



WHITE PAPER

The Evolution of the Networking Skills Gap in Asia/Pacific

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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. With the rapid economic growth experienced in the region, countries in Asia will need to address the serious skills mismatches that exist in their labor markets to create sufficient employment and sustainable growth. Rapid emergence of new technologies has also radically impacted on the availability of networking skills, and has now become a major challenge in the IT industry.

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 have at its core a robust foundational network. Trends 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 competency in the enterprise. With networking being fundamental to next-generation converged infrastructures, and an increasing challenge for enterprises to add intelligence to their networks to be able to handle traffic flows, complex applications, and quality-of-service requirements and to ensure that applications are aligned with business needs, team talent to keep pace with changes in technology and maintain an IT team's high level of performance will increasingly become a key strategic advantage.

The next generation of IT will have at its core a robust foundational network.

Access to the types of skills needed to keep pace with changes in technology and maintain an IT team's high level of performance will increasingly become a key strategic advantage. The Asia/Pacific trends show an increasing need for people with networking skills in emerging technologies, and for well-trained teams that focus on higher value-added activities and can align technology demand with the business to create value for the organization.

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

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.

EXECUTIVE SUMMARY

IDC conducted 504 interviews in eight countries in Asia/Pacific: Australia, India, Indonesia, Korea, Malaysia, the Philippines, Thailand and Vietnam. 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. This study only included companies with in-house IT services staff, thus excluding any IT staff used via an outsourced delivery model.

Respondents were selected based on their responsibility for network infrastructure and management of professionals involved in network design, operation & 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. This document analyzes the results of this survey in what IDC has dubbed "The Evolution of the Networking Skills Gap in Asia/Pacific".

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 & 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.

Total networking skills gap refers to the aggregation of essential and emerging networking skills. By the end of 2012, IDC estimated a shortage of approximately 252,732 full-time equivalent (FTE) professionals with networking skills across Asia/Pacific (excluding Greater China and Japan) with this number increasing to 482,671 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 28% in 2012 and 31% in 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 staff within the company. External staff, such as those accessed via outsourcing arrangements, are thus excluded from the analysis.

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 & 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 the following:

- Essential networking skills.** This refers to basic or core networking skills, network security, IP telephony (IPT) and wireless networking. This represented 58% of total FTEs' skills gap in 2012 and will account for 47% in 2016. IDC estimated a skilled-people shortage of around 145,545 FTEs in 2012, increasing to 227,560 FTEs in 2016. These figures represent a similar FTE skills gap of 24% 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 12% from 2012 to 2016.
- Emerging networking technology skills.** This refers to skills in technologies such as unified communications, video, cloud computing, mobility and datacenter & virtualization and represented 42% of total FTEs' skills gap in 2012, growing to 53% in 2016. Within this group of skills, IDC estimated a skilled-people shortage of around 107,186 FTEs in 2012, increasing to 255,112 FTEs in 2016. These figures represent a projected incremental skills gap of 34% in 2012 and 38% in 2016. As these technologies ramp up and gain a stronger foothold within Asia/Pacific organizations, the demand for these skills will cause the gap to widen at a CAGR of 24% from 2012 to 2016.
- Other key findings.** Besides 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, 74% of respondents are expected to need multiple technology skills. This is the result of a need to offset the lack of skilled headcount as well as to build a flexible pool of 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 be considered advanced, such as security and wireless, but which are now deemed essential.
 - Perceived value of certification has grown.** More than 70% of companies interviewed indicated that certifications play an important role in their organization and selection of employees. Of those surveyed, 63% said that certifications are "important" to them while 10% of them found them "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.

The evolution of technology necessitates more essential skills to address additional demand for skills that only a couple of years ago would be considered advanced. More than 70% of companies indicated that certifications play an important role in their organization and selection of employees.

- Targeting new groups of IT professionals.** This study identified a scenario where a large IT professional demographic group is untapped — that of the female workforce. In 2013, within Asia/Pacific, the proportion of female network professionals is only an average of 7% and constitutes a new source of skills that, with appropriate recruitment programs, could provide a way to narrow the skills gap.
- Impact of managed services on the networking-skilled professional's development.** IT outsourcing use is growing more frequent in Asia/Pacific to mitigate the lack of skilled professionals in the organizations as well as the rapid rise in skills requirements for emerging technologies. IDC expects increasing demands on service providers for networking support skills in cloud computing and mobility technologies.

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 analysis of survey results coupled with the IDC's Networking Skills Model, which together result in an accurate picture of the current situation as well as future trends.

METHODOLOGY

- In 2013, IDC Asia/Pacific conducted a survey and combined it with a supply-side study to analyze the current status for both the demand and supply side of networking skills in eight selected Asia/Pacific countries. 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 introduce 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 & virtualization.
- IDC conducted 504 interviews in eight countries for the Asia/Pacific region: Australia, India, Indonesia, Korea, Malaysia, the Philippines, Thailand and Vietnam. 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.
- IDC contacted approximately 914 IT managers in order to arrive at 504 completed and valid interviews.
- Respondents were selected based on their responsibility for network infrastructure and management of professionals involved in network design, operation & 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

