WHITE PAPER

The Evolution of the Networking Skills Gap in Greater China

Sponsored by: Cisco

William Lee, Ph.D.
July 2013

IDC OPINION

Skills have become the global currency of 21st century economies. Without sufficient investment in skills, technological progress does not translate into productivity growth, and countries can no longer compete in an increasingly knowledge-based global economy. Almost half of global unemployment is in Asia/Pacific, but employers in the region still face difficulty in finding suitable talent in their markets.

In Greater China (GC) — with the rapid economic growth experienced by China in the last ten years and the new competitive market dynamics being faced by Hong Kong and Taiwan — there is an increased need to address the growing skills mismatches that exist in its labor markets to create sufficient employment and sustainable growth. The rapid evolution and emergence of new technologies in addition to significant government initiatives such as the "smart city" programs have also radically affected the availability of networking skills, and that has now become a major challenge in the IT industry.

The definition of networking skills used for this analysis refers to the skills of those people needed to plan, design, manage, and support the networking technologies in an organization. The definition of skills needs to be broad due to the proliferation of networking technologies in organizations of all sizes and across vertical industry segments.

The next generation of IT will mandate that at its core is a robust foundational network. Business demands driving network upgrades, including growth of voice and video over IP, the proliferation of network-attached and wireless devices, virtualization and cloud computing, are all contributing to continued demand for increased breadth and depth of network competency in the enterprise.

Building and maintaining high level of performance of an IT team will increasingly become a key strategic advantage as networking becomes fundamental to next-generation converged infrastructures. IT skills maintenance will become increasingly challenging for enterprises to add intelligence to their networks to be able to handle traffic flows, new and complex applications, and quality-of-service requirements to ensure that applications are aligned with business needs.

According to IDC's Networking Skills Model analysis, the demand for networking skills currently surpasses supply, and this trend will continue to do so for the foreseeable future. In fact, unavailability of skilled professionals may affect some markets' ability to extract value from technology.

The technology and business trends in China especially highlight an increasing need for people with networking skills in emerging technologies, and for well-trained teams

Without sufficient investment in skills, technological progress does not translate into productivity growth, and countries can no longer compete in an increasingly knowledge-based global economy.

The next generation of IT will mandate that at its core is a robust foundational network.

that focus on higher value-added activities to align technology demand with the business and create value for the organization.

EXECUTIVE SUMMARY

Within this generation of technology, where converged IT infrastructure is shaping enterprise networks from the datacenter to the network edge, IDC has explored the growth of and demand for professionals in essential technologies (e.g., routing and switching) and emerging technologies (e.g., cloud). Based on the results of the survey, it is clear that organizations in the region will continue to lack skilled people in networking with demand outstripping supply throughout the forecast period. This skills gap is driven by the following trends:

☑ Demand for greater efficiencies within the IT infrastructure, with virtualization as the cornerstone

☑ The proliferation of devices — both wired and wireless

☑ Requirements for the network to support interactive (video) and virtualized IT-supported business applications

☑ Cloud or host-based networking across multiple enterprise technologies as an emerging network and services offering

☑ Intelligent networks must now mitigate security threats compounded by increased complexities caused by the mix of users and applications supported

The emerging technologies will demand additional skilled headcount in other key areas such as unified communications (UC), video technologies, cloud computing, mobility technologies, and datacenter and virtualization, a majority of whom will require essential networking skills as the basis for their profession.

The different types of networking skills assessed in this document include:

☑ **Essential networking skills**. This refers to basic or core networking skills, network security, IP telephony, and wireless networking. Essential skills account for 58% of total full-time equivalents (FTEs) skills gap at the end of 2012 and will account for 63% in 2016. IDC estimated a skilled people shortage of around 131,813 FTEs in 2012, increasing to 197,757 FTEs in 2016. These figures represent a similar FTE skills gap of 23% in 2012 and 26% in 2016. The rapid adoption of networking technologies by organizations throughout the region is continuously driving demand for these skills causing the gap to widen at a compound annual growth rate (CAGR) of 11% from 2012 to 2016.

> IDC estimated a skilled people shortage of around 131,813 FTEs in 2012, increasing to 197,757 FTEs in 2016.

☑ **Emerging networking technology skills.** This refers to skills in technologies such as UC, video, cloud computing, mobility, and datacenter and virtualization. Emerging skills represented 42% of total FTEs skills gap at the end of 2012, declining to 37% in 2016. Within this group of skills, IDC estimated a FTEs shortage of skilled people of around 94,218 FTEs in 2012, increasing to 117,924 FTEs in 2016. These figures represent a projected incremental skills gap of 36% in 2012 and 28% in 2016. Although the adoption of these technologies is high in the region, the relative increase in the pool of skilled talents is higher as more professionals pick up on these emerging technologies skills. Thus, the skills gap only grows at a modest CAGR of 6% from 2012 to 2016.

> IDC estimated a FTEs shortage of skilled-people of around 94,218 FTEs in 2012, increasing to 117,924 FTEs in 2016.

☑ **Total networking skills gap.** This refers to the aggregation of essential and emerging networking skills. IDC estimated a shortage of approximately 226,031 FTE professionals with networking skills across GC In 2012, with this number increasing to 315,680 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 27% through to 2016. The number of skilled people is based on IDC's proprietary skills model which calculates FTEs that are defined as IT professionals spending 100% of the time working with networking technologies as in-house IT services staffs within the company.

☑ **Other Key Findings.** Aside from the size of the networking skills gap, other results from the model illustrate that the demand for networking skills has increased not only in numbers but also in complexity.

- ❏ **Cross-technology skills.** According to the survey conducted by IDC, 62% of respondents are expected to need multiple technology skills. This is significantly lesser than the 73% reported for the rest of the Asia/Pacific countries. This shows that companies in GC place less value on flexible multi-skilled workforce.

- ❏ **Essential networking technology skills.** Evolution of technology necessitates more essential skills to address additional demand for skills that only a couple of years ago would have been considered advanced — such as security and wireless — yet now they are deemed essential.

- ❏ **Perceived value of certification has grown.** More than 60% of companies interviewed indicated that certifications play an important role in their organization and selection of employees. Of those surveyed, 52% said that those certifications are "important" to them while 13% of them found it "very important".

- ❏ **Increased integration of the corporate network with business processes**. The profile of the IT network professional will necessarily expand to include "soft" skills that cover business IT alignment and analysis. The retraining of network-skilled staff is thus a near term consideration for all CIOs, as is the recruitment of a new type of network professional. Sourcing these additional staff is a primary concern as the skills gap for essential and emerging skills is already a challenge in all countries.

