

WHITE PAPER

Networking Skills in North America: Trends, Gaps, and Strategies

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CHANGING ROLE OF THE NETWORK

Over the past several years, the role of the network has changed. While cost savings is an important IT goal, business enablement has taken center stage as the challenges of conducting business across distance and competing on innovation are driving collaboration and business processes to the network.

In the underlying enterprise network technology market, voice traffic is migrating onto the IP network, changing the network life-cycle services paradigm. Networks with converged voice, data, and growing video traffic are being built and managed differently. The increased complexity of today's enterprise networks is increasing the demand for network consulting and integration skills. Growing regulatory and compliance requirements are also causing network transformations. And finally, the proliferation of access points and the increased focus on network security and resource management also fuel IT spending.

These shifts of network use and importance place a premium on skilled networking professionals to design, install, manage, and secure the network infrastructure that is becoming a critical component to successful business.

This white paper shows that the number of networking positions will grow 30% in the next four years. Additionally, organizations will face an increasing shortage of people within the areas of network security and specialized network skills such as IP telephony and wireless networking. The data in the white paper is based on an IDC survey, sponsored by Cisco Learning Institute, of over 500 telephone interviews with IT professionals across North America and on IDC's proprietary IT skills model.

SITUATION OVERVIEW

Total Networking Skills

About 14% of the total IT workforce in North America works on IP networks. That will grow 30% over the next four years to almost 780,000 workers.

However, there is a "skill gap." The difference between the supply of skilled workers and the demand for those skills represents a challenge for networking vendors and their clients and an opportunity for IT professionals.

The overall gap between supply and demand for networking professionals is about 8% of the total demand. The good news is that the overall gap isn't getting any bigger. The bad news is that in some specialties, such as wireless networking, the gap is large, and in other segments, such as network security, the gap is growing very fast.

Application, Business, and Multiple Skill Sets

One strategy that companies use to mitigate the impact of the networking skill gap is to share job roles and tasks between multiple workers. Skilled network professionals perform several network jobs — network design, installation, configuration, and so on — in addition to performing work in other areas of IT and even non-IT-related work for their companies. This "decentralized" job role helps reduce the impact of a single open position because it represents only a small share of multiple tasks that are left "undone" or being picked up by other workers. For the same reason, this approach also reduces the impact of a worker leaving the organization because tasks are easily shared by or shifted to other workers.

Our research suggests that networking professionals spend about 30% of their time in their primary networking role, about 40% of their time on other networking activities, and the remaining time on other IT and non-IT activities.

Skills Certification

A second strategy leveraged by enterprises facing a skills shortage is to "short-circuit" the need for years of experience. Instead, enterprises increasingly look for a certification in a relevant technology. Nearly three-quarters of enterprises believe certifications improve the credibility and reflect the capability of a candidate for a networking position. It is even more important to the largest companies, where four out of five view certification as beneficial to the credibility of a candidate at the point of hire.

Marketplace Response to a Skills Shortage

A third strategy that enterprises employ is to accelerate outsourcing and global sourcing for networking activities to other companies within North America or even in other regions. As salaries rise in areas where shortages exist, the propensity to move tasks to countries where wages are lower increases.

Vendors of networking services increasingly will offer managed networking services to their clients. The value proposition of managed network services is as a cost advantage for the client. At the same time, scalability and strongly leveraged management and deployment tool sets allow vendors to operate more extensive networks with lower aggregate headcounts. Vendors also leverage parallel sourcing strategies by leveraging their own talent from less expensive regions and by selectively outsourcing activities of their own networking management to third (or fourth) parties.

Ultimately, the networking skills shortage will cause changes in behaviors at all levels of the IT industry. Most dramatically impacted will be the individual enterprises and their employees, who will need to change their work and their skills to remain competitive.

FUTURE OUTLOOK

Changing Role of the Network to a Business-Enabling Infrastructure

Over the past several years, the role of the network has changed. Network-enabled business processes, collaboration tools, and communications technologies are becoming central to enterprises' competitive positioning in the global marketplace. Although cost savings are still an important IT goal, business enablement has taken center stage as the challenges of conducting business across regions and competing on innovation are driving collaboration and business processes to the network.

In the enterprise network technology market, vendors are phasing out TDM-only telephony systems and accelerating enterprise adoption of IP PBXs and hybrid TDM/IP PBX systems. The migration of voice traffic onto the IP network changes the network life-cycle services paradigm for the IP network. Architecting and supporting IP networks with converged voice, data, and growing video traffic requires a major shift in the way many enterprise networks are built and managed. Demand for network consulting and integration skills is growing as a result of the increased complexity of today's enterprise networks. IT departments are challenged to find or build in-house expertise to fulfill their network transformation needs.