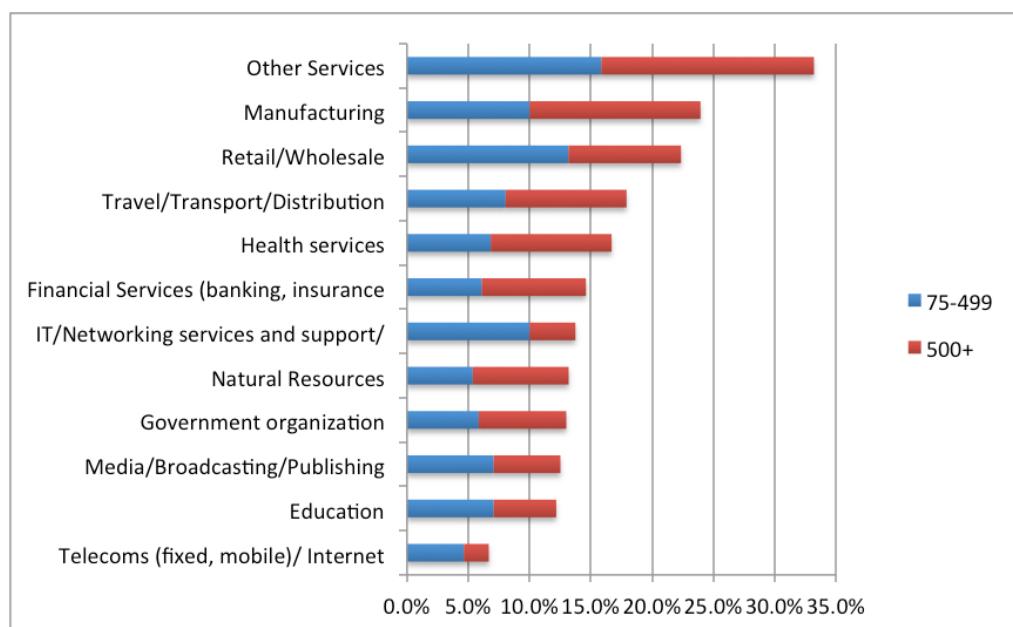
and future trends related to the use and development of networking skills, as well as the role of the network in Asia/Pacific organizations. This document analyzes the results of this survey in what IDC has dubbed "The Evolution of the Networking Skills Gap in Asia/Pacific".

- 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).

FIGURE 1

Number of Employees

Approximately how many employees does your organization have nationwide?



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 and 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 Worldwide Black Book. Please refer to the Appendix for a more detailed methodology description and glossary.

SITUATION OVERVIEW

Rapid economic growth in Asia/Pacific fuels the need for networking technologies as companies expand their operations, adding and renewing their outdated IT infrastructure. Proliferation of new technologies like mobility, unified communications and cloud services also drives the importance of network technologies for the companies as they serve a crucial part of the business backbone — 99% of respondents to our survey 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 for intra-company collaboration. According to this IDC survey, 25% of companies use their network for sharing business process information with key business partners, suppliers and customers. A further 13% use it for remote access to the organization, and 12% use the network for collaboration using specific applications that combine mobile phones, video, applications and other tools. Despite the importance of the network, survey results indicate that Asia/Pacific companies are not placing enough focus on formal network skills development and training. While cited as being important to the organization, professional certification is a far less important motivational factor in Asia/Pacific than in other regions. Only 62% of companies indicated 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 to oversee a team of non-certified engineers that learn the basic procedures as part of on-the-job training. While practical experience is undoubtedly valuable in solving issues, structured and formal training can bring more value to the company and allows personnel to acquire other essential and emerging skills.

Areas experiencing the greatest pressure include security skills, with 82% of respondents considering extra security skills requirements for the next 12–24 months. Wireless networking skills are considered by 78% of the companies as an area to add extra skills, while datacenter networking skills are third, with 71% of respondents considering investments in additional skills. IDC believes that this is a result of the explosion of mobile devices connected to the wireless network driving a flow-on effect all the way from the network edge to the datacenter.

IDC found that 73% of the companies interviewed believed that vendor certifications will become more important in the near future. Along those same lines, 80% of companies believe that a service provider's staff must have professional certifications, a factor 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 challenges posed by the lack of skilled staff at organizations is by increasing the number of students and professionals receiving formal training in all essential and emerging technologies.

Regional Analysis

The ICT industry is in the midst of a "once every 20–25 years" shift to a new technology platform for growth and innovation — IDC terms this as 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, toward 2020, these technologies will inevitably represent 80% of all IT spending.

Asia/Pacific is not immune to these trends and the economic characteristics of the region encourage technology adoption for the following years. Countries in the region are being characterized by their position of strength and driven by the momentum of a decade of prosperity. During the period 2011–2015, the telecommunications services market in Asia/Pacific will also outpace the global average. Asia/Pacific is forecast to have a CAGR of 8% for general switching and routing equipment, 12% for security and wireless LAN (WLAN) equipment and 25% for emerging technologies such as unified communications as a service (UCaaS), cloud services and mobility.

Furthermore, the networking market has shown significant stability and investment. As next generation requires a robust network at its core, a technology reconversion and replacement of former legacy installed base is taking place in Asia/Pacific. The networking market is being fuelled 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.

These illustrative facts demonstrate how Asia/Pacific 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 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 unified communications.

- ☒ **The proliferation of devices — both wired and wireless.** With the explosive growth of smartphones, and more recently tablets, IT has been forced to re-evaluate 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, 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.

Successful management of network infrastructure and the delivery of "as-a-service" solution will require that the skills gap in each country be narrowed. Retraining and cross-training will help to ameliorate the demand, but new, additional professionals are also needed in the ICT industry. Across the surveyed region a large IT professional demographic group has a very low representation in the regional network skills inventory — that of the female workforce.

