CREATE-developed credit course. All CREATE courses apply to a degree or certificate. Requests to expand the teacher training nationally have resulted in the addition of participants from multiple states and National Science Foundation centers.

Setting the Stage for the 21st Century

The Internet is on the verge of yet another expansion. We must take advantage of the opportunity to build on our partnership successes to ensure that we are well positioned for the future. Here are the challenges that the United States must undertake to meet our collective education and workforce goals.

Create More Interest—We must continue to foster interest in technology careers among young people. It is important to get the word out by working with local employers and demonstrating to students and workers the connections between local educational pathways.

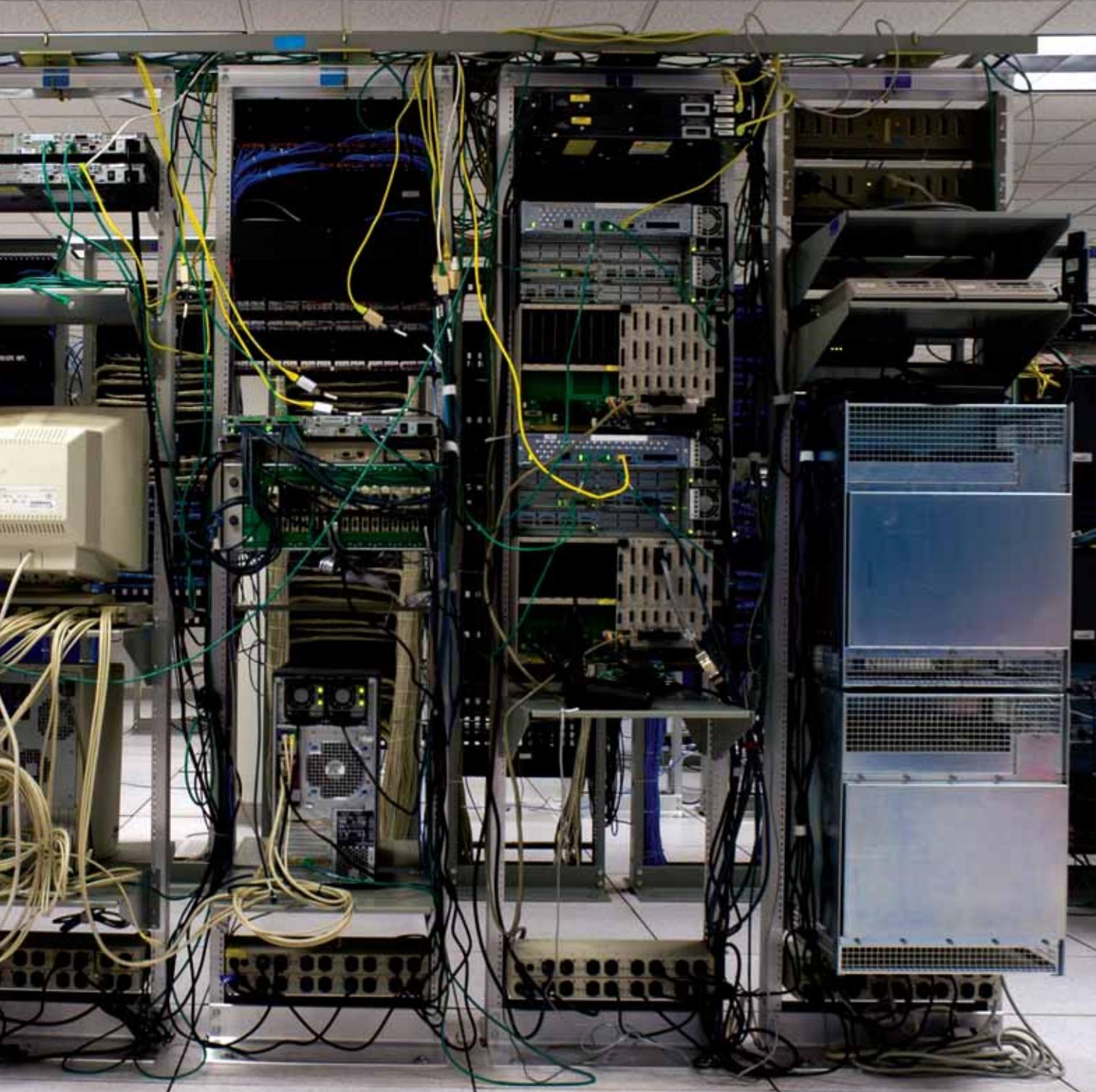
Attract Untapped Groups—Women and minorities continue to be underrepresented in computer science and engineering fields. It is critical to attract and encourage a diverse pool of workers. Academic and business leaders must reach out to our successors and serve as role models, whether it's through classroom interaction, mentoring networks or other initiatives.

Develop Clear and Vibrant Learning Pathways—The skill requirements within the industry have become more complex over the last 10 years. Postsecondary training has become a distinct advantage for professionals in the field. As mentioned before, meeting this challenge requires concrete connections between educational and corporate institutions. Students and workers must see the parallels between career aspirations and the necessary educational require-



ments. Institutions must establish the creative dual-enrollment and articulation agreements necessary to make the progression of learning efficient, and staff and faculty must take the lead to see that the people within the institutions are connected, forming a seamless path for students and workers.

Forge Unprecedented Partnerships—Web 2.0 is about the human network. We



know that we are more powerful together than we ever could be apart. As technology skill requirements become more complex, the classroom is no longer enough. Employers' expectations for entry-level professionals are higher than ever. Students must be able to demonstrate the ability to transfer knowledge and skills acquired in a school setting to a work environment. Many dimensions of

business acumen and customer-related skills are best attained through job-related experiences. We must work together to ensure that employers are engaged in local cooperative learning programs, internships and apprenticeships.

Looking Ahead

The renewed excitement within the technology industry is taking us into the

world of Web 2.0. The challenges facing the industry and our ability to secure talent are evident. This is why Cisco is committed to continuing its efforts with schools across the United States and around the globe. Our collective challenge is to develop partnerships across education, government and business to prepare a world-class American workforce for the 21st century. **T**