

2018

IT Skills and Salary Report

A comprehensive study
from Global Knowledge



Global Knowledge®



TABLE OF CONTENTS

INTRODUCTION	3	NEW AND EMERGING CERTIFICATIONS	31
Primary findings	4		
COMPENSATION	5	PROFESSIONAL DEVELOPMENT	40
Raises and bonuses	6	How tech professionals stay up to date	41
Responsibility level	8	Internal versus external training resources	43
IT functional areas	9	Why professionals train	43
Company size	10		
Industry	10	JOB SATISFACTION	45
Global variations	12	Training increases job satisfaction	46
U.S. variations	13	Which industries have the most and least turnover?	47
Canadian variations	14		
CERTIFICATIONS	15	LOOKING FORWARD	48
Do certifications still matter?	16	Tech interest areas for 2018	49
Certification resources	17	Business conditions	50
Top 20 highest-paying certifications	21		
IT DECISION-MAKERS	25	CONCLUSIONS	51
IT department budgets	26	About Global Knowledge	52
Skills gaps	27	Survey demographics	53
Skills to invest in	28		
Hiring areas	29		
The value of training	29		
The value of certifications	30		

INTRODUCTION

For the 11th year, Global Knowledge has surveyed IT professionals to learn about their skills and their salaries. We uncovered the factors that influence both. Like last year, we've gone global, including data from Europe, the Middle East and Africa (EMEA); Latin America; and the Asia-Pacific region, along with data from North America.

In the fall of 2017, Global Knowledge and partners emailed the IT Skills and Salary Survey to professionals around the world. More than 16,200 respondents worldwide completed the survey. This report focuses on the 98% of whom define their role as an IT professional—either IT staff or the decision-makers who lead them.

After reading this report, you should understand the issues facing IT departments worldwide. While salaries vary around the globe, IT departments face similar challenges and demand similar skills, no matter the country or region. You will be able to understand how IT professionals learn, how much they get paid, what topics interest them the most, and how they expect their job to change going forward.



PRIMARY FINDINGS

SKILLS GAPS ARE A GLOBAL CONCERN

More than two-thirds of IT decision-makers report a gap between their team's skill levels and the knowledge required to achieve organizational objectives. In fact, this is the second straight year that skills gaps have increased. IT decision-makers around the world reported that skills gaps lead to higher levels of employee stress, delays in development and deployment of critical projects, and even loss of revenue.

CLOUD COMPUTING AND CYBERSECURITY ARE IN SERIOUS DEMAND

Like last year, respondents worldwide agree that the primary technology focus areas for their organizations are cloud computing and cybersecurity. More than half agree that cloud computing is a high priority, while 50% of respondents worldwide view cybersecurity as a top tech interest area. Other technology areas are important too. About a quarter of IT decision-makers in all regions think virtualization, networking, Internet of Things (IoT) and AI/cognitive will be investment priorities for their organizations.

At the same time, 38% of IT decision-makers reported having the most difficult time finding qualified cybersecurity talent, and 29% said cloud computing is a challenging hiring area. Increased demand in these areas is impacting salaries. Salaries of certified respondents working in security positions report the highest overall salaries with six of the 20 top-paying certifications.

CERTIFICATIONS MATTER

Respondents across the board noted direct benefits of certification, including increased productivity, faster troubleshooting and fewer skills gaps. In all regions, certification pays off financially as well. In North America, the average salary difference between certified and non-certified IT staff is \$15,913, or 22%. The percentage increase is even more noticeable in the Asia-Pacific

region, as certified professionals earn 45% more than non-certified peers. In EMEA, certified professionals make roughly \$3,000 more than those with no certifications. Worldwide, certified professionals earn \$5,439 more than non-certified staff, a nine percent increase.

U.S. SALARIES OUTPACE ALL REGIONS; RAISES UP GLOBALLY

United States salaries continue to considerably outperform the rest of the world. IT professionals in the U.S. have an average salary of \$87,333, which is 36% more than the global average of \$64,206.

Salaries for IT professionals outside of the U.S. vary considerably due to many factors, including cost of living, education, experience, certifications and industry. For example, salaries for IT decision-makers range from the mid-\$30,000s in Latin America to \$78,000-plus in Canada.

With substantial salary fluctuations across all regions, one constant was the percentage of respondents who received a raise in the past year. Sixty-three percent of IT decision-makers and staff in Canada received a raise, up seven percent from 2017. The United States, EMEA and Asia-Pacific also saw more raises across the board compared to a year ago.

BUSINESS IS GOOD, BUT WORKLOADS ARE HEAVY

Globally, 60% reported that business is good, or business conditions are either growing slowly or significantly improving. However, when factoring in workload management and hiring challenges, the outlook is not as strong. Two-thirds of respondents indicated their workloads are challenging, with 37% reporting workloads that are either very challenging or the worst they've seen. Further, 65% of IT decision-makers reported that hiring qualified talent is a challenge.

COMPENSATION

An employee's compensation is determined by a combination of factors, including education, responsibility level, job role, certification, tenure, industry, company size and geography—even global and regional economies. In this year's IT Skills and Salary Survey, we asked respondents about these factors and discovered variations around the globe, starting with base salaries. We converted salaries into U.S. dollars to enable relevant comparisons.

IT professionals in the U.S. earn higher salaries than their counterparts in any other region. A clear distinction across all geographies is the ratio of IT decision-makers' salaries compared to the salaries of the employees they manage. In North America, IT managers earn an average of 42% more than

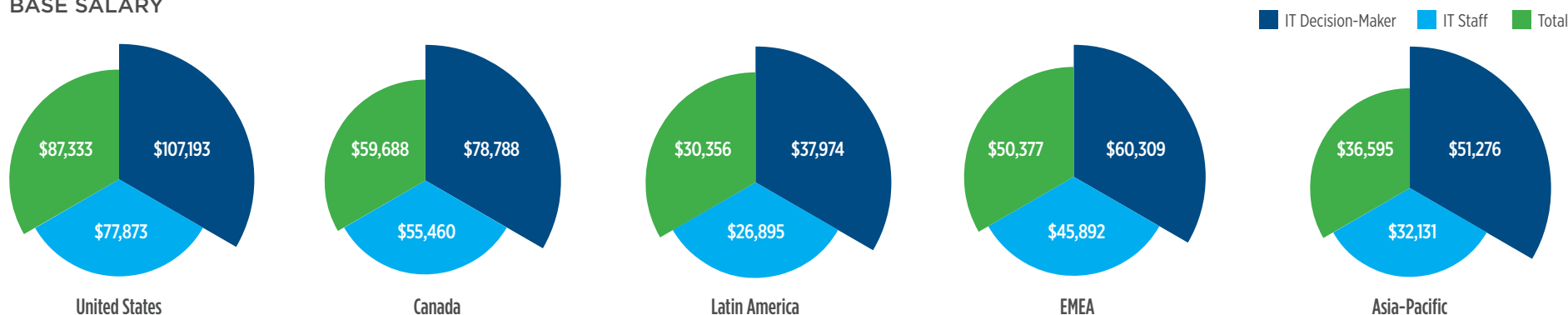
their staff. This ratio is comparable to EMEA's 31% difference. In Asia-Pacific, IT decision-makers report much larger differentials, earning 60% more than their staff. Latin America is in line with Canada—both with about a 41 to 42% difference between IT staff and IT decision-makers.



RAISES AND BONUSES

Between half and 72% of respondents received a raise in the prior year. This compares quite favorably to all other employees, where the average raise for IT decision-makers ranges from one percent in Canada to seven percent in Latin America. Raises for IT staff are somewhat more generous, with the average ranging from two percent in Canada to eight percent in Latin America.

BASE SALARY



REASONS FOR A RAISE

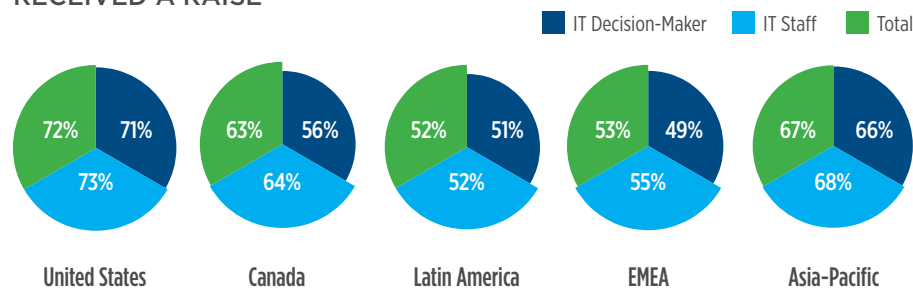
Forty percent of the respondents who received a raise attribute it primarily to job performance. Standard company increase is the second most frequently mentioned reason. Fifteen percent of IT professionals attribute their raise to adding new skills—the first of several indications in this report that certifications pay off.

The reason for a raise impacts the amount of the raise. External promotions or lateral moves garner the largest average salary increase. For example, U.S. respondents who moved to another company reported raises averaging between 13 and 19%. Internal promotions also lead to salary increases, but to a lesser extent than external moves.

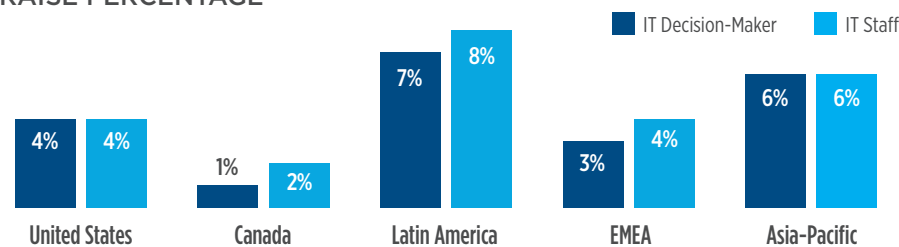
Respondents who received raises driven by skills development, including achieving new certifications, reported increases of 9 to 16% in the U.S.

Respondents who took on additional responsibilities or developed new skills that added value typically reported raises averaging 7 to 13%.

RECEIVED A RAISE

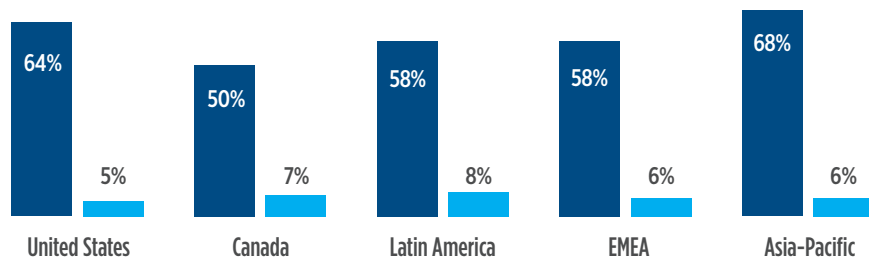


RAISE PERCENTAGE



RECEIVED A BONUS

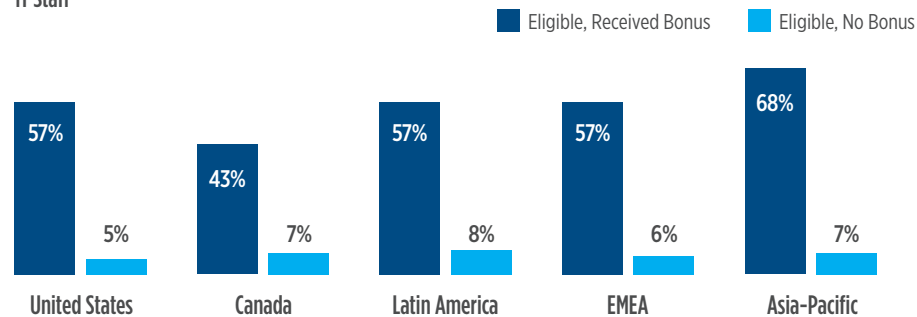
IT Decision-Maker



IT professionals who achieve a new certification experience salary gains worldwide, but there are plenty of other reasons for raises too. IT professionals taking a new assignment within their company is typically worth about an 11% bump in salary. In EMEA, a change in assignment is worth about 13%, and in Asia-Pacific a change in role might result in a 15% increase.