It is important to consider the following when planning ICT skills programs:

- ☒ In 2013, the proportion of female network professionals is only an average of 9% and this low representation constitutes a potential new source of skills that, with appropriate recruitment programs, could provide a means to narrow the skills gap.
- ☒ During the 2012–2013 period, on average, 77% of responding companies indicated that the proportion of female network professionals remained unchanged. Only an average of 20% indicated that the proportion had increased. The growth markets of ASEAN and India reported the largest changes in female staff with network skills; for example, in Malaysia and Indonesia, the proportion of respondents reporting an increase in female network skills was 34% and 68%, respectively.

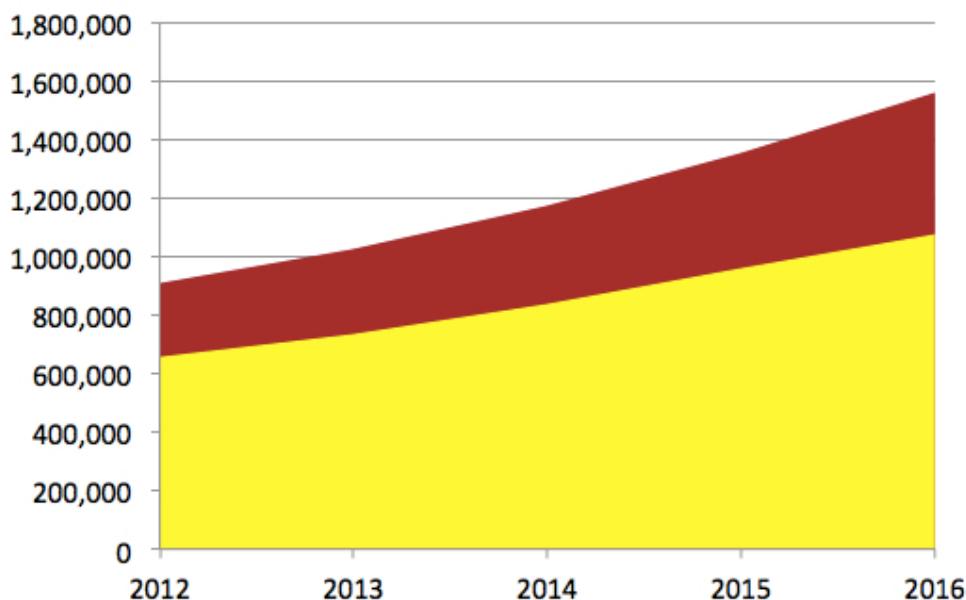
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Total Networking Skills Demand and Supply Trends in Asia/Pacific

Region-wide, IDC estimates that the demand for networking skills currently outstrips supply and will continue to do so during the forecast period (Figure 2). Total networking skills is the aggregation of essential and emerging networking skills. In 2012, IDC estimated a shortage of approximately 252,732 FTE professionals with networking skills across Asia/Pacific with this number increasing to 482,671 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 28% in 2012 and 31% in 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 Asia/Pacific, 2012–2016



Source: IDC, 2013

Essential and Emerging Networking Skills Gaps in Asia/Pacific

Constant flux and dynamic changes have always been the norms for the enterprise security landscape. Recent dynamics around cloud and datacenter build-outs, 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 IDC's Networking Skills Gap Model, essential technologies represented 58% of the total gap by the end of 2012. This will decrease to 47% of the total gap in 2016 with an increased demand for professionals focused on emerging technologies.

The exponential growth of data and information is placing pressure on the restructuring and strengthening of corporate datacenters. IDC has observed that skills

gaps will center around three key areas during the next few years: datacenters, security and wireless networking. By the end of 2012, 55% of the professional shortages focused on wireless networking, security and datacenter technologies. This gap will only be marginally lower at 54% in 2016.

The increasing number of devices connected to the network, and companies' information expansion across different sites, has increased 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 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. 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 and easily deployed WLAN solutions to support employees' mobile working needs.

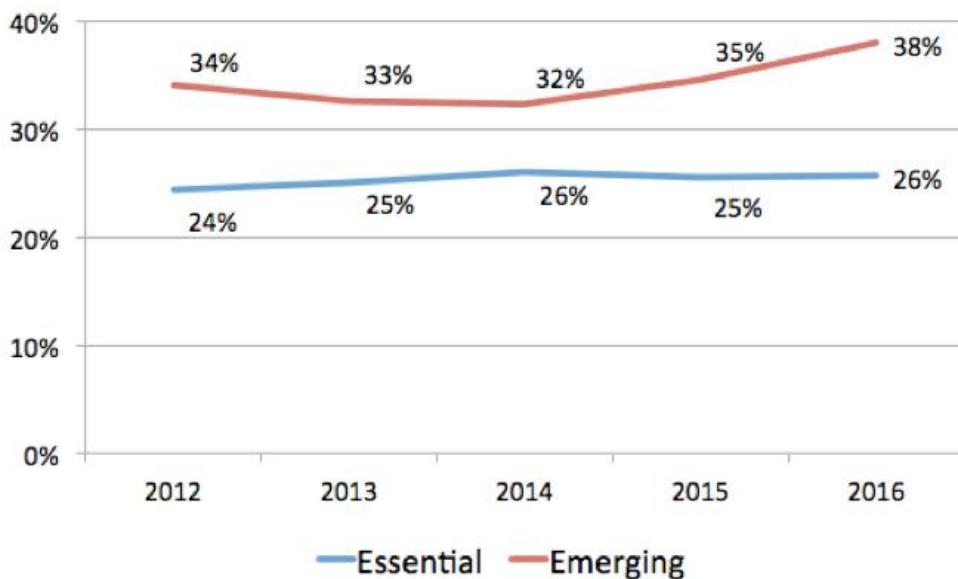
On the other hand, companies seek to take more advantage of their networks, wanting to directly link IT with business results. Enterprise IT managers are finding synergies in integrating other parts of their enterprise communications systems into their WLAN. Voice, UC and video technologies are prominent 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 a great vendor by restructuring their business and leveraging their networks to offer more value-added services, taking advantage of the capillarity of their networks and position in the small and medium-sized business (SMB) market.