Evolution of technology necessitates more essential skills to address additional demand for skills that only a couple of years ago would have been considered advanced.

IN THIS WHITE PAPER

This IDC White Paper analyzes the demand and supply of networking professionals in Asia/Pacific. This White Paper is derived from a combination of regional and local analyses of survey results coupled with the IDC Skills Model, which together result in an accurate picture of the current situation as well as future trends.

Although economic growth in GC is slowing down, the region still contributes about half of the total demand for networking professionals. Many companies in this region are still in early stages of adopting networking technologies and are ready to take advantage of the experience of others and leapfrog technology stages. Emerging technologies like mobility, unified communications, and cloud services also drive the demand for companies in the region as businesses begin to leverage these technologies for competitive growth, with 98% of respondents to our survey having reported that the network will become more important for their organization in the future.

Beyond the typical role of connectivity for email and Internet access already widely adopted by companies, the network is viewed as a key mechanism for sharing processes with business partners and as a collaboration platform. According to this IDC survey, 30% of companies in GC use their network for sharing business process information with key business partners, suppliers, and customers. But 49% use the network for collaboration using specific applications that combine mobile phones, video, applications, and other tools. This shows that the business applications associated with networking technologies in GC still lag behind the traditional applications for collaboration across the network.

Despite the importance of the network in supporting this usage pattern, survey results indicate that companies in this region are not placing enough focus on formal network skill development and training on their staff. While 75% of companies interviewed find it important to hire people with networking professional certification, only 63% of companies are indicating that they will send their staff for vendor-specific network courses.

IDC noted that companies could be experiencing shortages in certain networking competencies. As a general practice, most companies hire a certified professional who will be in charge of a team of non-certified engineers that learn the basic procedures through on-the-job training. While practical experience definitely helps fire-fighting, structured and formal training brings more value to the company and allows personnel to acquire other essential and emerging skills.

Areas experiencing the greatest pressure in GCR include security skills, with 77% of respondents considering extra security skills requirements for the next 12 to 24 months. General networking skills are considered by 64% of the companies as an area in which to add extra skills, and wireless networking skills are third, with 63% of respondents considering investments in additional skills. IDC believes this is a result of the explosion of mobile devices connected to the wireless network driving greater needs to set up and manage the wireless networks as well as the security of the devices on these networks.

IDC found that 65% of the companies interviewed believed that vendor certifications will become more important in the near future. Along those same lines, 75% of

98% of respondents to our survey reported that the network will become more important for their organization in the future.

75% of companies interviewed find it important to hire people with networking professional certification

companies believe that service provider's staff must have professional certifications, a condition that will become increasingly important for them.

As a result of this, it is apparent that one of the most effective ways to combat the growing challenge posed by the lack of skilled staff at organizations in the GC region (GCR) is by increasing the number of students and professionals receiving formal training in all essential and emerging technologies.

METHODOLOGY

☑ In 2013, IDC Asia/Pacific conducted a survey across selected countries in Asia/Pacific and combined it with a supply-side study to analyze the current status for both the demand and supply sides of networking skills in three countries/regions within GC. The study provides an update to the one conducted by IDC in 2007. In addition to the previously measured essential networking skills, IDC has introduced an analysis of other technologies that while enabling new capabilities and advantages introduces new challenges with regard to management, maintenance, and support of the network. IDC has identified these as emerging networking skills including: unified communications, video technologies, cloud computing, mobility technologies, and datacenter and virtualization.

☑ IDC conducted 200 interviews in three countries/regions for GC: China, Hong Kong, and Taiwan. Additionally, interviews were segmented by vertical industry and size segments: government, education, healthcare, telecoms, financial services, manufacturing, retail/wholesale, media/broadcasting/publishing, travel/transport/distribution, natural resources, and other services in companies with more than 75 employees. Only companies that have IT services staff in-house were surveyed.

☑ IDC contacted approximately 931 IT managers in order to arrive at 200 completed and valid interviews.

☑ Respondents were selected based on their responsibility for network infrastructure and management of professionals involved in network design, operation and maintenance, deployment, and support. The survey was conducted in the native language of the respondents. Results from this survey were analyzed in conjunction with data from several ongoing IDC research practices around networking and information technologies. IDC leveraged the results of this end-user survey conducted from November 2012 to January 2013 to define current and future trends related to the use and development of networking skills, as well as the role of the network in GC organizations. This document analyzes the results of this survey in what IDC has dubbed "The Evolution of the Networking Skills Gap in Greater China".

☑ Respondents represent organizations of 75+ employees and verticals including the following: government, telecom, healthcare, education, and enterprise (financial services, manufacturing, retail/wholesale, media/broadcasting/publishing, travel/transport/distribution, natural resources and other services) (refer to Figure 1).

Demographics of Survey: Number of Employees
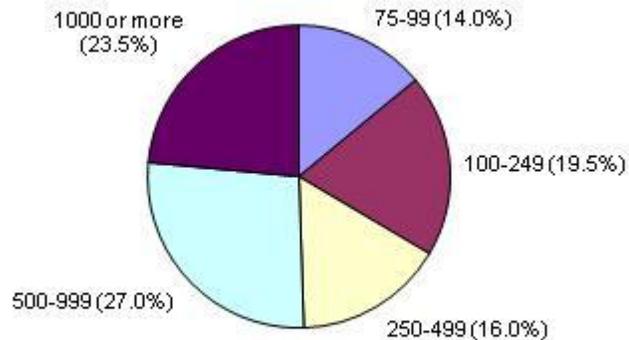
n = 200

Source: IDC, 2013

The survey data has been used to populate IDC's skills model and to make market predictions. The model is based on economic and statistical indicators in each country, including gross domestic product (GDP), IT workforce estimates, population growth, registered companies, as well as forecasts from IDC's syndicated studies such as Asia/Pacific Enterprise Networks Systems Tracker, Asia/Pacific IT Services Tracker, Asia/Pacific Unified Communications Tracker, Asia/Pacific Software Tracker, Asia/Pacific Business ICT Services Tracker, Asia/Pacific Cloud Computing Technologies, Asia/Pacific Server Virtualization Tracker, Asia/Pacific Emerging Markets Tracker, Asia/Pacific Mobile Devices Tracker, Asia/Pacific Security Appliances Tracker, Asia/Pacific PC Tracker, and the *Worldwide Black Book*. Please refer to the Appendix for a more detailed methodology description and glossary.

SITUATION OVERVIEW

Regional Analysis

The ICT industry is in the midst of a "once every 20–25 year" shift to a new technology platform for growth and innovation — IDC calls it the third platform — built on mobile devices and apps, cloud services, mobile broadband networks, big data analytics, and social technologies. At least 80% of the industry's growth and enterprises' highest-value leverage of IT will be driven by these third-platform technologies as well as an explosion of new solutions built on the new platform and rapidly expanding consumption of all of the above in emerging markets.