Growing regulatory and compliance requirements are also driving IT departments to accelerate their network transformation timeline. With the proliferation of networked devices and heterogeneous access points, spending on optimizing network security and resource management issues continues to fuel IT spending on network assessment, consulting, integration, and optimization projects.

In the increasingly global marketplace, how enterprises leverage network technologies, applications, and services to intelligently process and disseminate information to customers, suppliers, employees, and partners is critical to success. The transformation of enterprise networks to streamline business growth requires enterprises to maximize the value of their internal skills and to leverage expertise from their vendors, suppliers, and service providers.

In 2006, IDC reported 16.2% growth in enterprise spending on LAN switch technologies, the core revenue stream of the enterprise networking market. Overall spending on enterprise LAN switch, router, WLAN, IP telephony equipment, and security appliances grew by 17% from 2005 to 2006 to over \$35 billion.

Total Networking Skills Shortage: Now and in the Future

It took about 600,000 IT workers to install, configure, manage, and secure networks in North America in 2007. That represents about 14% of the total IT workforce. Over the next four years, North America will employ an additional 180,000 IT professionals with networking skills. That represents 30% growth between 2007 and 2011.

However, there are more job openings and more demand for IT workers than there is supply of trained, experienced professionals. The "skill gap," the difference between the supply of skilled workers and the demand for those skills measured in full-time equivalent (FTE) workers, represents a challenge for networking vendors and their clients and an opportunity for IT professionals.

About 10% of open networking positions remain unfilled for more than six months. This gap in workers changes the way organizations deploy and manage networks. The overall gap between supply and demand for networking professionals is about 8% of the total demand. The good news is that the gap isn't getting any bigger. The bad news is that in some specialties, such as wireless networking, the gap is large, and in other segments, such as network security, the gap is growing very fast.

Future Need for Networking Skills

The increasingly central role of the network in business processes has strong implications for the skills needed in organizations in the future. Professional IT staff — even those who are not working primarily with networking technologies — are expected to have some networking skills and to understand the impact of the network on other technology areas. The following findings from our user survey support this analysis:

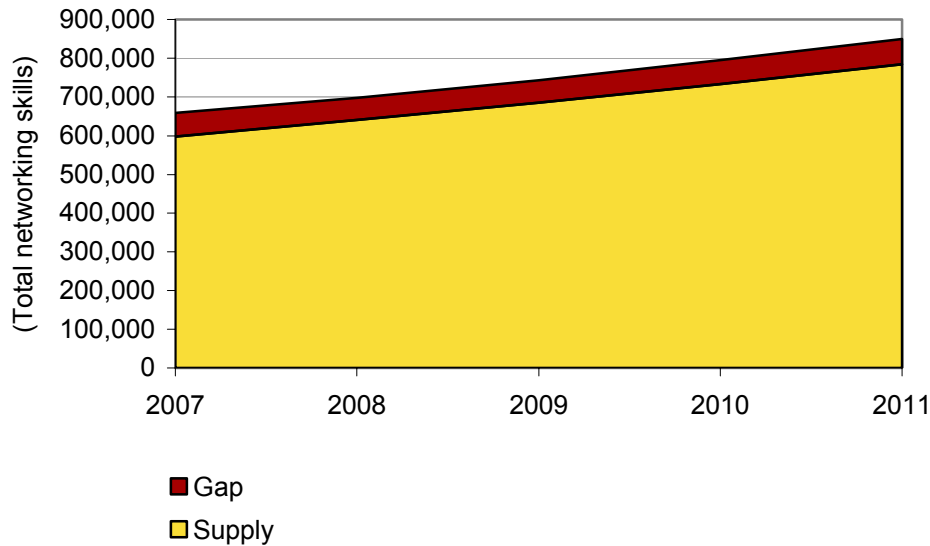
- ☒ 73% of respondents expect to need new or extra security skills in the future, indicating the critical nature of network infrastructure to the business.
- ☒ 57% of respondents expect to require additional IP telephony skills, and 59% are planning for additional wireless networking skills, indicating a sophisticated use of the network for communication.
- ☒ 49% of respondents expect network-centric applications such as messaging and videoconferencing to be more important in the future, illustrating the closer integration between the network and business success.

The shifts in network use and importance place a premium on skilled networking professionals to design, install, manage, and secure the network infrastructure. The accelerated adoption of highly complex, converged IP technologies and the growing proliferation of network access points and mobile devices exacerbate the labor and skills shortage of enterprise IT departments, creating significant demand for network expertise to effectively design, develop, and integrate mission-critical network projects.