New services delivered though the cloud are permeating the SMB market. 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 (refer to Figure 3).

FIGURE 3

Essential and Emerging Networking FTE (%) Skills Gap in Asia Pacific, 2012–2016



Source: IDC, 2013

Essential technologies will grow at a CAGR of 12% from 2012–2016. 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 operation, 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 24% from 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 outship 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 a small base, will be the fastest growing segment to drive the demand for skills in this area.

Cross-technology Skills

More than 70% 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 financial and project management to justify new technology return on investment (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 eight countries of the region found the following:

- 39% of respondents stated that they have hired networking professionals in the past 12 months.
- A significant proportion of organizations (38%) across the eight countries surveyed found it difficult to find networking engineers who have the right skill 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 the combination of skill sets that are needed.
- Security skills positions are the most difficult to fill. This is because security skills are increasingly in greater demand throughout the eight geographies analyzed; 82% 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:

- 39% of respondents see more value in the certification if they are recognized by the government.
- 36% of respondents see more value in the certification if they are sponsored by the technology vendors.

FUTURE OUTLOOK

The Changing Role of IT

IT systems are increasingly perceived as a business differentiator and facilitator within Asia/Pacific enterprises. 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 eight countries surveyed, an overwhelming 99% of respondents believe their network will become more important in the future.

- ☒ Of all respondents interviewed, 25% say that the network is a key platform for process sharing with key partners, suppliers and customers.

In addition to this, emerging technologies such as unified communications, video, datacenter & virtualization, 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 communication 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 2012–2016 CAGR of 7.1%, reaching approximately US\$4.7 billion in 2016.
- ☒ According to IDC forecasts, the IP telephony equipment market will have a 2012–2016 CAGR of 1.9%, reaching approximately US\$656 million in 2016.
- ☒ Security and WLAN equipment revenue will increase at a 2011–2015 CAGR of 29%.
- ☒ Emerging technologies including unified communications, video, cloud computing, mobility and datacenter & virtualization will increase together at 33.7% in market value in the period 2012–2016. Technologies such as virtualization show the highest CAGR of 59% through 2016. This is followed by other technologies such as video and cloud that will grow at a CAGR of 17% and 37%, respectively. Finally, solutions such as unified communications and mobility will increase their value at an average of 6% and 21%, respectively.

Total Networking Skills Shortage

In order to provide further insight into the existing and future requirements for networking professionals across the region, IDC's Networking Skills Gap 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. As research has shown that, on average, networking professionals spend 60% of their time working on networking tasks in Asia/Pacific, the model also uses the concept of skilled people that includes those 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 910,932 FTEs across Asia/Pacific 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 spend 100% of their available time on networking.

The total number of professionals estimated for Asia/Pacific includes those for essential and emerging technologies. Considering these technologies, the undersupply of around 252,732 FTEs in 2012 represented a shortage of skilled

people of around 28% in 2012, increasing to 482,671 skilled people by 2016. In percentage terms, IDC estimates that the total networking skills gap in Asia/Pacific will increase by 3 percentage points to reach 31% by 2016.

TABLE 1

Total Networking Skills in Asia Pacific (2012–2016): FTE Estimates

	2012	2013	2014	2015	2016	2012-2016 CAGR
Demand	910,932	1,022,467	1,175,305	1,355,144	1,559,599	14.4%
Supply FTE	658,200	736,998	839,499	958,867	1,076,927	13.1%
Gap FTE	252,732	285,468	335,806	396,277	482,671	17.6%
Gap (%)	27.7%	27.9%	28.6%	29.2%	30.9%	

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 (refer to 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 exist in each of these countries. This provides a clear picture of the challenges ahead.

TABLE 2

Total Networking Skills Gap Index

	2012		2016	
	FTE Gap	Gap (%)	FTE Gap	Gap (%)
Philippines	30,309	39.3%	51,922	41.2%
Vietnam	11,879	29.5%	24,478	40.9%
India	119,645	28.2%	227,066	29.7%
Malaysia	9,817	27.1%	23,873	34.4%
Indonesia	42,266	26.9%	99,445	35.6%
Thailand	21,330	24.7%	35,357	25.0%

TABLE 2

Total Networking Skills Gap Index

	2012		2016	
Australia	8,952	22.8%	11,719	21.0%
Korea	8,533	17.3%	8,811	13.6%

Source: IDC, 2013

The more mature Asia/Pacific countries like Korea and Australia have a lower overall networking skills gap. Korea posted the lowest gap both in terms of percentage and absolute terms. Government-related policies and industry dynamics are important drivers of a well-planned technology road map. Moving talent from different parts of the world is an important factor that has reduced the capacity gaps in emerging technologies. These mature Asia/Pacific economies tend to attract more skilled people, thus the low skills gap seen in these countries. However, with over 60% of total demand coming from the bigger economies — India and Indonesia, network professionals will look at these emerging Asia/Pacific countries for more opportunities, potentially exacerbating skills gaps in adjacent economies.