Today, third-platform technologies and the services around them generate only about 20% of all IT spending, but they are growing, collectively, at about 18% per year — six times the rate of the rest of the IT industry. Given the importance and acceptance

of these technologies in enterprise environments, by 2020 these technologies will inevitably represent 80% of all IT spending.

The networking market is being fueled by pillars of the third platform: mobility, datacenters, cloud computing, social media, and virtualization. Also, government programs and service providers have significantly contributed to the steady growth in most of the countries.

GC is not immune to these trends and the economic characteristics of the region will encourage technology adoption for the following years. Countries in the region are characterized by their position of strength and driven by the momentum of a decade of prosperity.

These illustrative facts demonstrate how GC is slowly shrinking the technology gap and increasing its competitiveness to face the global challenges. Still, the road to greater competitiveness is strewn with minefields: companies throughout the region face several challenges in the fast-paced and ever changing world of technology. Throughout the GC region, IDC would like to highlight the following trends:

☑ **Intelligent networks for new applications and services.** The network must now support a mix of applications and services, including voice and video, enhancing security, deploying WLANs and supporting wireless applications, and even supplying power to end-user devices with power over Ethernet (PoE). This lays an additional burden on the network, not only by placing increased demands on functionality and resiliency but also by driving the need to build intelligence into the network to control traffic flows, ensure that application delivery is aligned with business needs, and mitigate security threats compounded by increased complexities caused by the mix of users and applications supported.

☑ **Demand for greater efficiencies within the IT infrastructure, with virtualization as the cornerstone.** Network support of virtualized workloads will continue to drive datacenter and enterprise network investments. One of the greatest challenges for network managers is architecting a new network that supports and furthers application availability on virtualized x86 systems. This creates a blind spot for network administration teams, making it difficult to effectively troubleshoot and manage problems related to virtual machines. This lack of visibility makes it difficult for network administrators to understand traffic patterns and create policies around virtual machines. Additionally, to move to the "next level" of virtualized IT the network must be an active participant in virtual machine policies and service levels. Nonetheless, IDC also believes that the benefits of virtualization will expand to include UC.

☑ **The proliferation of devices — both wired and wireless.** With the explosive growth of smartphones, and more recently tablets, IT has been forced to reevaluate how to support this growing array of devices in the enterprise. As the number of devices, applications, and interactions increases, we can expect to hear more around fixed-mobile convergence, 3G/4G offload, WiFi offload, smartphone-based collaboration solutions, virtualization of business apps for smart mobile devices, mobile device security and management and, most importantly, how enterprises will converge their IT infrastructures into an intelligent, scalable fabric that is ready for tomorrow.

◌ **Cloud or host-based networking across multiple enterprise technologies as an emerging network and services offering.** IDC believes that delivering network services through the cloud will garner more attention and, in some cases, will be a building block for the next generation of network provisioning and delivery models. These new models will be built upon existing and emerging technology platforms, whether they come from smaller, more nimble vendors or from established leaders in network infrastructure. If "everything as a service" is the mantra for the new IT, then networking as a service will be looked at favorably.

Total Networking Skills Demand and Supply Trends in Greater China

Total networking skills is the aggregation of essential and emerging networking skills.

Regionwide, IDC estimates that the demand for networking skills currently outstrips supply and will continue to do so during the forecast period (see Figure 2). In 2012, IDC estimated a shortage of approximately 226,031 FTE professionals with networking skills across GC with this number increasing to 315,680 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 27% by 2016. The number of skilled people is based on IDC's proprietary skills model which calculates FTEs that are defined as IT professionals spending 100% of the time working with networking technology.

FIGURE 2

Total Networking Skills Demand and Supply Trends in Greater China, 2012–2016
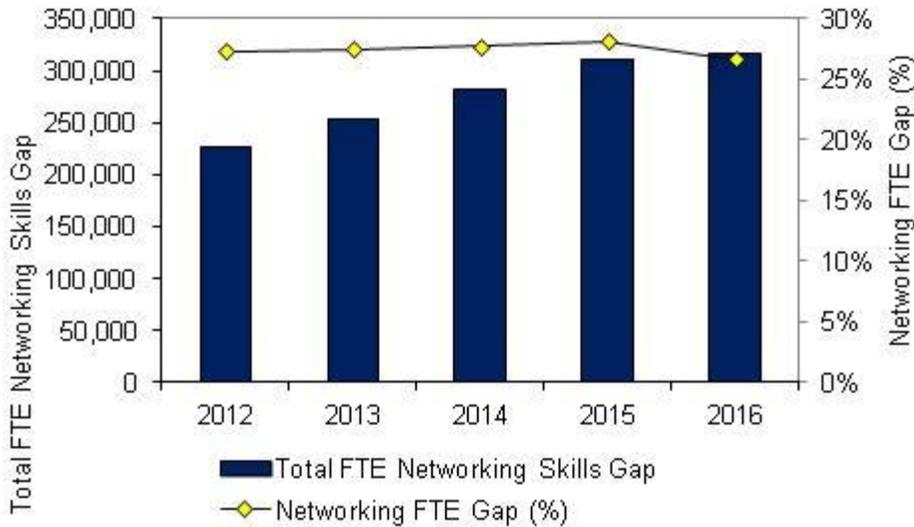
Source: IDC, 2013

Essential and Emerging Networking Skills Gaps in Greater China

Constant flux and dynamic changes have always been the norms for the enterprise security landscape. Recent dynamics around cloud and datacenter buildouts, as well

as increased traction for enterprise mobility arise as the main technological changes within companies that are permeating investments in the IT ecosystem.

According to the results of the Networking Skills Gap Model, essential technologies represented 58% of total gap by the end of 2012. This will increase to 63% of total gap in 2016 resulting in an increased demand for professionals focused on essential technologies.

The exponential growth of data and information is placing pressure on the restructuring and strengthening of corporate datacenters. IDC has observed that skill gaps will center during the next years in three key areas: datacenters, security, and wireless networking. By the end of 2012, 62% of the professional shortages focused on wireless networking, security, and datacenter technologies. This gap represents 58% in 2016.

The increasing number of devices connected to the network, and companies' information expansion across different sites, increase the pressure for security departments. Emerging technologies such as cloud computing, virtualization, and mobile devices are driving the need for wireless network and increasing the complexity of managing datacenters. Under these scenarios, organizations should consider taking steps to manage organizational resources to better control information growth.