Overall, there will be a relatively steady gap of about 60,000 workers (about 8% of the total demand) between 2007 and 2011 (see Figure 1). This gap is sufficient enough to cause some difficulty filling positions. The variations in supply and demand are seen in the advanced skills of networking professionals and are severe enough to cause a dramatic change in salaries for some networking specialties such as VoIP and wireless networking.

FIGURE 1

Supply and Demand for Networking Skills, 2007–2011 (FTEs)



Source: IDC's *Networking Skill Gap Survey*, 2007

Demand for Advanced Technology Skills: What Skills Will Be Needed?

IDC's analysis of current trends in supply and demand for networking skills reveals interesting findings.

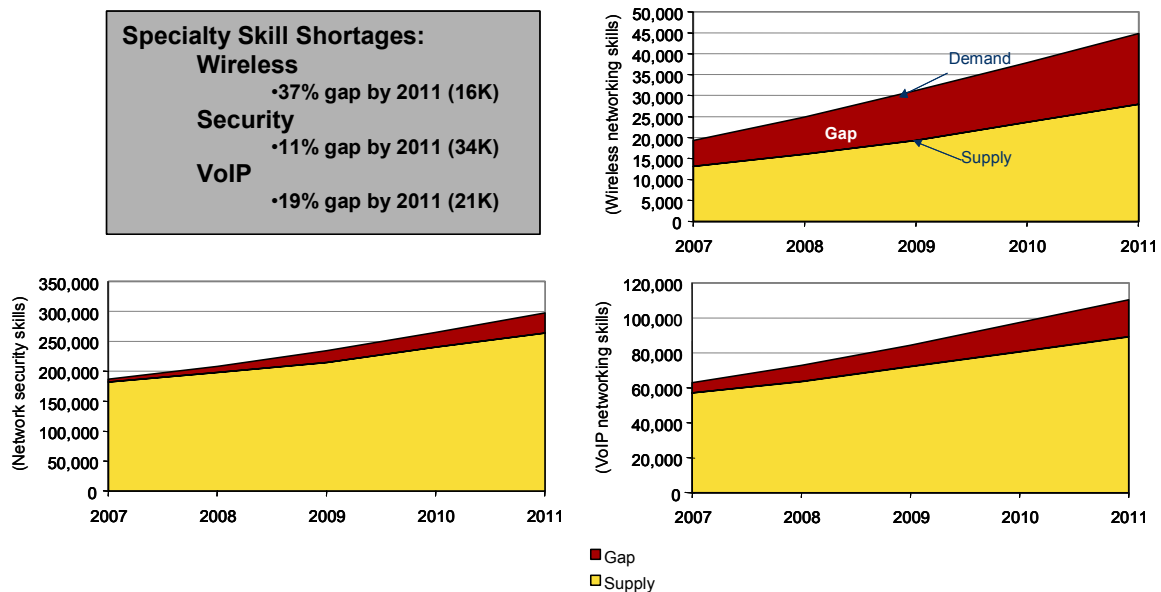
Wireless networking skills will have the greatest growth and the greatest skill gap percentage of all of the specialties we examined. By 2011, there will be a demand for nearly 45,000 IT professionals with wireless networking skills, nearly 132% growth from 2007. At the same time, only about 28,000 such professionals will be available in North America. This leaves a gap of nearly 38% of demand (see top right in Figure 2). Such a significant gap in demand will cause enterprise IT management and supplier behaviors to change in response. Salaries will climb, new network management technology will be introduced, and new services vendors will emerge in regions with smaller gaps or even surplus skills. When a skill gap becomes most severe, enterprises may delay initiating wireless networking projects to reduce their implementation risk of proceeding without the proper skills in place to manage the new technology.

Another likely reaction for IT workers with some networking skills is to retrain themselves or somehow reposition themselves as having wireless networking skills. There will be a flow of skills from the less valuable skills to the more in-demand skills.

Network security, the largest specialty, currently has a very low gap between supply and demand. The gap was about 2% in 2007. Because security has been a magnet for skilled workers for the past five to seven years, workers have moved to network security from other areas. However, by 2011, the gap between supply and demand could reach 12% as the demand for newly skilled network professionals far outstrips the ability of workers to gain experience (see bottom left in Figure 2). IDC research on networking technology and services suggests that VoIP growth in both commercial settings and residential settings will increase steadily. As a result, the current skill gap of about 9% of demand will grow to over 20% of demand (see bottom right in Figure 2). This also sets up a situation where salaries will rise, vendors of services and products will react, and enterprises may delay projects in order to reduce risk.