India is the second largest economy in the region after China. It has the largest demand for 424,880 FTEs with a gap of 119,645 in 2012, forecast to increase to 227,066 in 2016. India's rapid development as the IT powerhouse in the region has seen many of its skilled talent move to the mature economies for better career prospects. The country needs to continuously develop and retain skilled IT professionals.

Indonesia has the third highest demand for 157,242 FTEs with a gap of 42,266 in 2012, forecast to increase to 99,445 in 2016. Indonesia is also one of the fastest growing economies in the region and is attracting increased foreign direct investment (FDI) and skilled people to fuel its growth. Many of these skilled people are short-term expatriates, brought in to satisfy demand for particular projects. Vendors in Indonesia insist on knowledge transfer to local staff so as to help narrow the skills differential and to be able to develop a group of cheaper, local staff. Continued political stability and a favorable economic environment are important to narrow this gap.

The Philippines posted the largest gap in terms of percentage. Its skills gap of about 30,309 FTEs in 2012 is forecast to rise to 51,922 FTEs by 2016. Key reason for this is a large percentage of skilled talent leaving the country for better paid jobs in the region. The economic growth of the country is also driving the increasing demand for skilled talent. Information technology is one of the priority sectors for national government initiatives, but to sustain the Philippines's steady economic growth, the country must address its weak industry infrastructure and its perceived unfriendly business environment.

Vietnam will continue to face a significant skills shortage challenge due to its rapid transition from a state-planned economy to current state-market hybrid. Although the country attracts large inflows of foreign investment toward export-oriented manufacturing subsectors, the Vietnamese labor force is still heavily organized

around agriculture. Poor tertiary education systems which resulted in poor fit of graduates' skills to the needs of the industry also contributed to the gap. Faced with an unstable global market and galloping inflation, more skilled people will continue to move to other countries in the region for better opportunities. This will drive the current skills gap from 11,879 FTEs in 2012 to 24,478 in 2016.

Demand for Essential Technologies Skills

This survey also showed a strong intention for hiring of essential technology skills across all countries, 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 596,357 FTEs by the end of 2012 and reach 887,418 FTEs by 2016. This represented a percentage gap of 24% in 2012 and will hit 26% in 2016 (refer to Table 3).

TABLE 3

Total Essential Networking Skills in Asia/Pacific (2012–2016): FTE Estimates

	2012	2013	2014	2015	2016	2012-2016 CAGR
Demand	596,357	638,639	703,794	791,236	887,418	10.4%
Supply FTE	450,811	478,158	520,452	589,580	659,858	10.0%
Gap FTE	145,545	160,481	183,342	201,656	227,560	11.8%
Gap (%)	24.4%	25.1%	26.1%	25.5%	25.6%	

Source: IDC, 2013

Looking at the specific essential skills in demand, general networking (maintenance and operations) skills tops the list in 2012 with 46% 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 51,895 FTEs (19%) in 2012, and it is expected to drop to 42,302 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 24% of total essential skills demand for security growing to 31% from 2012 to 2016. Estimated skills gap percentage of 28% (41,201 FTEs) in 2012 has reduced to 26% (72,099 FTEs) in 2016, showing the slight growth in skilled professionals focusing on 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. WLAN networking skills are in strong demand, growing from 102,409 FTEs (17% of total essential skills demand) to 202,941 FTEs (23%) from 2012 to 2016. Estimated skills gap has also grown from 31,959 FTEs (31%) to 63,302 FTEs (31%) 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, accounting for only 8% of total demand in 2012, and growing to 10% by 2016. Since 2009, the implementation of VoIP solutions has not been as rapid as anticipated due to other IT investment priorities.

However, in its place the transition from existing time-division multiplexing (TDM) voice networks to the IP-base 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 communication specialists. The current gap of 20,490 FTEs (29%) in 2012 is forecast to grow to 49,853 FTEs (41%) by 2016.

Table 4 shows the skills gap by countries. It is evident that Vietnam posted the largest gap by percentage (30%) and will grow rapidly to 42% by 2016. Mature countries like Korea and Australia are narrowing their gap for essential networking skills workforce. In general, the rest of the Asia/Pacific countries are slowly stabilizing their demand and supply gaps for skilled FTEs.

TABLE 4

Essential Networking Skills Gap Index by Country

	2012		2016	
	FTE Gap	Gap (%)	FTE Gap	Gap (%)
Vietnam	9,473	30.0%	17,107	42.0%
India	73,006	26.4%	128,679	27.8%
Philippines	12,493	26.2%	15,587	23.6%
Thailand	14,200	23.4%	17,824	21.4%
Indonesia	19,811	23.2%	32,773	26.3%
Malaysia	5,129	22.3%	5,619	18.7%
Australia	5,341	16.6%	5,376	14.0%
Korea	6,093	15.5%	4,595	11.0%

Source: IDC, 2013

Demand for Emerging Technologies Skills

Rapid emergence of new technologies has radically impacted networking skills and they are now becoming a major challenge in the IT industry. IDC has conducted research on skills gaps of some of these key emerging technologies including: unified communications, video technologies, cloud computing, mobility and datacenter technologies. It is not surprising to note that these technologies represent the most substantial skills gap in the region — 42% of the total skills gap in 2012 and rising to 53% in 2016.