This explosion of mobile devices within the enterprise also introduced a new dynamic into enterprise wireless LAN (WLAN) networks. Businesses are increasingly adopting mobile applications to communicate with their employees, enhance business processes, and streamline customer interactions. This results in the need for business-focused applications also driven by a variety of factors including consumerization of IT, where increasingly more employees are bringing their own devices into the enterprise (BYOD).

The combination of technological, business, and organizational changes is driving changes across the entire WLAN market at a faster rate than predicted years ago. Enterprises need adaptable, robust, easily deployed wireless LAN solutions to support employee's mobile working needs. On the other hand, companies seek to take more advantage of their networks, wanting to directly link IT with business results. Enterprise IT managers are finding synergies in integrating other parts of their enterprise communications systems into their WLAN. Voice, UC, and video technologies are prominent examples of this.

Commonly, organizations often approach communications as a tactical set of disjointed point solutions provided either uniformly across the organization or on an ad hoc basis within specific business units. UC solutions provide an opportunity to unify infrastructure silos and increase productivity to infrastructure already present within the organization or adding some other solutions, such as video.

Service providers are other key players that are rapidly emerging as a growth market segment for WLAN rollouts, moving up from traditional "hotspot" applications to more of a mainstream 3G/4G offload segment, which is more lucrative in the times ahead. Moreover, they are becoming vendors with much wider portfolios by restructuring their business and leveraging their networks to offer more value-added services, taking advantage of the capability of their networks and position in the small and medium-sized business (SMB) market.

New services delivered though the cloud are now permeating the SMB market, a segment which is very prominent in the GCR. However, the complexities that networks are experiencing are leading a greater number of companies to outsource some parts of their IT departments and networks in order to respond to changing technology cycles. As a result of demand generated by outsourcing, IDC found that the greatest skills gap is in the area of datacenters, followed by security and wireless networking skills gap (see Figures 3 and 4).
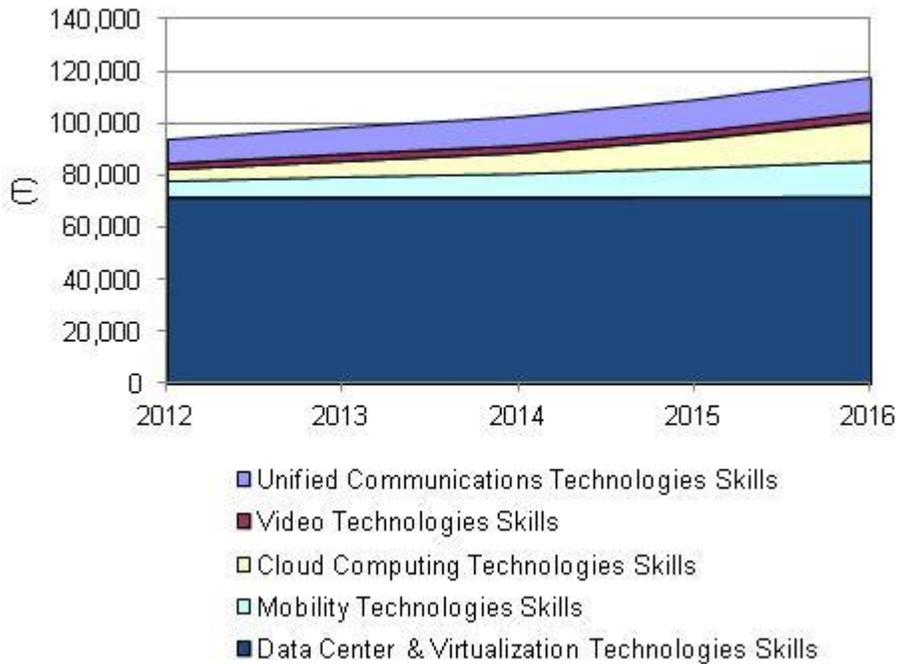

F I G U R E 3

Essential Networking Skilled People Gap in Greater China, 2012−2016
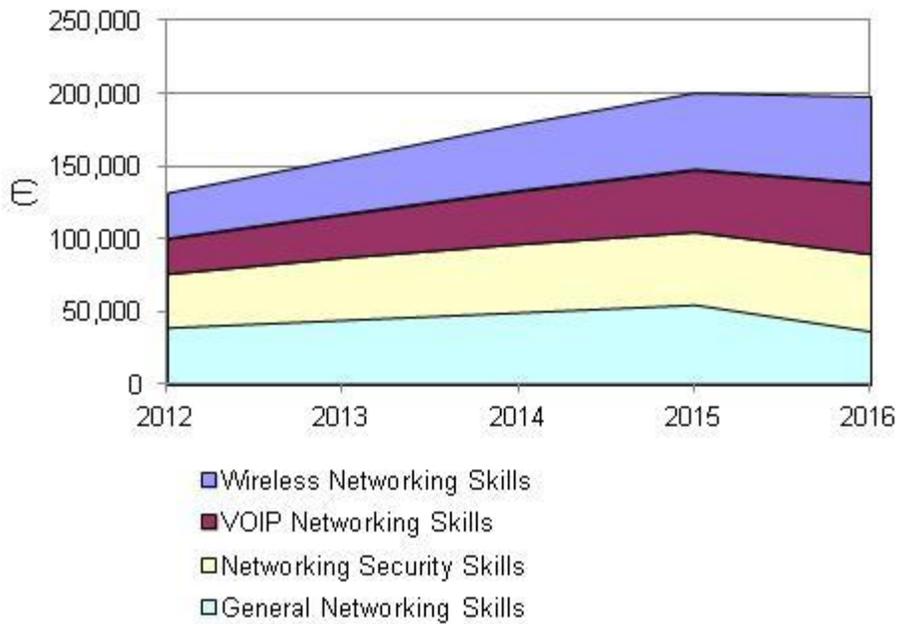
Source: IDC, 2013

FIGURE 4

Emerging Networking Skilled People Gap in Greater China, 2012−2106

Source: IDC, 2013

Essential technologies will grow at a CAGR of 11% from 2012 to 2016. The next generation of IT will have at its core a robust foundational network. As more elements are connected to the network during the next five years, risks and threats to information will increase. Thus, security will become a mandatory function embedded within network operations and network-enabled business services, driving demand for essential technologies. The explosion of mobile devices will drive the growth in demand for wireless technologies which require the optimization of WLAN as key network access technology for applications.