When IT professionals leave to work for another company, they seem to get a good bump as well. When IT professionals make a lateral move to another company it typically is accompanied by a 17% increase in salary worldwide. IT professionals in Latin America see the highest gain, getting an increase of 21% for a lateral move. In EMEA, IT professionals experience a 20% increase. In North America, it's about 13%.

IT Staff



But the biggest increase comes from getting a promotion when moving to another company. Worldwide, IT professionals report a raise of about 18% when moving to a new company with an increase in responsibility. Again, Latin America has the biggest increase (22%) and the U.S. reports a 17.5% increase.

According to the U.S. Bureau of Labor Statistics, between 35 and 40% of all employees in the U.S. were eligible for a bonus in 2017. The rate of bonuses in IT is somewhat higher, where 64% of U.S. respondents reported being “bonus eligible.” Globally, 60% of IT staff are eligible for a bonus. There are many types of bonuses, including profit-sharing, end-of-year, holiday and employee performance recognition bonuses. Only in the past several decades have staff or “non-managers” been eligible for bonuses tied to organizational performance or profits. This was in response to both tighter labor markets (where companies needed to offer higher compensation to attract new employees) and difficult economic cycles (where employers wanted to pay workers less when the employer didn’t perform as well). But bonus eligibility continues to vary by region and job function, reflecting traditional payment practices and economic cycles. IT decision-makers are still slightly more likely to be eligible for a bonus, especially when tied to corporate profits.

RESPONSIBILITY LEVEL

We compared respondents' compensation data, including base salary plus bonus if applicable, to their levels of responsibility on the job, ranging from entry-level to executive levels.

Entry-level IT staff (specialists, analysts, associates, level 1, etc.) account for 19% of this year's respondents. Average entry-level salaries range from \$19,500 in Asia-Pacific to \$55,275 in North America, with a global average of \$40,268.

Typical job roles include:

- Senior help desk specialist
- Network technician
- Business systems analyst

Mid-level professionals (managers and team leads) form the core of this year's respondent base, accounting for 52% of respondents. The average salary for these mid-level IT pros is \$63,330. Average salaries range from \$32,286 for Latin American respondents to \$83,072 for those in North America. Mid-level IT managers in EMEA average \$52,535, and their counterparts in Asia-Pacific average \$39,389.

Typical job roles include:

- Information security manager
- Network operations manager
- Applications systems architecture manager

Respondents in senior-level roles account for 26% of this year's participants. The average salary at this level is \$81,110. Salaries for senior-level respondents are lowest in Latin America where the average is \$37,108. Their counterparts in North America earn an average of \$107,483.

Typical job roles include:

- Director of systems engineering
- Vice president of corporate applications
- Vice president of enterprise infrastructure

Executives account for two percent of technical respondents and reported an average salary of \$87,817.

Typical job roles include:

- President
- CIO

SALARY BY RESPONSIBILITY LEVEL

Level	Average	Count	Percent
North America			
Entry	\$55,275	1,319	18%
Mid	\$83,072	3,971	53%
Senior	\$107,483	2,023	27%
Executive	\$107,273	166	2%
Total	\$85,310	7,479	100%
Latin America			
Entry	\$20,453	216	23%
Mid	\$32,286	429	46%
Senior	\$37,108	258	28%
Executive	\$63,464	35	4%
Total	\$32,051	938	100%
EMEA			
Entry	\$36,854	888	20%
Mid	\$52,535	2,167	49%
Senior	\$61,837	1,265	29%
Executive	\$80,635	112	3%
Total	\$52,758	4,432	100%
Asia-Pacific			
Entry	\$19,500	601	20%
Mid	\$39,389	1,741	57%
Senior	\$54,575	664	22%
Executive	\$54,352	47	2%
Total	\$39,007	3,053	100%
Worldwide			
Entry	\$40,268	3,024	19%
Mid	\$63,330	8,308	52%
Senior	\$81,110	4,210	26%
Executive	\$87,817	360	2%
Total	\$64,206	15,902	100%

SALARY BY FUNCTIONAL AREA

FUNCTIONAL AREA	NORTH AMERICA		LATIN AMERICA		EMEA		ASIA-PACIFIC		WORLDWIDE		
	Average	Respondents	Average	Respondents	Average	Respondents	Average	Respondents	Average	Respondents	Total
Application Development / Programming	\$88,644	500	\$29,094	56	\$48,221	261	\$23,850	313	\$58,409	1,130	8%
Business Analysis	\$73,033	276	\$32,010	23	\$55,372	55	\$32,185	56	\$62,783	410	3%
Business Operations	\$82,232	148	\$43,576	11	\$69,970	63	\$43,180	57	\$69,960	279	2%
Cloud Computing	\$110,265	172	\$20,158	17	\$70,584	134	\$37,087	131	\$74,064	454	3%
Data Management / Analytics / Business Intelligence	\$89,731	314	\$30,502	48	\$56,921	146	\$42,111	148	\$67,351	656	5%
Help Desk / Support / Service Management	\$53,651	801	\$21,614	70	\$32,358	394	\$29,342	222	\$42,872	1,487	11%
Networking / Infrastructure	\$76,473	1,111	\$23,344	234	\$38,140	847	\$25,661	712	\$48,553	2,904	21%
Project / Program Management	\$84,292	471	\$32,666	58	\$59,428	253	\$46,768	225	\$66,687	1,007	7%
Security	\$100,650	1,398	\$34,571	95	\$61,431	689	\$59,827	384	\$81,564	2,566	18%
Systems / Enterprise Architecture	\$92,402	1,281	\$39,301	121	\$57,545	773	\$47,837	371	\$72,802	2,546	18%
Telecommunications	\$73,550	174	\$25,531	62	\$39,291	154	\$29,692	96	\$47,905	486	3%
Total (includes "Other" Job Functions)	\$85,310	7,479	\$32,051	938	\$52,758	4,432	\$39,007	3,053	\$64,206	15,902	

IT FUNCTIONAL AREAS

Salaries vary considerably by respondents' job functional area. Of the IT roles we examined, more than two-thirds of respondents work in four of the 11 primary IT functional areas:

- Networking/infrastructure (21%)
- Security (18%)
- Systems/enterprise architecture (18%)
- Help desk/support (11%)

With salaries ranging from \$34,571 in Latin America to \$100,650 in North America, positions in security command the highest average global salary at \$81,564. That is 10% greater than the second highest-paying functional area, cloud, with an average global salary of \$74,064.

Respondents working in systems/enterprise architecture had the third largest salary at \$72,802. Those in business operations rank fourth, with an average global salary of \$69,960.

COMPANY SIZE

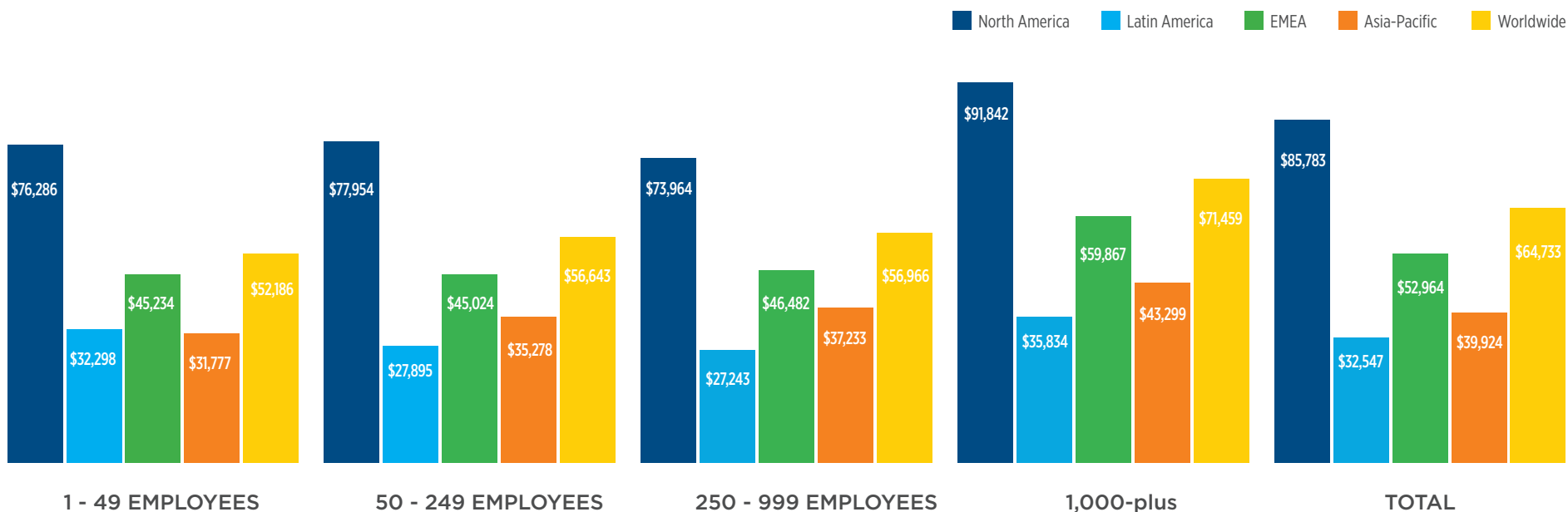
Our past surveys have consistently revealed that IT professionals earn higher salaries at larger companies than at smaller ones. That's true this year except in North America and Latin America, where IT professionals from mid-sized firms (250-999 employees) earn less than IT professionals from smaller or larger firms. Globally, the difference between average salaries at the largest and smallest firms is \$19,273, or 37%. The salary difference between the largest and smallest organizations is more than \$15,000 in North America and more than \$14,000 in EMEA.

INDUSTRY

Generally speaking, employees who are “revenue generating” earn higher salaries than employees who are not. So it is not unexpected that IT professionals who work for system integrators or VARs (value-added resellers) and charge clients for their time, earn the most of all IT professionals, a global average of \$88,004 annually. The industry is particularly well-paid in North America, where it earns an average of \$114,828.

IT professionals in the aerospace/defense industry earn a little less globally on average, earning about \$86,646 annually. This is the highest-paying industry in both EMEA and Asia-Pacific. IT professionals in insurance, real estate or the legal industry earn slightly less, at \$84,108 on average globally. In the pharmaceutical, medical, biotech industry, IT professionals earn a global average of \$80,566.