According to IDC's model, the demand for emerging networking skills climbed to 314,575 FTEs by the end of 2012 and will reach 672,181 FTEs by 2016 (refer to Table 5). This represents 35% of all FTEs demanded in 2012 and 43% in 2016.

TABLE 5

Total Emerging Networking Skills in Asia/Pacific (2012–2016): FTE Estimate

	2012	2013	2014	2015	2016	2012-2016 CAGR
Demand	314,575	383,828	471,511	563,908	672,181	20.9%
Supply FTE	207,388	258,840	319,047	369,287	417,069	19.1%
Gap FTE	107,186	124,988	152,463	194,621	255,112	24.2%
Gap (%)	34.1%	32.6%	32.3%	34.5%	38.0%	

Source: IDC, 2013

Datacenter and virtualization skills remain a challenging area in terms of finding skilled professionals. Server virtualization and datacenter are vital in the development of IT environments and the majority of medium and large organizations in the region are involved in the transformation of their datacenter in one way or another. The gap in this skills area accounts for 26% of new technologies through to 2016. Skills gap percentage in datacenter and virtualization across the region has also reduced from 34% (65,776 FTEs) to 32% (123,271 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 16,189 FTEs (31%) and is expected to rise to 36,941 (38%) by 2016.

- ☒ Video technologies. In 2012, the skills gap was 5,797 FTEs (52%) and is expected to rise to 9,895 (45%) by 2016.
- ☒ Cloud computing technologies. In 2012, the skills gap was 7,163 FTEs (33%) and is expected to rise to 44,565 (51%) by 2016.
- ☒ Mobility technologies. In 2012, the skills gap was 12,262 FTEs (37%) and is expected to rise to 40,440 (52%) by 2016.

Table 6 shows the emerging networking skills gap by country.

TABLE 6				
Emerging Networking Skills Gap Index by Country				
	2012		2016	
	FTE Gap	Gap (%)	FTE Gap	Gap (%)
Philippines	17,815	60.4%	36,335	60.5%
Australia	3,612	50.1%	6,343	36.5%
Malaysia	4,688	35.4%	18,254	46.3%
India	46,640	31.5%	98,387	32.7%
Indonesia	22,456	31.3%	66,672	43.1%
Vietnam	2,406	27.6%	7,372	38.7%
Thailand	7,130	27.5%	17,533	30.2%
Korea	2,440	24.2%	4,216	18.4%

Source: IDC, 2013

Country Analysis

The Philippines

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

- ☒ The Philippines posted the highest skills gap of 60% for emerging networking skills through to 2016.
- ☒ 24% 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.
- ☒ 59% of companies have not hired networking professionals in the past 12 months.
- ☒ 39% of companies do not send their staff to vendor specific network training courses.

The Philippines has fared relatively well in the current period of global economic instability. To diversify its economy and to provide more productive employment

opportunities, the Filipino Board of Investment has identified four broad sectors on which to focus government investment and coordination: Electronics, IT/Business Processes Outsourcing, Pharmaceuticals and Shipbuilding. However, the country has the largest skills gap percentage in Asia/Pacific and this gap is expected to continue through to 2016.

Current labor shortfalls exist at the semi-skilled to skilled level. Most job vacancies are in clerical and professional positions. Although it is relatively easy for employers to find qualified candidates for recruitment as compared to other countries in the region, most employers find the affordability of skilled staff to be a challenge. This is because most Filipino professionals have a long-standing habit of emigrating to seek better-remunerated opportunities abroad. This explains the huge gaps for networking skills professionals who are in high demand in other parts of the Asia/Pacific region.

According to the proprietary skills gap model, IDC estimated a shortage of 30,309 FTE professionals with networking skills in 2012 with this number increasing to 51,922 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 39% in 2012 and 41% in 2016.

Australia

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

- ☒ Australia posted the second highest skills gap of 50% for emerging networking skills by the end of 2012, which is expected to drop to 37% by 2016.
- ☒ 16% 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.
- ☒ 67% of companies have not hired networking professional in the past 12 months.
- ☒ 28% of companies do not send their staff to vendor specific network training courses.

In 2012–2013, Australia accepted about 200,000 permanent migrants, of which about 125,000 were skilled. Such public policy of skilled migration has helped to close the skills gap in the country. Skilled migrants will continue to fill shortages in the Australian labor market to help the economy grow.

According to the proprietary skills gap model, IDC estimated a shortage of 8,952 FTE professionals with networking skills in 2012, with this number increasing to 11,719 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 23% in 2012 and 21% in 2016.

Malaysia

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

- ☒ Malaysia posted a skills gap of 35% by the end of 2012 for emerging networking skills and this is expected to increase to 46% by 2016.
- ☒ 28% of companies interviewed indicate difficulty in finding qualified candidates.
- ☒ The primary reason for difficulty in hiring networking professionals is finding technically-qualified candidates who can understand and communicate well.

- 68% of companies have not hired a networking professional in the past 12 months.
- 56% of companies do not send their staff to vendor specific network training courses.