Emerging technologies will grow at a CAGR of 6% in 2012–2016. The ICT industry is shifting to its third major platform for accelerated growth, built on mobile, cloud, social and big data technologies, forcing the industry's leaders to adopt new strategies and adjust investment planning to new trends. "Mobility wins" is the top theme of the year 2013 as mobile devices out-ship PCs by more than 2 to 1 and generate more revenue than PCs for the first time, driving increasing demand for mobility technologies skills. Cloud, albeit coming from small base, will be the fastest growing segment to drive the demand for skills in this area. However, this region's growth is significantly lower than the rest of the Asia/Pacific countries at 24%.

Cross-Technology Skills

More than 60% of respondents expect networking professionals to need multiple technology skills. This is a clear indication of the growing importance of networking

technologies as a platform to support critical line-of-business systems, applications, and repositories of data that are found in datacenters across the region.

The challenge of finding qualified staff with cross-technology skills is compounded by the fact that networking professionals are also expected to demonstrate cross-disciplinary skills that extend beyond IT into other business skills. Skills like financial and project management, business planning, technology road-mapping are essential to justify new technology ROI and to manage new installations or upgrades.

Networking professionals are also expected to demonstrate cross-disciplinary skills that extend beyond IT.

Assessment of Networking Skills

As the role and importance of the network within organizations grows, so does the requirement for skilled IT professionals. This trend is expected to continue and furthermore increase throughout the forecast period, as technology continues to evolve at an increasingly rapid pace. Therefore, around the region, it is anticipated that it will be increasingly more difficult to attract and retain the required numbers of networking-related staff.

IDC's survey within three countries/regions within GC found the following:

- ☒ 23% of respondents stated that they have hired networking professionals in the past 12 months.

- ☒ Almost half of the organizations across the three countries/regions surveyed found it difficult to find networking engineers who have the right skills set to meet their organizational requirements. The primary difficulty they face is in assessing the quality of the applicants without a standard assessment framework (e.g., a professional certification program). The secondary difficulty is to find technically qualified candidates who can understand the business and communicate well on the value of IT to the stakeholders in the organization.

- ☒ Security skills positions are the most difficult to fill. This is because security skills are increasingly in greater demand throughout the geographies analyzed; 77% of the companies agreed that they will need extra skills in this area in the next 12–24 months.

Therefore, in order to improve the value of certifications companies should consider the following elements as potential opportunities for developing more certified headcount:

- ☒ 45% of respondents see more value in the certification if they are sponsored by the technology vendors.

- ☒ The Government can also play an important role in increasing the value of certifications. This was reported by 32% of the companies interviewed.

FUTURE OUTLOOK

The Changing Role of IT

IT systems are increasingly perceived as a business differentiator and facilitator within enterprises in GC. Organizations across the region recognize that the corporate IT infrastructure is becoming more important. Indeed, most organizations now see their network as a critical business tool. More specifically:

- Of the three countries/regions surveyed, an overwhelming 98% of respondents believe their network will become more important in the future.

- Of all respondents interviewed, 49% say that the network is a key collaborative platform with key partners, suppliers, and customers.

In addition to this, emerging technologies such as unified communications, video, datacenter and virtualization, and cloud and mobility are serving to increase the importance of the role played by the IT platform within organizations of all sizes.

The network has definitely become the backbone of both public and private sector organizations supporting internal and external communications and business processes. This is also confirmed by IDC's related market forecast for the Asia/Pacific region. According to IDC's Enterprise Network Systems Tracker:

- Investment in general switching and routing equipment is expected to have a CAGR of 8% in 2012–2016, reaching approximately US$6.1 billion in 2016.

- According to IDC forecasts, IP telephony equipment market will have a CAGR of 2% in 2012–2016, reaching approximately US$312.3 million in 2016.

- Security and Wireless LAN equipment revenue will increase at a CAGR of 12% in 2012–2016, reaching approximately US$2.9 billion in 2016.

- Emerging technologies including UC, video, cloud computing, mobility, and datacenter and virtualization will increase together at 35% in market value in 2016. Technologies such as datacenter show the highest CAGR of 67% thru 2016, followed by other technologies such as cloud and video that will grow at a CAGR of 32% and 24%, respectively. Finally, solutions such as mobility and unified communications will increase their value at average percentages of 19% and 7%, respectively.

Total Networking Skills Shortage

In order to provide further insight into the existing and future requirements for networking professionals across the region, the IDC skills model was used to quantify demand, supply, and the subsequent gap. The definition of networking skills includes all people needed to plan, design, manage, and maintain networking technologies and infrastructures within an organization.

IDC also used the concept of FTEs to allow direct comparison between countries and industry sectors. FTEs are staff members that spend 100% of their time on networking-related activities. Because research has shown that, on average, networking professionals spend 60% of their time working on networking tasks, the IDC model also uses the concept of skilled people that includes all people with formal training and certifications in essential and emerging technologies to plan, design, manage, and maintain networking technologies and infrastructures within organizations.

As shown in Table 1, IDC estimated that demand for networking skills in organizations will reach more than 827,176 FTEs across GC in 2012. This number represents the total amount of work that needs to be done in the networking space, and the number of people that need to be assigned to these tasks — assuming that they all spend 100% of their available time on networking.

The total of professionals estimated for GC includes those for essential and emerging technologies. Considering these technologies, the undersupply of around 226,031 FTEs in 2012 represented a shortage of skilled people of around 27% in 2012, increasing to 315,680 skilled people by 2016. In percentage terms, IDC estimates that the total networking skills gap in GC to remain relatively constant at about 27% through to 2016.

T A B L E 1

Demand and Supply of Combined Networking Skills in Greater China, 2012–2016

	2012	2013	2014	2015	2016	2012–2016 CAGR (%)
Demand	827,176	923,311	1,016,872	1,100,924	1,181,898	9.3
Supply FTE	601,144	669,173	734,848	791,079	866,218	9.6
Gap FTE	226,031	254,138	282,023	309,845	315,680	8.7
Gap (%)	27.3	27.5	27.7	28.1	26.7	

Source: IDC, 2013

Another way to look at the gaps in networking skills is to examine how the sizes of the forecast percentage gaps for each country compare with one another. Such an examination provides an interesting ranking of countries (see Table 2). While the position of each country in the table is indicative of the situation faced when it comes to skills shortfalls as a proportion of total demand in each country, it is also important to examine how the magnitude of the gaps relate to the relative size of the technology markets that exists in each of these countries. This provides a clear picture of the challenges ahead.

T A B L E 2

Total Networking Skills Gap Index by Country

Total	2012		2016	
	FTE Gap	Gap (%)	FTE Gap	Gap (%)
China	215,420	27.7	301,876	27.0
Taiwan	7,260	23.3	8,776	21.1
Hong Kong	3,351	19.4	5,029	21.3

Source: IDC, 2013

China has the largest demand for 728,779 FTEs with a gap of 215,420 in 2012, forecast to increase to 301,876 in 2016. China's economic growth outstrips its technology and skill development. Being the second largest global economy, the country needs to rapidly develop and attract skilled talent to sustain its progress.