SALARY BY NUMBER OF EMPLOYEES



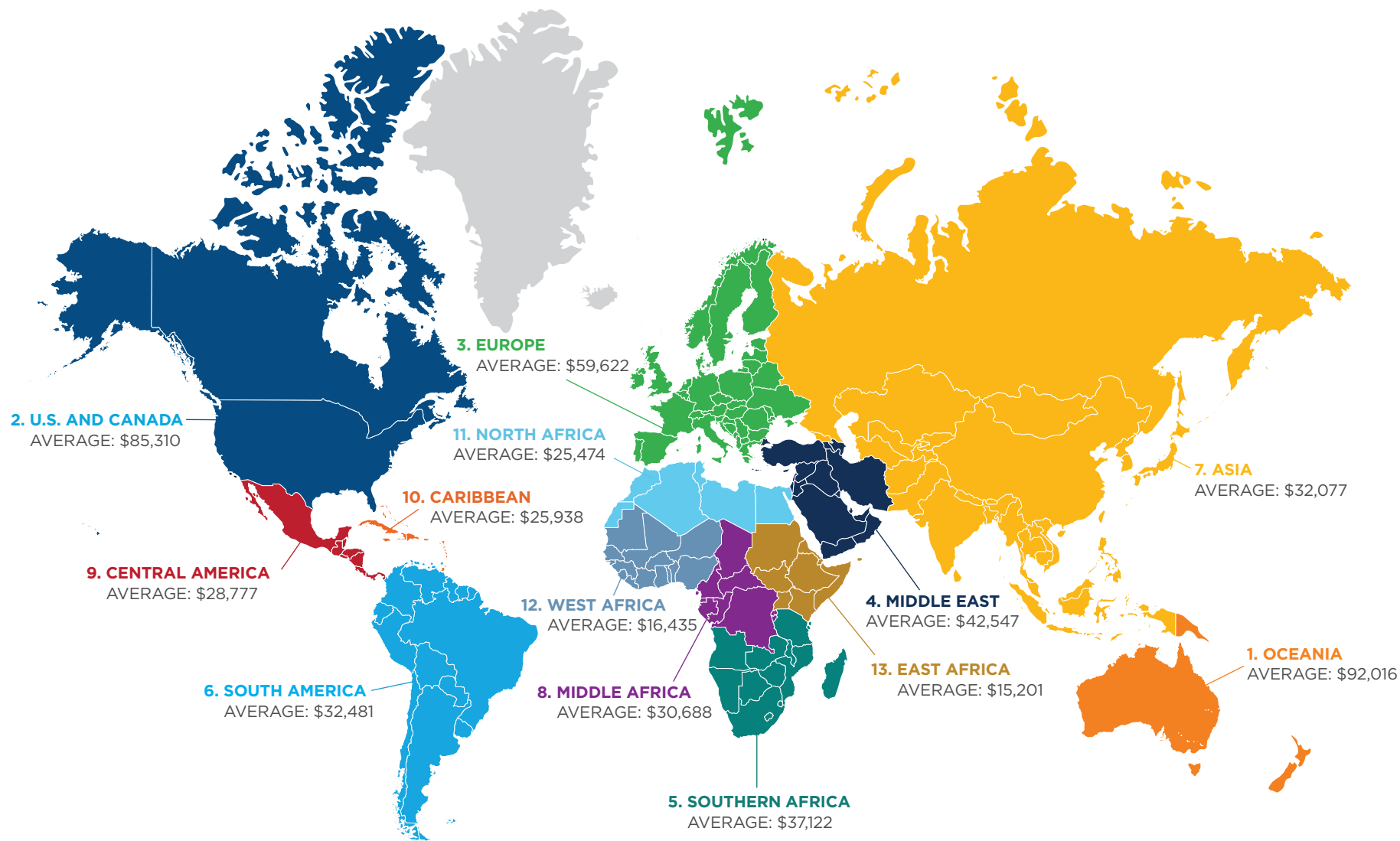
SALARY BY INDUSTRY

INDUSTRY	NORTH AMERICA		LATIN AMERICA		EMEA		ASIA-PACIFIC		WORLDWIDE	
	Average	Respondents	Average	Respondents	Average	Respondents	Average	Respondents	Average	Respondents
IS and VAR integration	\$114,828	74	\$39,510	7	\$60,408	30	\$42,579	18	\$88,004	129
Aerospace / Defense	\$91,239	242	\$7,102	2	\$70,463	46	\$69,323	12	\$86,646	302
Insurance, real estate, legal	\$94,212	368	\$49,831	9	\$62,824	108	\$66,470	63	\$84,108	548
Pharmaceutical, medical, biotech	\$92,161	78	\$45,992	4	\$65,770	32	\$62,273	16	\$80,566	130
Transportation or public utilities	\$90,887	181	\$31,266	6	\$63,288	77	\$62,594	28	\$79,671	292
Government: Military and homeland security	\$84,718	432	\$29,506	6	\$45,957	70	\$69,308	22	\$78,334	530
Natural resources: Mining, oil or gas	\$92,188	109	\$33,968	15	\$68,288	46	\$49,442	22	\$77,016	192
Manufacturing: Consumer	\$95,047	163	\$19,839	14	\$69,158	56	\$38,687	48	\$76,513	281
Media, film, music	\$94,170	66	\$70,350	2	\$53,491	28	\$25,799	13	\$75,129	109
Healthcare	\$80,450	620	\$28,965	9	\$50,314	95	\$37,935	58	\$73,043	782
Hospitality, travel and recreation	\$94,762	70	\$26,252	3	\$38,691	25	\$43,512	22	\$71,972	120
Banking and finance	\$91,399	838	\$35,269	80	\$58,145	562	\$53,340	377	\$71,190	1,857
Manufacturing: Industrial	\$86,148	202	\$32,883	21	\$66,093	89	\$42,858	65	\$70,983	377
Professional business services	\$94,353	149	\$24,693	21	\$58,221	108	\$43,564	58	\$69,618	336
Retail	\$84,291	159	\$37,947	9	\$51,719	80	\$38,596	34	\$68,062	282
Government: Nondefense, state, local	\$72,441	716	\$35,562	31	\$46,489	207	\$59,061	80	\$65,105	1,034
IT consulting	\$95,847	698	\$30,504	219	\$57,693	860	\$36,411	518	\$61,899	2,295
IT communication manufacturing	\$104,906	74	\$58,894	28	\$59,090	111	\$35,703	110	\$61,605	323
Natural resources: Agriculture, forestry, fishing	\$76,655	27	\$11,955	2	\$31,632	11	\$53,250	2	\$60,668	42
Other	\$80,076	349	\$32,710	30	\$47,677	224	\$33,138	136	\$59,694	739
Nonprofit	\$68,220	106	\$23,296	1	\$41,158	46	\$57,668	11	\$59,648	164
Wholesale	\$72,746	37	\$23,342	3	\$48,576	21	\$44,152	14	\$58,665	75
Construction, architecture, engineering	\$73,386	110	\$28,873	9	\$51,199	55	\$27,246	30	\$58,655	204
Communications, public relations, advertising	\$76,540	45	\$26,352	10	\$46,354	40	\$42,836	33	\$54,497	128
IT-related services	\$85,175	885	\$32,798	255	\$49,027	919	\$31,313	944	\$52,733	3,003
Education services	\$63,801	429	\$25,862	27	\$26,598	123	\$32,758	89	\$51,282	668
Telecommunications	\$87,635	252	\$26,267	115	\$43,555	363	\$33,796	230	\$50,717	960
Total (includes "Other" Job Functions)	\$85,310	7,479	\$32,051	938	\$52,758	4,432	\$39,007	3,053	\$64,206	15,902

SALARY BY GLOBAL REGION

A region's cost of living is one of the strongest drivers behind salary. For insight into how strong, we compared the salaries of respondents in 13 regions. Average salaries for IT decision-makers are greatest in North America at \$107,467, and lowest in East Africa at \$15,203. The region with the highest salary for IT staff is Oceania (\$86,689). IT staff in West Africa average \$13,237.

Oceania is a large outsourcing hub, and includes Australia, New Zealand and the Pacific Islands. That region has the highest combined average IT salary at \$92,016, eight percent greater than the North American average of \$85,310.



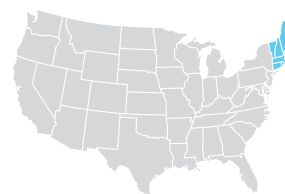
U.S. VARIATIONS

For IT professionals in the continental U.S., the average salary ranges from a high of \$100,692 in New England to a low of \$79,406 in the East South Central region. (This comparison excludes Puerto Rico and other territories because of the low number of responses.) The two biggest factors that contribute to differences in salary by region are the overall cost of living and demand for IT skills. In areas where there are lower costs of living, like the Mountain region, salaries overall will tend to be lower. In regions where there is higher demand for IT talent, specifically the Mid-Atlantic and New England regions, salaries will be higher.

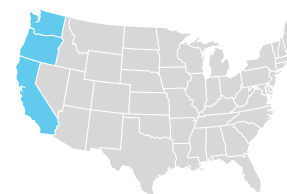
SALARY BY STATE

Top 5 States by Salary	Average
Connecticut	\$105,327
Massachusetts	\$98,722
Maryland	\$98,268
New Jersey	\$98,028
Virginia	\$97,868

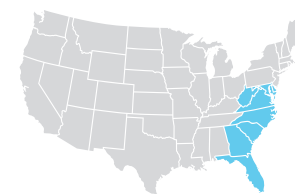
Bottom 5 States by Salary	Average
West Virginia	\$63,392
New Mexico	\$62,907
Arkansas	\$59,911
South Dakota	\$58,876
Alaska	\$52,576



1. NEW ENGLAND
AVERAGE: \$100,692



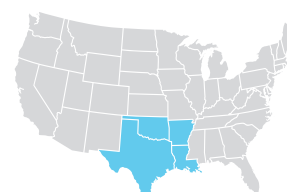
2. PACIFIC
AVERAGE: \$95,513



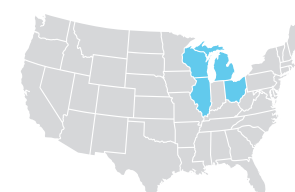
3. SOUTH ATLANTIC
AVERAGE: \$93,599



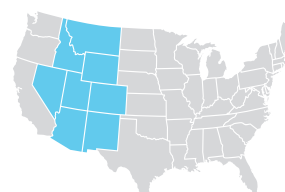
4. MID-ATLANTIC
AVERAGE: \$93,527



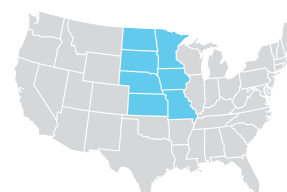
5. WEST SOUTH CENTRAL
AVERAGE: \$87,943



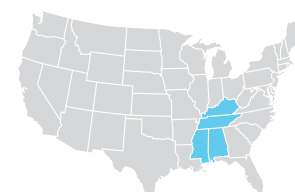
6. EAST NORTH CENTRAL
AVERAGE: \$87,287



7. MOUNTAIN
AVERAGE: \$85,972



8. WEST NORTH CENTRAL
AVERAGE: \$82,151



9. EAST SOUTH CENTRAL
AVERAGE: \$79,406

10. PUERTO RICO & OTHER TERRITORIES
AVERAGE: \$46,192

CANADIAN VARIATIONS

Overall, IT professionals in Canada earn an average of \$62,196, with IT decision-makers averaging \$82,825 and staff averaging \$57,630. Provincial variations range from \$67,719 in Quebec to \$49,698 in Nova Scotia.



1. QUEBEC

AVERAGE: \$67,719



2. ALBERTA

AVERAGE: \$67,657



3. ONTARIO

AVERAGE: \$62,162



4. OTHERS

AVERAGE: \$59,864



5. BRITISH COLUMBIA

AVERAGE: \$59,306



6. MANITOBA

AVERAGE: \$57,417



7. SASKATCHEWAN

AVERAGE: \$51,057



8. NOVA SCOTIA

AVERAGE: \$49,698

CERTIFICATIONS

Within five years, survey respondents have noticeably shown more respect for the value of certifications. In 2013, 70% of IT professionals believed that certifications lead to a more effective staff. That number is well above 90% today.

Investing in a certification—both in terms of time and money—is often a big decision, but it's one that IT professionals aren't hesitating to pursue. Eighty-nine percent of IT professionals worldwide hold at least one certification. That number jumps to 92% in both Latin America and EMEA.

One of the main reasons professionals are seeking certification: value. Individuals and organizations are witnessing the benefits firsthand, most notably higher salaries and greater productivity.



DO CERTIFICATIONS STILL MATTER?

ORGANIZATIONAL BENEFITS OF CERTIFICATIONS

The IT industry continues to invest heavily in the concept of certification as a means of validating an employee's skillset and capabilities. Though certifications require a time and money investment, IT decision-makers clearly see the benefits of having certified team members—95% believe certification provides added value to the organization. According to managers, certified individuals perform work faster (38%), are better able to meet client and stakeholder requirements (51%), and help close organizational skills gaps (42%).

INDIVIDUAL BENEFITS OF CERTIFICATIONS

IT professionals themselves see benefits, too. Seventy percent of IT professionals who prepared for certification exams in the past year report an improvement in their on-the-job effectiveness. Forty percent say they perform their job faster, 30% say they have implemented system efficiencies, and 38% say their expertise is more sought after within their organization.

Certification pays off financially as well. In North America, the difference between salaries of certified and non-certified IT staff is \$15,913, or 22%. In Asia-Pacific, the increase is 45%. Worldwide, certified IT professionals earn on average nine percent more than those with no certifications.

The trend is clear: It pays off economically for IT professionals to pursue a career-relevant certification.