Malaysia has a young, moderately well-educated workforce and generally low rates of unemployment; however, it also faces persistent shortages of skilled labor. There is an increasing skills gap trend for emerging networking skills through to 2016. Although the companies in the country do not face much difficulty in finding qualified candidates, most of them had indicated the challenge to finding technically-qualified candidates who can understand and communicate well.

Malaysia's Economic Transformation Plan (ETP) is expected to create 3.3 million jobs by 2020 with 43,162 jobs in the ICT sector, of which more than 75% will be for high-skilled workers. In the short to medium term, we do not expect the skills gap to close especially with the declining trend of skilled expatriates coming to the country.

According to the proprietary skills gap model, IDC estimated a shortage of 9,817 FTE professionals with networking skills in 2012, with this number increasing to 23,873 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 27% in 2012 and 34% in 2016.

India

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

- India posted a skills gap of about 32% for emerging networking skills through to 2016.
- 29% of companies interviewed indicate difficulty in finding qualified candidates.
- The primary reason for difficulty in hiring networking professionals is assessing the quality of the applicants and finding technically-qualified candidates who have good business sense and sound soft skills.
- 53% of companies have not hired a networking professional in the past 12 months.
- 30% of companies do not send their staff to vendor specific network training courses.

Domestic economic growth in India has created huge employment demand and job opportunities. However, the shortage of quality skills training is resulting in a poorer skill-fit workforce to meet the needs of the industry. This is attributed mainly to the lack of coordination between private skills development organizations and the 17 ministries that offer skills development initiatives through school education, institutes of higher learning and specialized vocational training institutes.

The Ministry of Labour and Employment provides vocational training through over 8,000 government-aided Industrial Training Institutes and Industrial Training Centers. But put together, these institutes and training centers across India only have the capacity to train a million people annually, whereas close to 13 million people are being added to the workforce. On top of this, placement outcomes post-training from these institutes have also remained poor over the years. This mismatch between training delivered and required, and a quantitative shortage of capacity has resulted in the skills gap in the country.

According to the proprietary skills gap model, IDC estimated a shortage of 119,645 FTE professionals with networking skills in 2012, with this number increasing to 227,066 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 28% in 2012 and 30% in 2016.

Indonesia

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

- ☒ Indonesia posted a skills gap of 31% by the end of 2012 for emerging networking skills which is expected to increase to 43% by 2016.
- ☒ 10% 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.
- ☒ 26% of companies have not hired a networking professional in the past 12 months.
- ☒ 20% of companies do not send their staff to vendor specific network training courses.

Indonesia's labor market is characterized by a large service-sector component (nearly half of the labor force) and a large number of young, tertiary-educated individuals. To ensure an economically sustainable future, the Indonesian government is implementing its largest economic plan to date — MP3EI. The primary goal of the plan is to ease Indonesia's transition into an industrialized economy, expanding its domestic economy and moving it up the global value chain. Such government-led investment initiatives will help deepen industries' downstream connections while improving infrastructure to help make industries more competitive. However, most of these investments are directed toward coal and other mining, and oil and gas, which are the mainstay of the country's economy. Thus, we are seeing the skills gap for networking and other ICT sector expanding.

According to the proprietary skills gap model, IDC estimated a shortage of 42,266 FTE professionals with networking skills in 2012, with this number increasing to 99,445 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 27% in 2012 and 36% in 2016.

Vietnam

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

- ☒ Vietnam posted a skills gap of 28% by the end of 2012 for emerging networking skills which is expected to increase to 39% by 2016.
- ☒ 28% 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.
- ☒ 78% of companies have not hired a networking professional in the past 12 months.
- ☒ 48% of companies do not send their staff to vendor specific network training courses.

Vietnam's rapid transition from a state-planned economy to the current state-market hybrid has seen the share of GDP contributed by exports rise from 30% in the mid-90s to roughly 80% today. This has caused a significant realignment in the economy and in the labor market as industries have shifted toward more export-oriented manufacturing subsectors.

The Vietnamese government has targeted a number of key subsectors for investment and tax incentives. These subsectors are mainly characterized by their employment of low-skilled or semi-skilled labor. A renewed focus on increasing research and development (R&D) and use of technology in some areas will lead to opportunities for higher skilled professionals. However, only 6.1% of the labor force has received university training, while the majority of the workforce has received no formal training aside from basic literacy and numeracy education. This has resulted in shortages of high-end technical and management skills that have consistently posed a significant challenge for would-be foreign investors and the growth of a sustainable middle-class in the country. We see the skills gaps growing through to 2016.

According to the proprietary skills gap model, IDC estimated a shortage of 11,879 FTE professionals with networking skills in 2012, with this number increasing to 24,478 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 30% in 2012 and 41% in 2016.

Thailand

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

- ☒ Thailand posted a skills gap of 28% by the end of 2012 for emerging networking skills and this is expected to increase to 30% by 2016.
- ☒ 31% of companies interviewed indicate difficulty in finding qualified candidates.
- ☒ The primary reason for difficulty in hiring networking professionals is the difficulty finding technically-qualified candidates who can understand and communicate well.
- ☒ 61% of companies have not hired a networking professional in the past 12 months.
- ☒ 37% of companies do not send their staff to vendor specific network training courses.

Thailand's moderate growth amid a reliance on foreign investment, exports and low-wage labor is pushing the Thai government's development goals toward higher productivity, a greater focus on sustainable development and "people-centered development". The country's software industry also continues to experience strong growth due to sound government policies, resulting in an expanding technical labor force and an increasingly high-tech infrastructure.