Taiwan has a demand for 31,183 FTEs with a gap of 7,260 in 2012, forecast to increase to 8,776 in 2016. With the region investing more in public and private education as compared with other countries in the region, we are seeing the skills gap narrowing from 23% in 2012 to 21% in 2016.

Hong Kong has the lowest demand in the region with 17,263 FTEs by the end of 2012. The skills gap percentage of 19% for 2012 is also relatively low as compared with the other Asia/Pacific countries. However, with the increasingly competitive global market for high-skilled workers, some of the region's skilled networking professionals are flowing out of the region in search of better opportunities and demand in the growing region. We expect the skills gap percentage to widen to 21% by 2016.

Demand for Essential Technologies Skills

The survey conducted by IDC in three countries/regions of GC showed a strong intention for hiring of essential technology skills across all countries/regions, industry sectors, and sizes of organizations analyzed.

According to the IDC economic model, IDC estimates that the demand for essential networking skills will climb to about 568,317 FTEs by the end of 2012 and reach almost 765,699 FTEs by 2016. This represented a percentage gap of 23% in 2012 and will be 26% in 2016 (see Table 3).

TABLE 3

Demand and Supply of Essential Networking Skills in Greater China, 2012–2016

	2012	2013	2014	2015	2016	2012–2016 CAGR (%)
Demand	568,317	626,448	681,918	726,142	765,699	7.7
Supply FTE	436,504	471,218	502,867	525,754	567,943	6.8
Gap FTE	131,813	155,230	179,051	200,389	197,757	10.7
Gap (%)	23.2	24.8	26.3	27.6	25.8	

Source: IDC, 2013

Looking at the demand for specific essential skills, general networking (maintenance and operations) skills tops the list in 2012 with 43% of the total demand. This proportion is expected to reduce rapidly over the next few years to 32% in 2016 as demand shifts to wireless and security skills.

Skills gap in general networking across the region was 39,770 FTEs (16%) by the end of 2012, and it is expected to drop to 37,203 FTEs (15%) by 2016. General skills are considered as the basis to access other specializations within organizations. As a consequence of the complexity of the network, we will see more professionals fulfilling new demands of the market by shifting focus to other emerging technologies like cloud and mobility.

Managing security functions within the network appears as an increasingly mandatory and horizontal set of skills with 26% of total essential skills demand for security growing to 31% from 2012 to 2016. Estimated skills gap percentage of 25% (36,997 FTEs) in 2012 was reduced to 22% (53,127 FTEs) in 2016, showing slight growth in skilled professionals focusing in security.

Widespread use of mobile devices within the enterprise has introduced a new dynamic into the enterprise wireless market at an even faster pace than expected five years ago. Wireless LAN networking skills are in strong demand, growing from 100,892 FTEs (18% of total essential skills demand) to 171,764 FTEs (22%) from 2012 to 2016. Estimated skills gap has also grown from 31,009 FTEs (31%) to 59,026 FTEs (34%) over the same period. The almost constant skills gap percentage shows that the skills market is keeping up with the growth in demand but is not doing so fast enough to narrow the gap.

Demand for VoIP networking skills were the lowest among all essential skills. Only 13% of total demand is for these skills in 2012 growing to 14% by 2016. Since 2009, the implementation of VoIP solutions has not been as rapid as anticipated as a consequence of other IT investment priorities. However, in its place the transition from existing time-division multiplexing (TDM) voice networks to the IP-based environment has gained speed. As enterprise networks are evolving from fixed, data-centric, client/server topology to an application-driven, multimedia, and mobile platform that is more closely aligned with business needs than ever before, IDC estimates a continued demand in this technology along with demands for unified communications specialists. Current gap of 24,037 FTEs (32%) in 2012 is forecast to grow to 48,400 FTEs (45%) by 2016.

Table 4 shows the skills gap by countries/regions. It is evident that China posted the largest gap at 123,814 FTEs (23%) and will grow to 189,557 (26%) by 2016. Taiwan's skills gap percentage is also relatively high in this region at 23% (5,714 FTEs) in 2012, but will narrow to 21% (5,690 FTEs) by 2016.

TABLE 4

Essential Networking Skills Gap Index by Country

Total	2012		2016	
	FTE Gap	Gap (%)	FTE Gap	Gap (%)
China	123,814	23.4	189,557	26.2
Taiwan	5,714	22.8	5,690	20.6
Hong Kong	2,285	16.7	2,510	17.2

Source: IDC, 2013

Demand for Emerging Technologies Skills

The rapid emergence of new technologies has radically impacted networking skills and it is now becoming a major challenge in the IT industry. According to IDC's model, the demand for emerging networking skills climbed to about 258,859 FTEs by the end of 2012 and will reach almost 416,199 FTEs by 2016. This represents 31% all FTEs demanded in 2012 and 35% in 2016. Despite the strong growth, this region is also doing very well in closing the skills gap, with 42% of the total of the skills gap in 2012 reducing to 37% in 2016.

TABLE 5

Demand and Supply of Emerging Networking Skills in Greater China, 2012–2016

	2012	2013	2014	2015	2016	2012–2016 CAGR (%)
Demand	258,859	296,863	334,954	374,782	416,199	12.6
Supply FTE	164,641	197,955	231,982	265,325	298,275	16.0
Gap FTE	94,218	98,908	102,972	109,457	117,924	5.8
Gap (%)	36.4	33.3	30.7	29.2	28.3	

Source: IDC, 2013

Server virtualization and datacenter are vital in the development of IT environments and the majority of medium-sized and large organizations in the region are involved in the transformation of their datacenter in one way or another. This region is doing a lot in closing the datacenter and virtualization skills gap. The gap in this skills area accounts for 76% of new technologies in 2012 to 61% by 2016. Skilled gap percentage in datacenter and virtualization across the region has also been reduced rapidly from 42% (71,843 FTEs) to 28% (72,064 FTEs) by 2016. This shows the increasing availability of datacenter and virtualization professionals in the market closing this gap.

Trends such as virtualization, driven by the steady preparation for cloud-ready environments and the availability of all types of mobile devices continuously connected to the network, are creating a series of challenges for IT departments. These IT departments must figure out how to deal with the increasing complexity of corporate network infrastructure and how to ensure its reliability and safety while controlling the rising costs. IDC identifies these gaps in the following technologies:

- **Unified communications.** In 2012, the skills gap was 9,186 FTEs (24%), and is expected to rise to 13,270 (23%) by 2016.