FIGURE 2

Supply and Demand for Specialist Networking Skills, 2007–2011 (FTEs)



Note: Each chart is rendered at a different scale for maximum clarity.

Source: IDC's North American Networking Skills Survey, 2007

Marketplace Response to a "Skills Shortage": Do Traditional Rules Still Apply?

Vendors of networking services and enterprises will react in several ways to a skills shortage.

Vendors increasingly will offer managed networking services to their clients. The value proposition of a cost advantage and improved service to the client and scalability and strongly leveraged management and deployment tool sets for vendors allow vendors to operate more extensive networks with lower aggregate headcounts. Vendors will also apply global sourcing strategies that leverage their own talent from less expensive regions and by selectively outsourcing activities of their networking management activities to third (or fourth) parties.

Enterprises will also respond to skill gaps in several ways. As a stopgap measure, enterprises will hire service providers for projects, and this approach may eventually evolve into longer-term management contracts. For critical positions, they will raise total compensation for existing workers and starting salaries for new hires. For less critical needs, they will accelerate outsourcing and global sourcing for networking activities from North America to other companies or regions.

Global sourcing and the availability of vendors and their offerings make satisfactory options available to enterprises of all sizes. Discomfort or pain from the aggregate skills shortage will likely be minimal for all but the most critical of circumstances.

Certifications: The Impact on Supply and Demand

Another strategy leveraged by enterprises facing a skills shortage is to "short-circuit" the need for years of experience and instead require a certification in a relevant technology. Certifications can be leveraged at two points: 1) by candidates who use a certification as a substitute for experience and 2) as a guide to support reskilling or upskilling of current employees. Reflecting the sensitivity enterprises have to skills shortages, certifications held by candidates are seen as valuable by nearly three-quarters of organizations. It is even more important to the largest companies, where four out of five view certification as beneficial to the credibility of a candidate at the point of hire.

A significant majority of companies plan to retrain existing staff (72%) to gain access to new skills. Only a little over 10% plan to hire skills from the market, and 13% plan to use external service providers. Certifications, especially from recognized sources, represent an opportunity for enterprise IT managers to develop talent within their organizations.

Certifications can strongly impact both the supply and the demand of networking talent. Certification and preparing for a certification create a path to achieve recognized capability. Certifications also provide an opportunity for enterprises to credibly expand their capability with limited risk.

Number of People Versus Number of FTEs

The Likely Effect of an Acronym

The preceding figures are wrong. Well, not wrong, exactly, but they relate to theoretical people — that is, people who work full-time on networking activities. If they don't work full-time on these activities, then more people are required to accomplish the same tasks.

It all has to do with full-time equivalents. FTEs are the mathematical result of the sum of all hours worked on a task or job divided by the number of work hours in a year. This is the theoretical number of employees working full-time that is required to perform that job.

This research found that networking professionals work on networking activities only about 75% of the time. This suggests that for every FTE required to manage a network, the practical impact is that it takes 1.3 employees who are capable of doing the work. (One work year divided by the effort available from a worker available 75% of the time equals 1.33 workers to complete the work.)

This suggests that both supply and demand are understated by about a third. The gap remains, but the numbers grow. But the convention when talking about activities and the number of people to fill jobs is to talk in FTEs. So, by convention, everyone knows these figures are wrong.

CONCLUSION

About 14% of the total IT workforce in North America works on networking technologies. The number of network professionals needed will grow at 6.6% per year over the next four years and will reach a total of 850,000 workers by 2011.

As a result, there will be a gap of about 65,000 skilled network professionals by 2011. This gap will cause some difficulty filling positions and will cause a dramatic change in networking salaries for some specialties such as VoIP and wireless networking.

Mitigating Strategies

Companies mitigate the impact of the networking skill gap by sharing job roles and tasks between multiple workers. Skilled network professionals perform several network jobs and non-IT-related work for their companies. This "decentralized" job role helps reduce the impact of a single open position and reduces the impact of a worker leaving the organization.

A second strategy leveraged by enterprises facing a skills shortage is to "short-circuit" the need for years of experience and instead require a certification in a relevant technology.

A third strategy that enterprises employ is to accelerate outsourcing and global sourcing for networking activities from North America to other companies or regions.

Ultimately, the networking skills shortage will cause changes in behaviors at all levels of the IT industry. Most dramatically impacted will be the individual enterprises and their employees, who will need to be aware of changing demands and the resulting need for new skills.

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