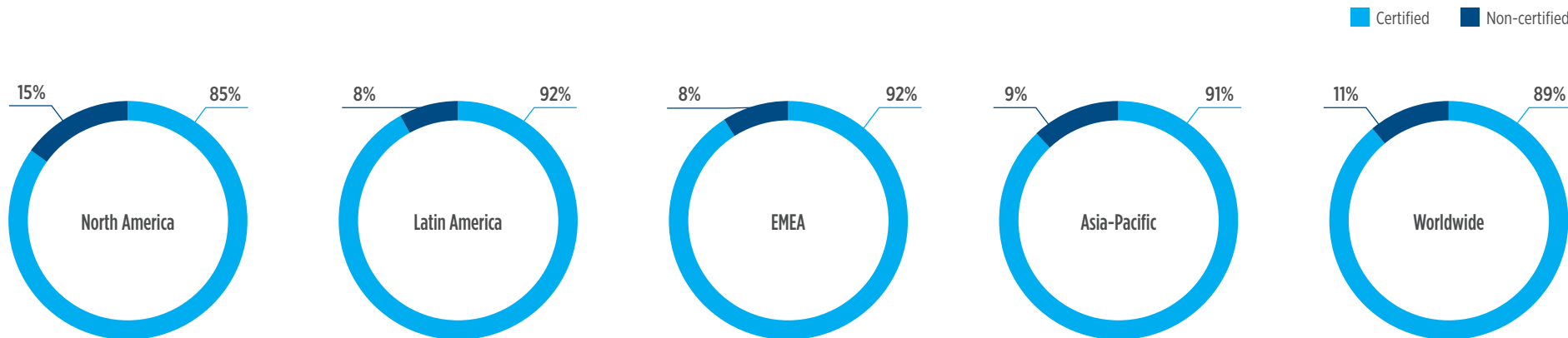
Globally, 89% of IT employees possess at least one valid certification, up three percent from last year. This skews down to 85% for North America and up to about 92% for EMEA, Latin America and Asia-Pacific. Respondents around the globe hold an average of just under three certifications each. Respondents in EMEA hold the most at just over three, and those in North America average the fewest at about 2.5 certifications per IT professional. It's likely IT professionals in EMEA hold more certifications for a practical reason: There is a bigger salary "bump" for the second (and subsequent) certification, than for the first. In the U.S. the biggest bump comes with the first certification.

Almost half of the respondents earned their most recent certification within a year of the survey. More than two-thirds earned their most recent certification within the last two years.

With additional certifications frequently required for someone to advance into new job roles, it is not uncommon to see IT employees planning their next certification, often years ahead. Overall, 64% of IT professionals are either presently engaged in training for a certification or plan to this year. This is slightly up from last year (59%).

Those who are currently certified are almost twice as likely to be actively engaged in pursuing new certifications. In North America, more than 50% of IT professionals with one or more certifications are actively pursuing another certification. Only 25% of IT professionals with no certification are pursuing their first one. The ratio is similar in Asia-Pacific where 27% of IT professionals with no certification are pursuing their first, compared with over 50% with one or more certifications who are pursuing their next one.

CERTIFIED PROFESSIONALS BY REGION



CERTIFICATION RESOURCES

Clearly the value of becoming certified has positive impacts on both the organization and one's career. We have a collection of resources to help you navigate your own certification journey.

For those of you looking to start your certification journey, read "[How to Select the Right Certification for You.](#)"

If you've decided to get certified but want to ensure you select a proven certification with staying power, check out "[18 Certifications Worth Having.](#)"

CERTIFICATION TRACKS:

Certification tracks provide easy-to-follow roadmaps of the steps and courses you need to take as you pursue a certification.

Certifications take a lot of time and energy, so before you embark on your journey, make sure you're fully aware of the courses and exam prep available, and what's required or optional.

- [AWS](#)
- [Business Analysis](#)
- [Cisco](#)
- [ITIL®](#)
- [Google Cloud](#)
- [Microsoft](#)
- [Project Management](#)
- Red Hat
 - [Enterprise Linux](#)
 - [Jboss Middleware](#)
 - [OpenStack](#)

CISCO CERTIFICATIONS

Cisco certifications were held by about 23% of this year's respondents (3,732).

The most commonly held certifications by Cisco-certified respondents include:

- 72% CCNA Routing and Switching (16% of all respondents)
- 30% CCNP Routing and Switching
- 17% CCNA Security
- 7% CCIE Routing and Switching
- 4% CCNP Security
- 2% CCIE Security

The average global salary for respondents holding at least one Cisco certification is \$48,898. By comparison, the average salary for respondents holding at least one Cisco certification in North America is \$80,617. The range of salaries varies by specific certification, too. For example, the global average for someone holding CCNA Routing and Switching is \$45,024—that's eight percent below the global average for all Cisco certifications. CCIE Routing and Switching has an average salary of \$70,437, which is 44% above the global norm.

MICROSOFT CERTIFICATIONS

Twenty-one percent (3,294) of this year's certified respondents hold a Microsoft certification. Certifications range from entry-level to the most advanced and cover numerous functional areas. Most respondents with Microsoft certifications hold certifications related to servers.

The most commonly held certifications by Microsoft-certified respondents include:

- 23% MCSA: Windows Server 2012 (5% of all respondents)
- 21% MCSA: Windows Server 2008
- 17% MCSE: Server Infrastructure
- 6% MCSA: Windows Server 2016

The average global salary for respondents holding at least one Microsoft certification is \$62,150. By comparison, the average salary for respondents holding at least one Microsoft certification in North America is \$81,300. The range of salaries varies by Microsoft certification, too. For example, the global average for someone holding an MCSA: Windows Server 2012 is \$54,549—that's 12% below the global average for all Microsoft certifications. MCSE: Server Infrastructure garners an average salary of \$71,169, which is 15% above the global norm.

Almost one in four respondents holds some form of security certification, and about one in five holds a certification related to ITIL/ITSM.

AVERAGE SALARY BY CERTIFICATION CATEGORY

CERTIFICATION CATEGORY	NORTH AMERICA		LATIN AMERICA		EMEA		ASIA-PACIFIC		TOTAL	
	Average	Count	Average	Count	Average	Count	Average	Count	Average	Count
Amazon Web Services	\$113,261	373	\$43,451	26	\$77,650	201	\$42,953	207	\$84,108	807
Application Development and Programming	\$98,072	228	\$34,970	34	\$55,325	166	\$38,836	169	\$65,823	597
Avaya	\$73,338	62	\$37,812	10	\$41,174	38	\$26,241	28	\$52,351	138
Business analysis	\$77,557	220	\$31,731	25	\$66,745	103	\$51,209	81	\$67,316	429
Business architecture (e.g., TOGAF)	\$112,260	102	\$53,144	14	\$84,136	124	\$65,540	69	\$87,863	309
Business process (e.g., Six Sigma)	\$95,091	263	\$33,763	23	\$68,252	123	\$60,135	83	\$79,617	492
Cisco	\$80,617	1,244	\$26,919	365	\$37,148	1,202	\$30,100	921	\$48,898	3,732
Citrix	\$89,095	442	\$28,317	67	\$52,305	474	\$30,476	272	\$59,251	1,255
Cloud (e.g., Cloud Credential Council, etc.)	\$103,182	229	\$31,294	31	\$69,994	156	\$41,299	127	\$75,070	543
CompTIA	\$75,930	1,562	\$38,516	48	\$43,632	269	\$55,385	101	\$69,587	1,980
Data Center	\$93,703	100	\$29,174	28	\$49,876	116	\$41,380	77	\$59,685	321
Database	\$95,209	289	\$30,810	49	\$53,856	218	\$37,494	192	\$64,123	748
Dell EMC	\$87,140	100	\$47,894	18	\$59,009	83	\$43,732	57	\$65,762	258
Governance (e.g., CGEIT, COBIT)	\$108,297	358	\$39,614	70	\$72,516	340	\$75,203	148	\$84,420	916
Help desk (e.g., HDI)	\$62,503	146	\$21,414	10	\$44,422	48	\$34,013	25	\$53,808	229
HP	\$83,343	144	\$26,783	33	\$46,258	146	\$31,744	73	\$55,445	396
IBM	\$97,517	559	\$36,285	200	\$54,217	532	\$34,100	482	\$60,377	1,773
Internet / Web development (e.g., CIW JavaScript Specialist)	\$98,910	82	\$18,459	5	\$33,998	50	\$29,403	30	\$64,580	167
ITIL and IT service management	\$87,998	1,207	\$34,829	187	\$59,644	1,112	\$48,500	641	\$66,774	3,147
Juniper	\$100,171	75	\$40,406	19	\$43,720	95	\$37,409	76	\$57,649	265
Knowledge management (e.g., KCSP, KCSF)	\$94,720	29	\$18,040	2	\$83,825	15	\$57,214	9	\$82,823	55
Microsoft	\$81,300	1,547	\$28,659	109	\$49,232	1,083	\$40,553	555	\$62,150	3,294
Networking (other) (e.g., Wireshark)	\$81,605	273	\$22,031	35	\$46,805	179	\$38,823	123	\$59,349	610
Novell	\$89,048	149	\$44,053	11	\$66,855	59	\$51,607	25	\$77,817	244
Other certifications	\$88,544	1,209	\$34,440	155	\$54,222	675	\$37,398	363	\$67,678	2,402
Project management (e.g., Agile, PMP, CAPM, Scrum)	\$97,745	691	\$38,979	69	\$67,352	473	\$59,783	331	\$77,926	1,564
Red Hat / Linux	\$91,806	173	\$31,943	37	\$53,033	164	\$32,683	124	\$59,869	498
Salesforce	\$100,412	52	\$46,260	5	\$59,287	23	\$26,871	36	\$67,101	116
SAP	\$96,966	57	\$42,882	16	\$71,072	65	\$38,923	47	\$68,445	185
Security and Privacy (e.g., CISA, CEH, CISSP, CIPM)	\$101,083	1,884	\$42,049	125	\$65,221	1,100	\$65,449	609	\$82,652	3,718
Sun	\$109,076	84	\$40,693	9	\$61,563	43	\$46,671	66	\$75,525	202
Virtualization (other) (e.g., MIA, CVDA, CVSE)	\$83,033	69	\$35,980	20	\$41,503	51	\$25,453	43	\$52,787	183
VMware	\$92,804	426	\$30,319	82	\$51,479	380	\$39,837	252	\$62,826	1,140
Wireless (e.g., CWNA)	\$90,762	120	\$29,924	26	\$47,955	85	\$41,809	54	\$63,170	285
Total	\$87,678	6,366	\$32,208	864	\$52,994	4,088	\$40,085	2,789	\$64,820	14,107

WHERE THE BIG MONEY IS

Average global salaries are highest in:

1. Business architecture (e.g., TOGAF) (\$87,863)
2. Governance (e.g., CGEIT, COBIT) (\$84,420)
3. Amazon Web Services (\$84,108)
4. Knowledge management (e.g., KCSP, KCSF) (\$82,823)
5. Security and Privacy (e.g., CISA, CEH, CISSP, CIPM) (\$82,652)

While certified respondents in North America reported the highest average salaries (\$87,678), the highest paid categories show considerable variation across regions. For example, certifications in AWS bring the highest salary in North America (\$113,261). In Asia-Pacific, Governance, Business Architecture, security and 10 other areas bring higher salaries, on average, than AWS. And of course, salaries for certified IT professionals of all types vary by region. For instance, certified project managers earn an average of \$59,783 in Asia-Pacific, \$67,352 in EMEA and \$38,978 in Latin America, compared to a worldwide average of \$77,926.

Overall, IT salaries are generally higher in Western Europe, but Asia-Pacific has countries with high IT salaries, too. Western Europe has six of the top 10 countries worldwide with the highest salaries, including:

- Switzerland (average salary of \$120,245)
- Norway
- Denmark
- Ireland
- Luxembourg
- Germany

In Asia-Pacific, Australia, New Zealand and Hong Kong are also among the top 10 countries for IT salaries. The U.S. is the remaining entry on that list.