Investment incentives related to high-technology manufacturing and services, and associated R&D, are receiving top priority on government mandates. However, growth in human capital has not caught up with economic growth of the country. So the shortfall in skilled labor is still a key challenge in the country. Despite the apparent shortage, the primary cause is not the shortage of graduates but the skills mismatch, in terms of relevant technical qualification and communication skills, among others.

This is also the primary difficulty indicated by Thailand companies interviewed in hiring networking professionals.

According to the proprietary skills gap model, IDC estimated a shortage of 21,330 FTE professionals with networking skills in 2012, with this number increasing to 35,357 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 25% through to 2016.

Korea

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

- ☒ Korea posted a skills gap of 24% by the end of 2012 for emerging networking skills, which is expected to decrease to 18% by 2016.
- ☒ 56% 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.
- ☒ 85% of companies have not hired a networking professional in the past 12 months.
- ☒ 53% of companies do not send their staff to vendor specific network training courses.

South Korea has experienced rapid and sustained economic growth since the 1960s. The economic policies that have underpinned this growth have emphasized the development of a vigorous, export-orientated manufacturing industry, with a progressive shift toward high technology. The networking skills gap is the lowest as compared to the other countries in Asia/Pacific. This can be largely attributed to the country's booming high-tech sectors and multi-disciplinary technical institutes such as KAIST that train and supply these skilled professionals.

Educational investment has played a significant role in Korea's rapid and sustained economic growth. The country's successful movement toward an information society is the result of concerted efforts by the government and industry. The industry has benefited from the government's initiative of building the information infrastructure and has consistently capitalized on these infrastructure and existing technologies.

According to the proprietary skills gap model, IDC estimated a shortage of 8,533 FTE professionals with networking skills in 2012, with this number increasing to 8,811 FTEs by 2016. These figures represent a skills gap (calculated as a proportion of total demand) of 17% in 2012 and 14% 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 services 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 users and business performance. This factor is demanding not only technically-skilled professionals but also an increasing knowledge of how to align technology with business goals.

In less mature markets, the challenges can be more basic. These countries have gaps in both essential and emerging technologies at a time when their industries need the benefit of world-class networks. The challenge they face is not only to train enough people but to also retain them, and financially motivate against migrating to adjacent markets and more attractive jobs. While the "brain drain" will never be stopped, maintaining the supply of IT and network professionals will be a necessary function of governments and industry. Developing new supplies of skills will require investment and new strategies to attract untapped demographic groups, especially women. That the need for a business as well as a technology focus is emerging has to be a trend that can be leveraged to build a new corps of network professionals.

Some verticals in the short term will face a greater networking skills gap. Governments, as an 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 represents a business differentiator. A majority of companies interviewed across the region indicated that they will send their staff for vendor specific training (especially Indonesia, Australia and India). However, economic factors as well as business strategies/culture determine the number of professionals that receive formal training and have a certification. Value of certification has also increased as companies struggle to qualify skilled candidates to meet the technological challenges, especially in emerging technologies.

Salary compensation for having better skills and technological readiness is not a common practice in companies in the region. Since qualified individuals are not paid more than those that are unqualified that factor leads qualified individuals to leave

(brain drain), making it challenging to find or retain truly qualified workers. This effect is more prominent in the Philippines and India which has resulted in some organizations finding it difficult to take advantage of new technologies because of the lack of skilled professionals.

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 actions for providers of networking education, IT industry bodies and providers of network product and services.

Training roadmap

- Focus product development by country considering each country's specific needs to best address requirements for essential, emerging and cross technologies' training
- Ensure that security courses are a module embedded within essential technologies' training/education
- Ensure that wireless networking courses are a module embedded within essential technologies' training/education
- Develop channels to market with technical education institutions/organizations to deliver industry-relevant skills development and certification
- Develop certification programs for service providers to ensure that they deliver certified support to their customers
- Develop soft-skills training that covers business IT alignment and analysis
- Work with service providers for networking support skills in the emerging skills of cloud computing and mobility technologies to close the widening skills gap in the region

Communication strategy

- Educate businesses on the fact that value to the organization is created through knowledge
- Promote the value of services delivered by certified network professionals
- Highlight the relationship and dependency between business and the network within a program to alter the current negative perception of a networking career and increase the proportion of female staff in the industry
- Raise awareness to key essential and emerging networking skill 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.

- Shared modules between IT and business curricula can cross-fertilize knowledge and provide a broader base of talent suited for a range of roles.
- Local governments: Consider embedding programs as part of digital agenda plans
 - Consider a joint communication effort with large value added resellers and system 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 to increase the rate at which customer staff are trained and certified. Existing partner programs do not always provide the same level of reward to training and education as they do product sales.

APPENDIX

IDC's Proprietary Skills Model

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

During the late 1990s and early 2000s, 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 & 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 below.

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, e.g., 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 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 — e.g., professionals with networking skills in the market for IP communications or data and RF engineers in the implementation of wireless networks.

- ☒ *CAGR*: Compound annual growth rate or cumulative annual growth rate.
- ☒ *Service Provider*: A company that transports information electronically. This category includes telecommunication service providers (TSP), competitive local exchange carriers (CLEC), long distance carriers (LDC), Internet service providers (ISP), value added resellers (VAR), local exchange carriers and mobile service providers.

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