- **Video technologies.** In 2012, the skills gap was 2,081 FTEs (25%), and is expected to rise to 3,325 (21%) by 2016.

- **Cloud computing technologies.** In 2012, the skills gap was 4,644 FTEs (29%), and is expected to rise to 15,378 (38%) by 2016.

- **Mobility technologies.** In 2012, the skills gap was 6,464 FTEs (27%), and is expected to rise to 13,887 (31%) by 2016.

T A B L E 6

Emerging Networking Skills Gap Index by Country

Total	2012		2016	
	FTE Gap	Gap (%)	FTE Gap	Gap (%)
China	91,606	36.8	112,318	28.6
Taiwan	1,546	25.3	3,087	22.2
Hong Kong	1,066	29.8	2,519	27.8

Source: IDC, 2013

Country Analysis

China

The main findings of the IDC survey in China include the following:

- China posted the highest percentage of skills gap of 37% for emerging networking skills at the end of 2012, narrowing to 29% by 2016.

- 54% of companies interviewed indicate difficulty in finding qualified candidates.

- The primary reason for difficulty in hiring networking professionals is the affordability of the skilled networking staff to be hired.

- 75% of companies have not hired dedicated networking professional in the past 12 months.

- 41% of companies do not send their staff to vendor-specific network training courses.

The rapid economic development of China for the past decade has seen domestic and multinational companies seeking to bolster staff as part of their bold expansion

plans in the China market. It has seen an increasing bidding by companies to attract qualified personnel across a broad range of industries. Candidates with the right level of education and skills are typically seeing inducement offers that include salary increases of 40% to 50%, in addition to enhanced responsibility. As such, we have seen China having a high percentage of skills gap for emerging networking skills ending 2012. However, the increasing pay for talent is attracting Chinese working or residing overseas to come back, and we are seeing a "brain-drain reversal" in China that will close this gap in the new decade.

With the recent economic slowdown in the United States and Europe, we are seeing an increasing number of multinational companies heading to Asia. These multinationals will offer more competitive wages for skilled professionals, which will put the pressure on Chinese companies to close the wage gap. We had seen more than half of the companies interviewed indicating the difficulty in finding qualified candidates with the primary reason of high expected wages from the skilled networking staffs to be hired.

According to the proprietary skills gap model, IDC estimated a shortage of approximately 215,420 FTE professionals with networking skills in 2012 with this number increasing to 301,876 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 28% in 2012 and 27% in 2016.

Taiwan

The main findings of the IDC survey in Taiwan include the following:

- ☑ Taiwan posted a percentage skills gap of 25% at the end of 2012 for emerging networking skills and will increase to 22% by 2016.

- ☑ 52% of companies interviewed indicate difficulty in finding qualified candidates.

- ☑ The primary reason for difficulty in hiring networking professionals is the difficulty in assessing the quality of the applicants.

- ☑ 86% of companies have not hired networking professional in the past 12 months.

- ☑ 36% of companies do not send their staff to vendor-specific network training course.

Taiwan has seen the increasingly competitive global market for high-skilled workers channel many of its best-educated people into jobs overseas. But unlike many countries that have suffered from "brain drain," Taiwan has seen many skilled emigrants return home to boost the country's economic development. Taiwan's relatively positive experience with high-skilled migration was built on education policies launched, where the country was investing in public and private education at a rate that far outstripped most countries with similar resources. This is evident in the low skills gaps from the survey. However, a majority of the companies interviewed had indicated difficulty in finding qualified candidates with the primary reason as the difficulty in assessing the quality of the applicants.

According to the proprietary skills gap model, IDC estimated a shortage of approximately 7,260 FTEs professionals with networking skills in 2012 with this number increasing to 8,776 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 23% in 2012 and 21% in 2016.

Hong Kong

The main findings of the IDC survey in Hong Kong include the following:

- ☑ Hong Kong posted a percentage skills gap of 30% at the end of 2012 for emerging networking skills that will decrease to 28% by 2016.

- ☑ 74% of companies interviewed indicate difficulty in finding qualified candidates.

- ☑ The primary reason for difficulty in hiring networking professionals is the difficulty in assessing the quality of the applicants.

- ☑ 74% of companies have not hired networking professional in the past 12 months.

- ☑ 32% of companies do not send their staff to vendor-specific network training courses.

Hong Kong provides a ready market for ICT companies, with 3,600 regional headquarters or offices based in the city and thousands of Hong Kong businesses located throughout the Greater Pearl River Delta (GPRD) region. Although the region boasts of a highly-skilled workforce, it shows sign of high structural unemployment where there existed a visible gap between the unemployment rates for lower-skilled and higher-skilled workers.

Changes in demographic structure, regional labor mobility and skills mismatch, and advancement in information technology all contributed to the gap between job vacancies and unemployment. A very high percentage of Hong Kong companies interviewed indicate the difficulty to find qualified candidates with the primary reason as difficulty to assess the quality of the applicants.

According to the proprietary skills gap model, IDC estimated a shortage of approximately 3,351 FTE professionals with networking skills at the end of 2012 with this number increasing to 5,029 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 19% in 2012 and 21% in 2016.

CHALLENGES/OPPORTUNITIES

The future of business communications is one of large-scale transformation driven by global macroeconomic conditions, technology advancements, and the evolution of societal trends. Firms today, more than ever, need greater agility, flexibility, and collaboration to compete for new customers and partners and extend existing relationships. This transformation has brought important changes that have impacted the demand for more skilled professionals especially in areas that we have called emerging technologies.

Undoubtedly, the focus that should be given to technologies such as security and datacenter is critical to the operation of business. Security is an area that requires intensive knowledge as a result of new threats that could impact business development. This also applies to datacenter management, as the cornerstone for the next third platform described earlier in this document.

While in the short term the market continues to pressure IT departments to optimize the use of existing assets and focus on rationalization, long-term competitive advantage requires a radical rethink of the existing model; a deeper focus on innovative approaches; and most critically, aligning communications strategy closer to user and business performance. This results in demand for technically-skilled professionals who also possess an increasing knowledge of how to align technology with business goals.

Some verticals in the short term will face a greater networking skills gap. Government as enabler of value projects will need to find sufficient skilled staff for their own projects. Vertical specialization is a critical factor in sectors like education, health, and even retail. Some sectors such as financial are demanding highly specialized professionals to deploy new solutions. As a result of the increase in the networking skills gap, actions such as linking IT needs to educational institutions as well as promoting incentives to encourage employers to invest in skills development are still needed.