TOP 20 HIGHEST-PAYING CERTIFICATIONS

CERTIFICATION	NORTH AMERICA		LATIN AMERICA		EMEA		ASIA-PACIFIC		TOTAL	
	Average	Count	Average	Count	Average	Count	Average	Count	Average	Count
CISSP: Certified Information Systems Security Professional (ISC) ²	\$109,965	921	\$44,504	24	\$80,140	212	\$76,878	149	\$100,146	1,306
CRISC: Certified in Risk and Information Systems Control (ISACA)	\$107,968	277	\$48,694	17	\$78,849	186	\$85,425	86	\$93,193	566
CGEIT: Certified in the Governance of Enterprise IT (ISACA)	\$117,544	120	\$40,430	11	\$77,805	110	\$75,642	43	\$92,821	284
AWS Certified Developer - Associate	\$112,984	118	\$42,917	6	\$83,174	54	\$45,026	42	\$90,782	220
AWS Certified Solutions Architect - Associate	\$117,773	314	\$50,143	14	\$77,503	174	\$43,454	165	\$87,463	667
CISM: Certified Information Security Manager (ISACA)	\$105,926	385	\$46,051	44	\$73,535	430	\$84,086	164	\$86,234	1,023
PMP®: Project Management Professional	\$103,406	396	\$42,353	36	\$69,924	109	\$63,193	164	\$85,757	705
Six Sigma Green Belt	\$99,865	145	\$38,275	11	\$78,832	58	\$54,904	41	\$85,195	255
Project+ (CompTIA)	\$87,416	141	\$45,433	10	\$48,383	27	\$85,180	14	\$79,577	192
Security+ (CompTIA)	\$84,011	906	\$37,407	26	\$56,393	129	\$70,372	48	\$79,116	1,109
COBIT 5 Foundation (ISACA)	\$102,112	121	\$40,713	54	\$74,437	204	\$71,481	76	\$77,300	455
CEH: Certified Ethical Hacker (EC-Council)	\$103,018	203	\$31,040	9	\$54,201	118	\$50,026	83	\$76,852	413
CISA: Certified Information Systems Auditor (ISACA)	\$97,117	746	\$44,088	72	\$62,298	680	\$63,096	425	\$75,300	1,923
Citrix Certified Expert – Virtualization (CCE-V)	\$111,923	108	\$31,714	10	\$58,130	130	\$43,719	42	\$75,165	290
VMware Certified Professional 5 – Data Center Virtualization (VCP5-DCV)	\$102,092	118	\$26,221	15	\$53,996	105	\$52,422	54	\$71,714	292
Certified ScrumMaster (Scrum Alliance)	\$98,562	134	\$30,116	17	\$62,542	58	\$38,541	75	\$71,258	284
MCSE: Server Infrastructure (Microsoft)	\$94,348	268	\$29,526	15	\$52,812	194	\$48,147	88	\$71,169	565
Network+ (CompTIA)	\$73,785	752	\$36,131	17	\$39,043	109	\$50,206	41	\$67,916	919
ITIL® v3 Foundation	\$87,453	1,083	\$33,920	173	\$58,782	968	\$48,524	589	\$66,143	2,813
Citrix Certified Professional – Networking (CCP-N)	\$103,111	112	\$19,984	22	\$58,946	118	\$27,196	73	\$64,397	325

Respondents said certifications have a positive impact on their earning potential, as evidenced by this year's [Top 15 Highest-Paying Certifications](#) article, which focuses on the United States data. To be included in the list, a certification must have had at least 100 North American responses.

The chart above and the following sections include worldwide certification data.

CYBERSECURITY

As in the last three years of this survey, certifications in security hold the top spots for salary. When we expand the list to the top 20, six are security certifications, including the top two spots: CISSP from (ISC)², and CRISC from ISACA. ISACA's CISM ranks sixth worldwide.

CISSP registers the top average global salary (\$100,146). Over 1,300 of our survey respondents are CISSP-certified. Another security certification in the top 20 is CompTIA Security+, with a North American average of \$84,011 at No. 10. EC-Council's CEH: Certified Ethical Hacker ranks 12th.

IT professionals with security certifications tend to have significantly higher average salaries overall. In North America, the average salary for all certified respondents is \$87,678. By contrast, the average salary for security-certified employees is \$101,083. Security-certified IT professionals earn about 15% more than the average certified IT professional. For security-certified professionals, this salary lift is true in Latin America (+31%), EMEA (+23%) and the Asia-Pacific region (+63%).

“Cybersecurity is everywhere,” said Dave Buster, Global Knowledge's global senior portfolio director for cybersecurity. “We've reached the tipping point where everyone in IT needs at least some exposure to cybersecurity. Meanwhile, cybersecurity itself is no long a single job, but has evolved into several related specialties that each require further education and training. That's one of the reasons cybersecurity professionals tend to make more—they have several years of experience in IT before moving into cybersecurity.”

CLOUD COMPUTING

Cloud certifications, including AWS Certified Solutions Architect – Associate, have average salaries significantly above the norm. In North America, the average salary for AWS Certified IT staff is 10% higher than average cloud certifications (\$113,261 versus \$103,182) and 29% more than average certified staff. AWS Certified Solutions Architect – Associate has an average salary of \$117,773 in North America, and \$87,463 worldwide.

The increased salary for cloud-certified professionals is not limited to those with AWS certifications. Those holding other cloud certifications, like Microsoft's MCSD: Azure Solutions Architect, show significant salary gains over their non-cloud-certified counterparts. The average North American salary for someone holding an Architecting Microsoft Azure Solutions credential exceeds \$107,221, though it is not yet widely adopted worldwide.

The emphasis on cloud has trickled down to other functional areas as well. Help desk and technical support professionals are actively seeking out certifications in cloud computing and networking to better prepare themselves.

“In the new era of IT where organizations run and secure mission-critical IT systems on cloud-based technologies, IT professionals with a solid foundation on computer networking and core infrastructure concepts are well-positioned for success in their roles,” said Tori Easterly, Global Knowledge's global product director for networks, products and services.

PROJECT MANAGEMENT

Certified project managers in North America also have average salaries above the norm. This is especially true for those possessing a current PMP® certification (\$103,406) versus the average for project management professionals of \$97,745.

Dan Stober, Global Knowledge's global portfolio director for project management and business analysis, says, "PMP will continue to remain one of the most important professional certifications available today. It's still growing and hasn't lost any of its luster of being the global standard in project management."

According to Stober, PMP's importance is attributable to three overarching reasons:

1. PMP-certified project managers demonstrate that they have mastered the concepts of project management that can be applied consistently throughout an organization. Projects should not be run on instinct, but rather through a repeatable, scalable framework. This reduces organizational risk and has everyone speaking the same language.
2. PMP certification shows mastery of the craft of project management. In addition to learning to manage constraints, PMP holders have studied and demonstrated knowledge of concepts like leadership, strategic contribution to the organization and long-term value delivery.

3. PMP certification signifies a desire for continuous learning. PMP holders must continue to seek and apply continuing education as a requirement to keep their certification current. Whether it is professional education, contributions to the project management community, or attending project management events, employers value those who continue to learn more about their craft.

PMI® certification update: Earlier this year, PMI rolled out its revision and update of the PMP exam. If you're preparing for your certification or recertification, watch our free webinar on "[What to Expect with the New PMBOKv6 Updates.](#)"

Another key certification in this category is Certified ScrumMaster (CSM) with an average salary of \$98,562.

Stober's take on CSM: "The CSM credential is indicative of the mastery of Scrum concepts as applied to agile projects. CSM is the global standard in applying Scrum methodology, and the CSM is the person responsible for ensuring teams operate within the limits of accepted global best practice. Whether it is removing obstacles, communicating with management on the status of projects, or coaching team members through project work, the CSM is an integral member of Agile teams. The CSM certification demonstrates that the holder is trained, competent, and can apply Scrum concepts for the delivery of business value."

CITRIX

Citrix has two certifications in the top 20 worldwide: Citrix Certified Expert – Virtualization (CCE-V), with an average salary in North America of over \$111,000, and Citrix Certified Professional – Networking (CCP-N), with an average salary in North America of more than \$103,000. Citrix has several high-paying certifications in North America that didn't break the worldwide top 20, including:

- Citrix Certified Professional – Virtualization (CCP-V) - \$97,978 in North America
- Citrix Certified Associate – Networking (CCA-N) - \$96,310 in North America

Overall, holders of Citrix certifications have average salaries of \$89,095.

VMWARE

Respondents who earned VMware Certified Professional 5 – Data Center Virtualization (VCP5-DCV) have an average salary of \$102,092 in North America and \$71,714 worldwide. In North America, salaries for VMware certifications average \$92,804. The overall average for virtualization-related certifications is \$83,033 in North America and \$52,787 worldwide.

MICROSOFT

Microsoft has one certification in the top 20. MCSE: Server Infrastructure ranks 17th with an average of \$94,348 in North America and \$71,169 worldwide. Three additional certifications have significant worldwide representation and good salaries in North America. Those include:

- MCSA: Windows Server 2008 - \$83,327
- MCSA: Windows Server 2012 - \$76,697
- Microsoft Specialist: Windows 7 - \$65,799

Even with the breadth of Microsoft certifications, which covers many categories and responsibility levels, holders of Microsoft certifications have an average salary of \$81,300 in North America and \$62,150 worldwide.

ISACA

ISACA is an independent association focused on the adoption and use of globally-accepted best practices for IT systems and organizations. With global acceptance and a wide portfolio, its certifications and practice standards enhance a wide range of careers. It has five certifications in the top 20 worldwide, including CRISC and CISM (mentioned previously). The other three are:

- CGEIT: Certified in the Governance of Enterprise IT with an average salary of \$117,544 in North America and \$92,821 worldwide.
 - COBIT 5 Foundation with an average salary of \$102,112 in North America and \$77,300 worldwide.
 - CISA: Certified Information Systems Auditor with an average salary of \$97,117 in North America and \$75,300 worldwide.
-

ROUNDING OUT THE TOP 20

Three foundation certifications round out the top 20.

- ITIL® v3 Foundation certification has an average salary of \$87,453 in North America. Globally, those with ITIL v3 Foundation earn average salaries of \$66,143.
- CompTIA's Network+ holders report an average salary of \$73,785 in North America and \$67,916 worldwide.
- Six Sigma Green Belt certification, sponsored by the independent association IASSC, is a foundation certification on a set of techniques and tools for process improvement, and has an average salary in North America of \$99,865. In EMEA, it earns an average of \$78,832.

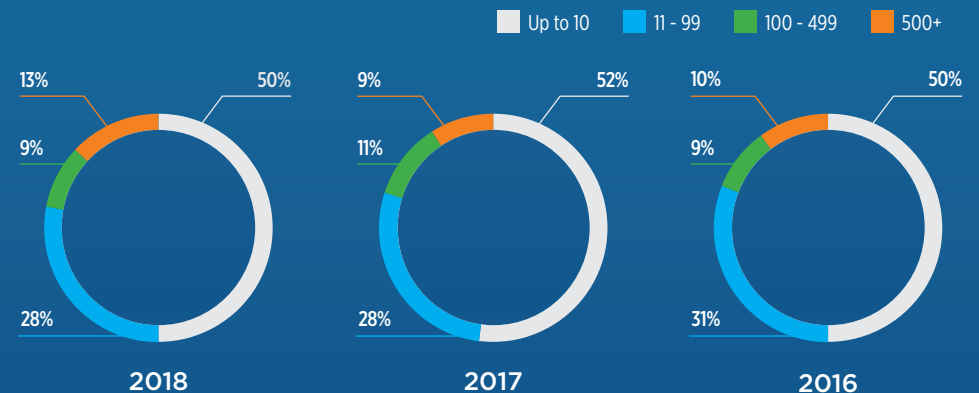
IT DECISION-MAKERS

Guiding the use of resources to meet the needs of the organization is the task of the IT decision-maker. For their organizations to be successful, they must address challenges such as security, skills gaps and the value of training.

In this year's response pool, more than one out of four respondents (29% or 4,777 IT professionals) said they hold some degree of managerial responsibility over IT efforts.

The size of the IT staff these respondents manage is similar to the past couple years. Seventy-eight percent manage teams of fewer than 100, and 13% manage teams of greater than 500.

SIZE OF IT WORKFORCE MANAGED



IT DEPARTMENT BUDGETS

Respondents reported budgets that correlate with the size of the teams they manage. This year, 52% manage budgets of less than \$500,000, compared to 55% in last year's study. This trend is influenced severely by North America, where more than 50% manage IT budgets of more than one million dollars.

Globally, 40% of IT decision-makers expected to see a budget increase in 2018. A slightly smaller percentage, 36%, expected their budgets to be flat compared to last year. One in four expected to see a budget decrease.

Two trends are worth noting. First, more IT managers in EMEA are expecting a budget increase this year compared with last year. This reflects the strengthening economy globally, but especially in Europe. In Asia-Pacific, while

ANNUAL IT BUDGET (EXCLUDING SALARIES)

Budget	2018	2017	2016
Up to \$249,999	40%	41%	38%
\$250,000 - \$499,999	12%	14%	16%
\$500,000 - \$999,999	9%	10%	10%
\$1 million - \$2.9 million	14%	14%	14%
\$3.0 million+	24%	21%	22%
Total	4,777	3,953	3,461

almost twice as many IT decision-makers expect a budget increase rather than a decrease, somewhat fewer expect an increase this year compared to last year (41% compared to 47% last year).

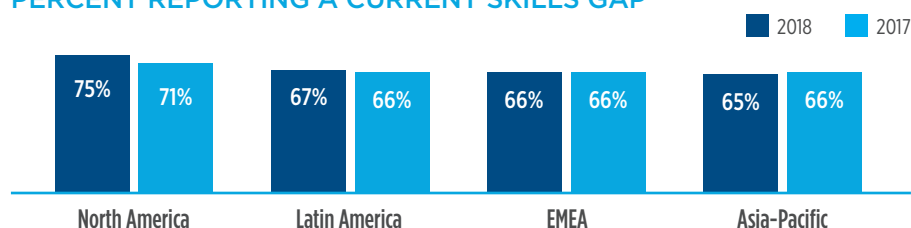
FORECASTED BUDGET CHANGE (EXCLUDING SALARIES)

	NORTH AMERICA			LATIN AMERICA			EMEA			ASIA-PACIFIC		
	2018	2017	2016	2018	2017	2016	2018	2017	2016	2018	2017	2016
Increase	41%	39%	50%	44%	44%	51%	36%	32%	44%	41%	47%	56%
Decrease	23%	22%	18%	27%	29%	25%	25%	28%	22%	22%	22%	20%
No Change	35%	39%	33%	29%	27%	24%	39%	40%	34%	36%	31%	25%

SKILLS GAPS

The top issue on the minds of IT decision-makers in organizations of all sizes is whether their teams have the skills needed to meet organizational goals. Globally, 70% of IT decision-makers said their teams presently face a shortage of necessary skills. The percentage reporting a gap is greatest in the U.S. and Canada, where it rises to 75%. In the rest of the world, skills gaps remain about the same year to year.

PERCENT REPORTING A CURRENT SKILLS GAP



Seventy percent of those who face a skills gap today expect it to continue over the next two years. Of those not currently facing a gap, 25% believe one will develop over the next 12 to 24 months. More than 40% of IT decision-makers attribute the gap to difficulty attracting talent to their industry. Many industries aren't perceived as being leading-edge in digital transformation, and that leads some candidates to overlook IT positions in manufacturing, retail, hospitality, and healthcare.

THE BIGGER PICTURE AROUND BUDGETS, SKILLS AND SALARIES

Many IT decision-makers also attribute skills gaps to self-inflicted wounds. Almost 40% say that their skills gap comes from a lack of training investment. Thirty-one percent of IT decision-makers report having difficulty paying what candidates demand. These are three sides of the same coin. A willingness to invest in developing skills will attract the talent. And a skilled workforce can enable innovation, extra value and the competitive advantage that can justify higher salaries.

REASONS BEHIND THE SKILLS GAPS

Reason	2018	2017	2016
It's difficult to attract candidates with the skills we need to our industry	40%	36%	42%
We have not invested enough in training to develop the skills we need	39%	43%	45%
We cannot pay what candidates demand	31%	33%	38%
We would hire more people if there were more qualified candidates	28%	29%	32%
We have not effectively anticipated the skills we need	23%	24%	26%
Our current training programs are not effective in developing the skills we need our employees to have	23%	26%	26%
We do not have the ability to track and measure the skills that exist in our employee base	19%	20%	18%
Other skills gap driver	9%	8%	7%

IMPACT OF SKILLS GAPS ON THE ORGANIZATION

Impact	2018	2017
Increased stress on existing employees	62%	61%
Difficulty meeting quality objectives	44%	43%
Delays in developing new products or services	41%	39%
Delayed deployments of new hardware and/or software	36%	36%
Declining customer satisfaction	32%	31%
Increased operating costs	29%	31%
Loss of business to competitors	25%	27%
Difficulty reaching revenue growth objectives	23%	22%
Loss of revenue	22%	23%

Regardless of the causes, skills shortages can result in insufficient staffing—fewer staff but the same workload—and less-skilled or less experienced workers performing important tasks. This has many impacts on organizations and staff—the most prominent concern is increased stress upon existing employees. More than 60% of IT decision-makers in all regions, except Latin America, report increased stress on existing employees resulting from skill shortages. While it is still the most common impact, only 39% of IT managers in Latin America report increased stress. Skills gaps also cause problems with product quality, customer service/satisfaction, process consistency, throughput, new product development speed and new system deployments, all of which cascade to loss of business and revenue.

SKILLS TO INVEST IN

When a technology is deemed strategically important, organizations must often consider, and eventually invest in, the skills needed to operate and understand these technologies. The technology investment area where IT decision-makers see the biggest skills gap is in blockchain. Globally, blockchain is the technology area that is most strategic, but also the area where CIOs and IT directors believe their teams are the weakest. It is closely followed by AI and cognitive computing.

WHAT'S GOING ON WITH BLOCKCHAIN?

Eric Strause, Global Knowledge's global senior portfolio manager for blockchain, stresses the opportunity and challenges blockchain presents:

"Blockchain is currently near the top of the technology hype curve and organizations are just trying to understand exactly what it is and isn't going to do for them. As with other technology innovations, blockchain will ultimately find its place and appropriate use cases that empower businesses and governments to fully adopt. We see strong reasons to believe blockchain will 'cross the chasm' and be a significant market disruptor with wide applicability to a variety of market segments, including supply chain, government, financial services and real estate.

"Because blockchain has the potential to significantly impact an organization's business model, it creates a more pervasive need for education across the organization. Organizations need to invest in knowledge and skills across the enterprise from line of business managers and C-suites to technical architects and application developer roles. To address this need, Global Knowledge is uniquely positioned to support a coordinated enterprise-wide awareness and skills development program canvassing a multitude of technical and non-technical job roles."

For specific technologies and methodologies, ITIL and PMI are the two areas where IT decision-makers believe their teams are weakest. Cybersecurity is another area, with decision-makers citing ISACA, Kaspersky and FireEye as investment areas where their teams have the least skills. After the survey closed and allegations surfaced about Kaspersky's ties to Russia, decision-makers might shift their focus away from this technology.

How are IT decision-makers managing skills gaps?

Once IT decision-makers realize skills gaps have emerged or are emerging, there are three approaches to remedy them:

1. Buy the skills by hiring new talent,
2. Rent the skills by working with a contractor/consultant, or
3. Build the skills by training existing talent.

IT decision-makers told us their preferences:

- 62% train existing staff
- 16% hire staff with the appropriate skills
- 16% hire contractors

U.S. and Canadian organizations have a slightly lower preference for training at 58% and we attribute this to these regions having easier access to larger pools of consultants. Though that's not necessarily the case for every functional area.

HIRING AREAS

For the third year in a row, IT decision-makers reported having the most difficult time finding qualified cybersecurity talent, with 38% indicating cybersecurity among their most challenging areas. This skews up to 41% for organizations in North America. Cloud computing is a challenging hiring area as well (29%). Respondents from Latin America and Asia-Pacific reported greater difficulty in hiring cloud specialists compared with North America and EMEA.

Dave Buster highlights that “the shortage of cybersecurity professionals is becoming acute, but it’s been trending worse in recent years. Some jobs in cybersecurity are much more difficult to outsource.”

WHY IT’S STILL DIFFICULT FINDING TALENT FOR CLOUD COMPUTING

Pete Vorenkamp, Global Knowledge’s global senior portfolio manager for cloud computing, sums it up like this:

The reason cloud computing is still high on the priority list is that businesses of all sizes in all industries are in different adoption phases. Adoption continues to accelerate at different rates even in sectors that have historically been laggards in adopting new tech.

Vorenkamp stresses that cloud skills are ever-growing.

The cloud skills shortage is largely due to the fact that you need more than just one or two specific skills to move or grow in cloud. To be successful, it requires seamless orchestration across multiple functions. Cloud is the ultimate enabler that is opening up new channels of revenue for companies, but the enabler is not enough. You need to leverage AI/ cognitive and IoT to feed the business, in order to analyze and extract insight that converts to business value.

LARGER COMPANIES ARE HAVING A HARDER TIME FINDING TALENT

Company size seems to matter when it comes to hiring talent, but not the way you might expect. Larger IT organizations consistently find it more difficult to hire talent than smaller organizations. While larger companies can more easily afford specialized talent, they have a more difficult time finding and hiring talent across technology areas, including cybersecurity and cloud. This may be a result of the more complex operating environment, and the need for broader experience on the part of new hires.

TOP 10 CHALLENGE AREAS FOR FINDING QUALIFIED TALENT

Challenge Area	North America	Latin America	EMEA	Asia-Pacific	Worldwide
Cybersecurity	41%	35%	36%	35%	38%
Cloud Computing	29%	32%	27%	30%	29%
Analytics and Big Data	18%	23%	19%	23%	19%
Infrastructure as a Service (IaaS)	16%	23%	20%	19%	18%
Networking and Wireless	16%	21%	17%	15%	17%
Application Development	16%	14%	16%	15%	16%
Enterprise Architecture	15%	17%	16%	16%	15%
DevOps	15%	14%	14%	16%	15%
Software as a Service (SaaS)	13%	21%	16%	16%	15%
Leadership and Management	15%	15%	12%	17%	15%

THE VALUE OF TRAINING

Fifty-nine percent of IT decision-makers said their organizations offer formal training for technical employees. That share isn’t appreciably different in any region we examined. And interestingly, the amount of money spent per employee on training doesn’t change much geographically either—a bit over \$2,000 per employee per year on training. About 78% of the organizations that provide formal training report that it is effective in developing the skills

needed. A similar percentage indicated they effectively anticipate the skills needed to achieve organizational objectives.

Just because an organization offers its employees formal training does not ensure employees will attend training. While 59% of IT decision-makers reported that training was available, only 46% authorized training for their team members. This is lowest in the U.S. (42%) and Canada (43%) and highest in Latin America (49%) and Asia-Pacific (55%). Since about 88% of IT staff worldwide took training in the past year, much of this difference must be because IT decision-maker approval wasn't required. Unfortunately, this suggests that IT decision-makers aren't attuned to the training needs and accomplishments of their staff.

THE VALUE OF CERTIFICATIONS

For those who did approve training, the majority (78%) did so to prepare their team members for certification or recertification. And an impressive 95% reported that their certified team members bring added value above and beyond the cost of certification.

That value shows in various ways. More than 50% of the IT decision-makers who sent their team members for certification or recertification training did so to fulfill client requirements. The percentage is higher in Latin America (62%) and EMEA (54%).

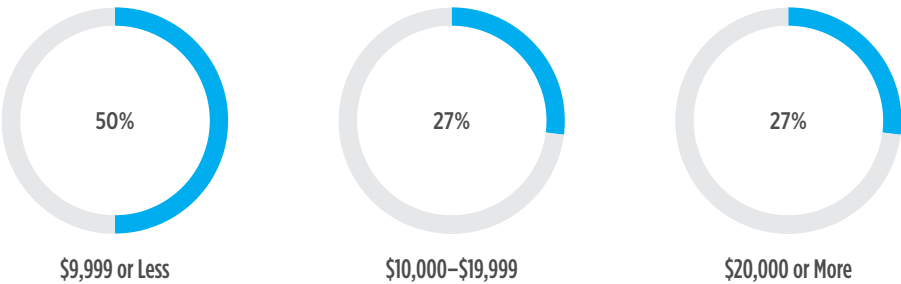
Overall, decision-makers reported that certified team members troubleshoot issues and complete projects more quickly, and have fewer skills gaps—especially notable among U.S. respondents.

When asked to estimate the economic benefit of the additional skills that certified employees bring to the table compared to non-certified peers, one in four IT decision-makers (27%) said it exceeds \$20,000 annually. A similar percentage projected the benefit to fall between \$10,000 and \$19,999.