CONCLUSION

IDC has identified an increasing gap between the demand for skilled networking professionals and the number of professionals that are available throughout the region.

According to the surveyed end-user organizations, IDC discovered that vendor certification consistently represents a business differentiator. A majority of interviewed companies across the region indicated that they will send their staff for vendor specific training. However, economic factors as well as business strategies/culture determine the number of professionals that receive formal training and have a certification. The value of certification has also increased as companies struggle to qualify skilled candidates to meet the technological challenges, especially in emerging technologies.

There are two more factors to be considered. Organizations are still looking for people with cross-technology and cross-functional skills. Nonetheless, other specializations, especially those in security, wireless networking and datacenter, are becoming indispensable as well as a good knowledge of vertical solutions. In order to correctly address these challenges, IDC recommends the following:

⊡ **Product Strategy**

❑ Focus product development by country considering necessities for each country to reinforce essential, emerging, and cross-technologies training.

❑ Make security courses a module embedded within training/education on essential technologies

❑ Make wireless networking courses a module embedded within training on essential technologies

- ❑ Develop channels to market with technical education institutions/organizations to deliver Industry relevant skills development and certification

- ❑ Develop certification programs for service providers to deliver certified support to end customers

- ❑ Develop soft-skills training that covers business IT alignment and analysis

- ❑ Work with service providers for networking support skills in cloud computing and mobility technologies to close the widening skills gap in the region

⊡ **Communication Strategy**

- ❑ Educate businesses in the fact that value to the organization is created through knowledge.

- ❑ Raise awareness to key essential and emerging networking skills sets through industry events and education forums.

- ❑ Promote benefits of certification, highlighting impact on business results.

⊡ **Alliances and Partnerships**

- ❑ Local educational institutions. Diversification between technical- and business-oriented universities/post-graduate programs is highly desirable. Develop more engineering business curriculum.

- ❑ Local governments. Consider embedding programs as part of digital agenda plans.

- ❑ Consider a joint communication effort with large value-added resellers (VARs) and systems integrators (i.e., Dimension Data, BT China, Eccom Network Systems, Syscom, Sysage Technology, Fujitsu, and Logicalis) to expand competency programs to their own partner ecosystems.

APPENDIX

IDC's Proprietary Skills Model

This document describes the methodology behind IDC's skills model, which forms the basis for developing networking skills demand and supply. The document further describes the data sources and official statistics that have been used as input into this model.

During the late 1990s and early 2000, IDC was commissioned to provide assessments and forecast of the demand and supply situation for skills in the network technology arena across different regions around the world. This 2013 study aims at updating the former analysis, furthermore accounting for arising technology solutions that were not evaluated in previous 2007 analysis. The networking market is experiencing an important shift driven mostly by the implementation of collaboration, video, datacenter and virtualization, cloud and mobility, and there is a real need for quickly attracting new talent into the market in order to fulfill demand.

As important factors and assumptions had changed dramatically since the original model was constructed in the late 1990s, such as lower growth expectations to both country GDP and IT spending overall, a new model that reflects these changed

environments has been constructed, the methodology of which is described on the next page.

Model Methodology

In addition to collecting data through the survey, IDC used its Skills Model to provide quantitative data to assist in developing an accurate picture of existing and future demand for networking professionals.

To ensure the accuracy of the model's outputs, and allow results to be compared across countries, the following criteria were followed:

☑ Only statistical information from reputable sources was used. These statistics must have been available in a wide range of countries to ensure consistency.

☑ The model must take into account economic developments in each country, based on both historical data as well as forecasts from IDC trackers: Asia/Pacific Enterprise Networks Systems Tracker, Asia/Pacific IT Services Tracker, Asia/Pacific Unified Communications Tracker, Asia/Pacific Software Tracker, Asia/Pacific Business ICT Tracker, Asia/Pacific Cloud Computing Technologies, Asia/Pacific Server Virtualization Tracker, Asia/Pacific Emerging Markets Tracker, Asia/Pacific Mobile Devices Tracker, Asia/Pacific Security Appliances Tracker, Asia/Pacific PC Tracker, and *Worldwide Black Book*. It must also take into account employment and unemployment rates in Asia/Pacific countries.

☑ The model must take into account enrollment and graduate data for higher education as these are indicators of current and future potential skills availability.

☑ The model must form part of a holistic view of the IT technology and workforce markets to ensure that there is no "sub-optimization".

As a first principle in developing the model, IDC established 2012 as a baseline year, since several factors are known or, at a minimum, have high confidence factors attached, such as GDP in each country, employment/unemployment rates, IT spending, IT services spending on network- and security-related services, network- and security- related shipment data and others.

Forecast for supply and demand of skills have then been developed based on several data points and predictions from IDC and recognized international sources.

Assumptions

As with any forecast and model exercise, several assumptions have to be made, the accuracy of which can usually only be established with a hindsight view.

Several occurrences can affect the forecast:

☑ Better or worse economic conditions in the countries than are currently expected.

☑ Sudden technology shifts (and therefore have not already been taken into account in IDC's forecasts),

☑ Government policy changes that support or suppress IT spending (examples of existing policies are regulatory changes, austerity decrees, nationalization acts, or others)

☑ Improved performance of the IT services sector, which will stimulate demand for skills — and as experience has shown — attractiveness of IT-related education.

- ☒ However, it is IDC's opinion that the model and the underlying assumptions are sound and realistic at the time of publication of the data.

Glossary

The definition of *networking skills* used in the model is: people needed to plan, design, manage, and support the networking technologies in the organization. The definition of skills needs to be broad due to the proliferation of networking technologies in organizations of all sizes. IDC further uses the following two classifications of skills:

- ☒ *Full-time equivalents (FTEs):* IDC's model is based on assessing the demand and supply of full-time equivalent networking skills, since this provides the most reliable foundation for modeling. Full-time equivalents are defined as spending 100% of their time working with the networking technology.

- ☒ *Labor supply:* Forces relating to the expertise or skills needed to support the market, such as IT or telecommunications engineers, technical support specialists, field engineers, product developers and designers, managers and other professionals, and skilled implementers. At the beginning of some markets, the availability of skilled professionals may be a gating factor — for example, professionals with networking skills in the market for IP communications or data and radio frequency (RF) engineers in the implementation of wireless networks.

- ☒ *CAGR:* Stands for *compound annual growth rate* or *cumulative annual growth rate*.

- ☒ *Service provider:* A company that transports information electronically. This category includes telecommunication service providers (TSPs), competitive local exchange carriers (CLECs), long distance carriers (LDCs), Internet service providers (ISPs), value-added resellers (VARs), local exchange carriers, and mobile service providers.

Copyright Notice