BENEFITS FROM CERTIFIED PERSONNEL

Benefits	North America	Latin America	EMEA	Asia-Pacific	Worldwide
Meets client requirements	45%	62%	54%	53%	51%
Closes organizational skill gaps	46%	30%	36%	45%	42%
Troubleshooting issues takes less time	35%	53%	42%	42%	40%
Gives us an edge over competitors	35%	37%	42%	38%	38%
Projects are completed faster	31%	56%	37%	45%	38%
Boosts productivity	33%	30%	32%	39%	34%
Products and services are deployed quicker	22%	41%	26%	29%	26%
Reduces employee turnover	28%	15%	19%	15%	22%
Makes hiring easier	21%	15%	16%	13%	17%
Reduces direct or indirect expenses	11%	26%	20%	15%	16%

ESTIMATED ANNUAL ECONOMIC BENEFIT CERTIFIED EMPLOYEES BRING TO THE ORGANIZATION



IT decision-makers whose organizations have a formal training plan, and who authorized training in the prior year, are significantly more likely to authorize training than those who did not in the prior year. This is consistent across geographies and curriculum areas.

Nearly 55% of IT decision-makers reported they are likely to authorize staff to take skills-based and certification-focused technical training in the coming year. The likelihood to approve staff training for business process improvement, leadership skills and/or project management falls between 27 to 30%.

A stylized illustration of a man in a dark suit and white shirt standing on a large, dark teal keyhole shape. The background is composed of various shades of teal and blue geometric shapes, creating a modern, abstract environment. The man is positioned on the left side of the page, looking towards the right.

NEW AND EMERGING CERTIFICATIONS

Looking ahead at new and upcoming certifications provides insight into the areas deemed valuable in the IT industry. If you are an early adopter or in a position where you need to show that you have the bleeding-edge expertise of a technology, this alphabetical list of recently released or soon-to-be-released certifications is for you. Certifications in blockchain, cloud computing and DevOps are leading the charge.



AWS CERTIFIED CLOUD PRACTITIONER

The AWS Certified Cloud Practitioner exam enables individuals with an overall understanding of the AWS Cloud to validate their knowledge with an industry-recognized credential. This entry-level exam allows more individuals to pursue an AWS Certification and demonstrate knowledge about the AWS Cloud platform.

This exam covers four domains: cloud concepts, security, technology, and billing and pricing. Candidates should have at least six months of experience with the AWS Cloud in any role, including technical, managerial, sales, purchasing or financial.

The AWS Certified Cloud Practitioner exam serves as a prerequisite option for specialty exams. Individuals who hold either an Associate or a Cloud Practitioner certification will be eligible to take specialty exams. Individuals can choose to pursue the Cloud Practitioner certification before attempting an Associate exam, but it is not a requirement.

Ultimately, the AWS Certified Cloud Practitioner exam gives individuals in a larger variety of cloud and technology roles the opportunity to validate their AWS Cloud knowledge and enhance their professional credibility. Organizations who are planning to migrate to the AWS Cloud need individuals with cloud talent on their team, and can rely on AWS Certification as independent validation as they look to build foundational cloud knowledge on their teams.

Recommended training:

- [AWS Tech Essentials](#)

AWS CERTIFIED SECURITY – SPECIALTY

The AWS Certified Security – Specialty exam was released in April 2018. This exam allows experienced cloud security professionals to demonstrate and validate their ability to secure the AWS platform.

This is the third specialty exam within the AWS Certification program. Specialty exams validate advanced skills in specific technical areas, and require either an Associate or Cloud Practitioner certification. The first two specialty exams, AWS Certified Big Data – Specialty and AWS Certified Advanced Networking – Specialty, were released in May 2017.

Candidates for this new exam should have five years of IT security experience designing and implementing security solutions, and at least two years of hands-on experience securing production AWS workloads.

Recommended training:

- [Advanced Architecting on AWS](#)
- [Security Operations on AWS](#)

Learn more about AWS certifications at

www.globalknowledge.com/awscerts



The demand for blockchain skills is on the rise and with it rises the need for standardization. Enter the Blockchain Training Alliance (BTA), an organization with a focus on disruptive technologies and believes the “distributed ledger is the movement of the future.” Its mission is clear: “provide the most relevant content, instruction, and certifications for the blockchain technology as it reshapes the corporate world.” The BTA certification advisory board is comprised of technology executives, thought leaders and developers from training organizations, Fortune 500 companies, and universities.

On May 7, the BTA, in conjunction with Pearson VUE, released three blockchain certifications: BTA Certified Blockchain Solution Architect (CBSA), BTA Certified Blockchain Developer - Ethereum (CBDE), and BTA Certified Blockchain Developer - Hyperledger Fabric (CBDH).

Here’s what you need to know about each:

BTA CERTIFIED BLOCKCHAIN SOLUTION ARCHITECT (CBSA)

A person who holds this certification demonstrates their ability to:

- Architect blockchain solutions.
- Work effectively with blockchain engineers and technical leaders.
- Choose appropriate blockchain systems for various use cases.
- Work effectively with both public and permissioned blockchain systems.

The Solution Architect exam will prove that a student completely understands:

- The difference between proof of work, proof of stake, and other proof systems and why they exist.
- Why cryptocurrency is needed on certain types of blockchains.

- The difference between public, private and permissioned blockchains.
- How blocks are written to the blockchain.
- Where cryptography fits into blockchain and the most commonly used systems.
- Common use cases for public blockchains.
- Common use cases for private and permissioned blockchains.
- What is needed to launch your own blockchain.
- Common problems and considerations in working with public blockchains.
- Awareness of the tech behind common blockchain.
- When mining is needed and when it is not.
- Byzantine Fault Tolerance.
- Consensus among blockchains.
- What hashing is.
- How addresses, public keys and private keys work.
- What a smart contract is.
- Security in blockchain.
- The brief history of blockchain.
- The programming languages of the most common blockchains.
- Common testing and deployment practices for blockchains and blockchain-based apps.

How to prepare for the exam: It’s recommended that professionals seeking the CBSA certification attend the [Blockchain Architecture Training](#) course or have extensive blockchain implementation knowledge and experience.

Learn more about the [Certified Blockchain Solution Architect certification](#).

BTA Certified Blockchain Developer - Ethereum (CBDE)

A person who holds this certification demonstrates their ability to:

- Plan and prepare production-ready applications for the Ethereum blockchain.
- Write, test and deploy secure Solidity smart contracts.
- Understand and work with Ethereum fees.
- Work within the bounds and limitations of the Ethereum blockchain.
- Use the essential tooling and systems needed to work with the Ethereum ecosystem.

The Ethereum exam will prove that a student completely understands how to:

- Implement web3.js.
- Write and compile Solidity smart contracts.
- Create secure smart contracts.
- Deploy smart contracts on both the live and test Ethereum networks.
- Calculate Ethereum gas costs.
- Unit test smart contracts.
- Run an Ethereum node on development machines.

How to prepare for the exam: It's recommended that professionals seeking the CBDE certification attend the [Blockchain Ethereum Training: Hands-on Development Bootcamp](#) course or have extensive Ethereum development knowledge and experience.

Learn more about the [Certified Blockchain Developer - Ethereum certification](#).

BTA Certified Blockchain Developer - Hyperledger Fabric (CBDH)

A person who holds this certification demonstrates their ability to:

- Plan and prepare production-ready applications for the Hyperledger blockchain.
- Write, test and deploy secure chain code.
- Understand how to use Hyperledger Composer to rapidly build Hyperledger applications.
- Write chain code using either Go or NodeJS.

The Hyperledger Fabric exam will prove that a student completely understands how to:

- Create a Hyperledger model.
- Build proper access controls for blockchain assets via .acl.
- Implement a Hyperledger “.bna” banana.
- Write and compile smart contracts as chain code.
- Deploy smart contracts on channels in the private network.

How to prepare for the CBDH exam: It's recommended that professionals seeking the CBDH certification attend the [Blockchain Hyperledger Training: Developing on Hyperledger Fabric](#) course or have extensive Hyperledger development experience.

Learn more about the [Certified Blockchain Developer - Hyperledger Fabric certification](#).

After achieving one of these certifications, your certifications will be registered on a blockchain platform where professionals and employers can easily verify certificates on a trusted network, using a unique cryptographic hash given to each certificate holder.



As Software-Defined Networking (SDN) becomes established in the market, the necessary skillset for network professionals has grown to include the policy-based automation enabled by SDN controller technologies. These automation and programming skills are critical as they enable maximum flexibility while reducing operational costs.

The Cisco Network Programmability curriculum and certifications address the evolving role of network engineers towards greater programmability, automation and orchestration. Students will develop the foundational skills needed to develop network applications in various programmable environments.

Cisco Network Programmability Design and Implementation Specialist

A person who holds this certification demonstrates their knowledge of:

- Network programmability fundamentals
- APIs and automation protocols
- Data models
- Operations
- Controllers

Recommended Prerequisite Training:

- [PRNE - Programming for Network Engineers](#)

Recommended Training:

- [NPDESI - Designing and Implementing Cisco Network Programmability v1.0](#)

Cisco Network Programmability Developer Specialist

A person who holds this certification demonstrates their knowledge of:

- Programming fundamentals
- Data handling and formats
- Network controller platforms and protocols
- Device programmability (NXOS-API, ASA-API, IOS (XE/XR))
- Application Programming Interfaces (APIs)
- Cisco Software Development Kits (SDKs)
- Networking fundamentals

Recommended Prerequisite Training:

- [PRNE - Programming for Network Engineers](#)

Recommended Training:

- [NPDEV - Developing with Cisco Network Programmability v4.0](#)



Cloud+ CVO-002

CompTIA's newest certification, Cloud+, is vendor-neutral and job-role based. It demonstrates one's ability to maintain and optimize cloud infrastructure services. Although vendor-specific certifications are prominent in the cloud marketplace, the industry is recognizing the growing demand to validate one's expertise in any more than one cloud environment to give certification holders the ability to stay ahead of competition and widen opportunities.

The CompTIA Cloud+ exam covers competency in cloud models, virtualization, infrastructure, security, resource management and business continuity, all of which are intricate details that will lead to effective implementation and adoption of cloud technologies in the workplace.

Learn more about this certification and recommended training at

www.globalknowledge.com/comptiacloud

Recommended Training:

- [CompTIA Cloud+ CVO-002](#)



Dell EMC Certified Associate Converged Systems & Hybrid Cloud Platforms

Dell EMC Certified Expert Multi-Cloud

Dell EMC Certified Master Enterprise Architect

Dell EMC Certified Specialist Infrastructure Security

Dell EMC Education Services is labeling these four as “transformational certifications.” According to Dell EMC, the intent of these certifications is to develop “highly skilled talent that can make transformation real” and stay on top of emerging technologies. Dell EMC education and certification ensures that you gain a solid understanding of the technology and can establish a team with the right skillsets to maximize your ROI today and drive your transformation into the future. As part of the Dell EMC Proven Professional program, these certifications confirm the knowledge and experience needed to accelerate an IT department's time to transformation.

The new certifications will help you:

- Understand how to manage converged/hyperconverged platforms.
- Develop expertise to enable automation and service delivery with multi-cloud solutions.
- Incorporate critical security controls for Dell EMC enterprise infrastructure.
- Translate emerging business trends into the technology solutions and new operating models of the future-ready organization.



DEVOPS AGILE
SKILLS ASSOCIATION

DASA DevOps Fundamentals

Organizations are under constant pressure to get products to market ahead of the competition. This inevitably can cause friction for development and operations teams to meet demands. The DevOps framework can bring cohesion to the two teams. The DASA DevOps Fundamentals certification provides an extensive introduction to the core Agile DevOps principles, covering basic knowledge and skill competencies that have been defined by the [DevOps Agile Skills Association \(DASA\)](#). The DASA DevOps Fundamentals certification is designed for anyone who is working towards implementing Agile and DevOps strategies into their organization. The DASA DevOps Fundamentals certification is the first step in the DASA competence framework.

Recommended training:

- [DASA DevOps Fundamentals](#)

DASA DevOps Practitioner

The DASA DevOps Practitioner certification builds on the fundamentals necessary to put DevOps into practice. This certification focuses on four skills from the DASA competence framework: courage, team-building, DevOps leadership and continuous improvement. Meeting these four skills puts a candidate at the “proficient” level of DevOps knowledge and practical application.

Recommended training:

- [DASA DevOps Practitioner](#)



DevOps Institute (DOI) - DOI DevOps Foundation

The DevOps Institutes' DevOps Foundation certification is based on the desire to promote a healthy culture in the workplace. Development and Operations teams can gain skills to improve communication and collaboration between the two teams. Improved workflows will result in a more streamlined approach in order to design, develop, deploy and operate software and services faster.

In order to pass the DevOps Foundation certification exam, candidates must achieve 65% or higher on this 60-minute exam, consisting of 40 multiple-choice questions.

Recommended training:

- [DOI DevOps Foundation](#)



As organizations continue to invest in the cloud, the demand for individuals with the skills to leverage cloud technologies increases. This year, Google Cloud Certified will launch this new Associate Cloud Engineer certification, an ideal entry point for individuals who have used the Google Cloud Console and are able to deploy applications, monitor operations and manage enterprise solutions.

Cloud Engineer follows the 2017 debut of two professional-level certifications, the Cloud Architect and the Data Engineer, which were developed as an assessment of advanced skill levels to identify experienced individuals with a broad scope of Google Cloud knowledge.

ASSOCIATE CLOUD ENGINEER

The Google Cloud Certified Associate Cloud Engineer demonstrates the fundamental skills needed to work with the Google Cloud Platform. The certification lays the groundwork for those who will be pursuing the professional-level architecting and data engineering certifications.

PROFESSIONAL CLOUD ARCHITECT

The Google Cloud Certified [Professional Cloud Architect](#) demonstrates the ability to design, develop and manage a secure, scalable and reliable cloud architecture using Google Cloud Platform (GCP) technologies.

- Learn everything you need to know about the GCP Architect certification in "[A Complete Guide: How to Become a Google Certified Professional Cloud Architect](#)."

PROFESSIONAL DATA ENGINEER

A Google Cloud Certified [Professional Data Engineer](#) possesses the necessary skills on GCP to design, build, maintain and troubleshoot data processing systems with a focus on security, reliability, and fault-tolerance.

- Learn everything you need to know about the GCP Data Engineer certification in "[A Complete Guide: How to Become a Google Certified Professional Data Engineer](#)."

All three of these certifications are industry-recognized and are valid for two years after which recertification is required.

VENDOR-NEUTRAL

CERTIFIED MACHINE LEARNING SPECIALIST (CMLS)

The CMLS certification, from the Global Science and Technology Forum (GSTF), validates skills across machine learning topics like algorithms, neural networks, natural-language processing and more. Machine learning has moved past the “hype cycle” and although many enterprises are seeking to automate their analytics processes and take advantage of machine learning technologies, adoption is hampered by a shortage of professionals with proven artificial intelligence expertise. Candidates for this certification should have a minimum of two years of experience in software development, data analysis, business analysis or a relevant business domain.

The CMLS certification exam primarily consists of 40 multiple-choice questions that assess a candidate’s understanding of machine learning, as well as their ability to evaluate and apply their knowledge, and identify and manage associated risk.

Recommended training:

- [Certified Machine Learning Specialist](#)

INTERNET OF THINGS FOUNDATION (IOTF)

The IoTF certification from the Cloud Credential Council (CCC), covers the basic concepts, terminology and key components of IoT from both a business and technical perspective. Skilling up for IoT can be challenging for organizations due to the deep and wide scope of IoT use cases. IoT is “everywhere” and capitalizing on IoT technologies requires organizations to validate their employees’ skills in this area. IoTF certifies high-level competencies and a common lexicon that is critical for the proof of concept and early adoption phases. Candidates for the IoTF certification are not required to have prerequisite experience but should be conversant with cloud concepts and vocabulary.

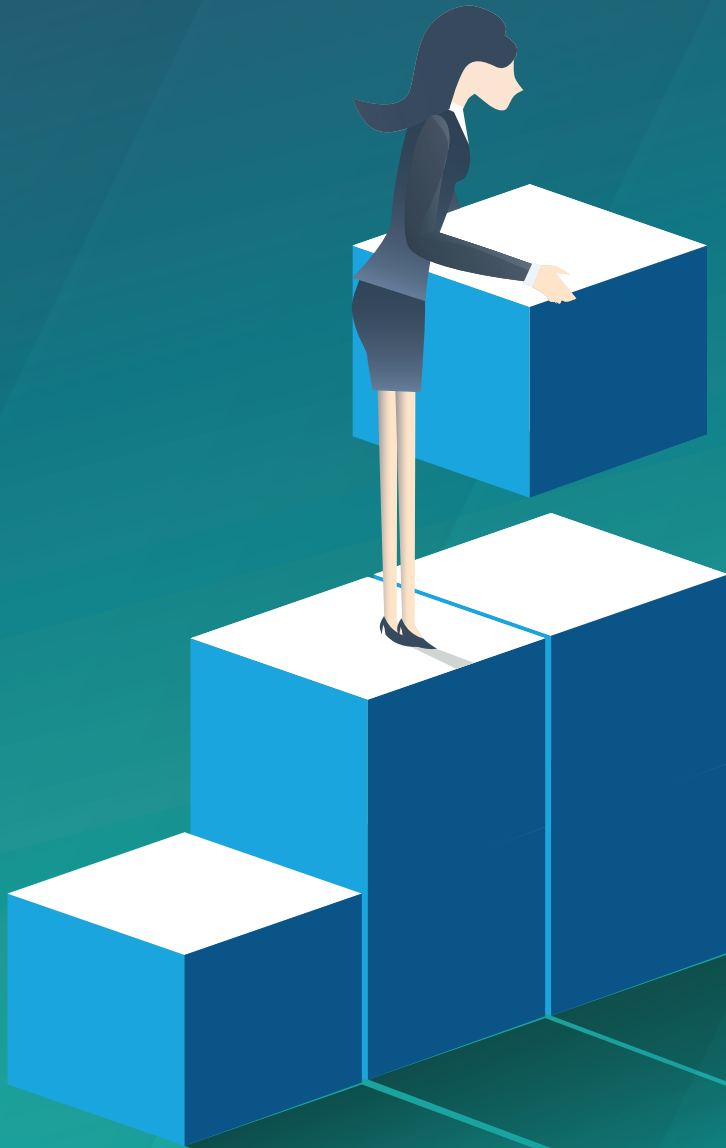
The IoTF certification exam is a 75-minute assessment that consists of 25 multiple-choice questions about topics like IoT implications, security, business perspectives and more.

Recommended training:

- [Internet of Things Introduction](#)

PROFESSIONAL DEVELOPMENT

Professional development includes everything from reading a blog post or downloading a white paper to attending a multi-day certification prep course or technical conference. IT professionals use these and other methods to stay current.



INFORMATIONAL AND TRAINING METHODS USED BY REGION

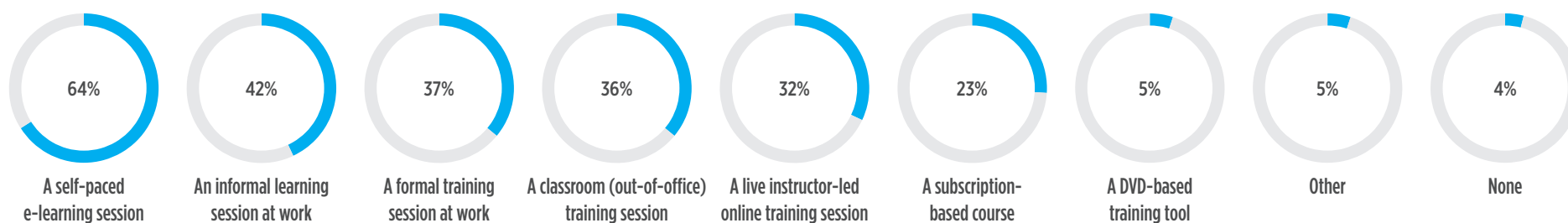
Informational Method	North America	Latin America	EMEA	APAC	World-wide
Research a topic online	77%	59%	66%	54%	69%
Attend webinars	71%	60%	61%	47%	63%
Attend a seminar, luncheon or technical conference	64%	51%	60%	48%	59%
Download a white paper	54%	48%	53%	36%	50%
Read and/or contribute to a blog	42%	32%	38%	33%	39%
Use a mobile device to download applications or view content	39%	33%	33%	32%	36%
Join an online community	36%	35%	34%	32%	34%
Post to or follow someone on Twitter or LinkedIn	28%	24%	25%	18%	25%

Training Method	North America	Latin America	EMEA	APAC	World-wide
Self-paced e-learning session	65%	64%	63%	62%	64%
Informal learning session at work	45%	43%	41%	36%	42%
Classroom training session	36%	40%	37%	37%	37%
Formal training session at work	36%	34%	38%	34%	36%
Live instructor-led online training session	37%	32%	26%	25%	32%
Subscription-based course	25%	28%	22%	20%	23%
DVD-based training tool	5%	4%	5%	5%	5%

HOW TECH PROFESSIONALS STAY UP TO DATE

Staying in step with technology involves a mix of informal and formal learning. This mix varies across regions and between IT roles.

TRAINING METHODS USED



Researching topics online is the go-to method for 69% of respondents. As IT professionals become more senior, they continue to research topics online at about the same rate, but they increase their use of webinars and seminars and their likelihood to read and contribute to blogs.

When IT professionals need a deeper dive into a subject, they take an on-demand (self-paced) online course. Sixty-four percent of technical professionals and decision-makers said they took a self-paced e-learning class in the last year. Thirty-three percent of IT professionals said e-learning is their preferred learning method which is more than the share that prefers classroom learning (25%) and live instructor-led online classes (13%).

Trade shows and technical conferences provide skill-building opportunities

With 59% of IT professionals worldwide attending seminars, luncheons or technical conferences, it's important to maximize your time when you attend an event.

Over our 20-plus years of trade show experience, we've heard year after year that a show is sometimes the team's training budget. As a result, it's critical to have a game plan when you're attending a show.

[Read “How to Maximize your Trade Show Experience” to make your experience as rewarding as possible.](#)

E-learning isn't a “generational thing”

There doesn't appear to be a generational preference to e-learning—in fact, executives and IT leaders prefer e-learning at a slightly greater rate than entry-level IT professionals (36% to 34%). More senior leaders even prefer live online training at a slightly greater rate compared with entry-level employees (14% to 13%).

PREFERENCE FOR CLASSROOM TRAINING HASN'T DECREASED

Traditional instructor-led classroom training is valuable, and its use hasn't changed much in the past year. Thirty-six percent of IT professionals report attending classroom training in the past year, and 25% labeled it their preferred learning method (a small increase from last year). Respondents also attended formal on-site training (37%), live, instructor-led online training (32%), and 23% used subscription-based training (24/7 on-demand access to training for a period of time), each about the same as last year.

Approximately 42% of respondents reported participating in informal learning sessions at work. Informal learning has no schedule and might not have a syllabus; it often occurs at unplanned times. Informal learning is the spontaneous, often demand-generated learning between co-workers or bosses and subordinates. Because of the need-based nature of informal learning, learners are often eager to achieve goals or to understand details, making informal learning an important component of organizational performance improvement.

There's no correct way to learn, but a little guidance can't hurt. We provide a high-level [overview of the 70:20:10 Model](#) that discusses how to find the right balance of formal and informal learning.

INTERNAL VERSUS EXTERNAL TRAINING RESOURCES

Organizations tap both internal and external resources to fulfill employee training needs.

Internal resources can include:

- Using company employees, such as human resources or learning and development staff, to train other employees.
- Internally developed and managed training materials.
- Purchasing and managing internally dedicated third-party software or printed materials.

External resources can include:

- Online third-party training software.
- Trainers brought on-site.
- Outside training sessions, conferences and events that employees attend.

More than 71% of respondents reported using some form of external training, compared to 63% using internal resources. Those numbers are close to last year's percentages (77% external, 64% internal). Given that organizations can use external, internal or a combination of the two, it is not surprising to see 37% of respondents using both.

TRAINING SOURCES

Training Sources	North America	Latin America	EMEA	APAC	World-wide
External Only	32%	31%	30%	26%	29%
Internal Only	33%	32%	32%	35%	34%
Both External and Internal	35%	37%	38%	38%	37%

WHY PROFESSIONALS TRAIN

Globally, 88% of respondents took some form of training last year. This is up from 84% in our 2017 report. Respondents are more often seeking to build new skills or meet employer requirements with their training this year. In 2018, IT staff train to solve specific work problems as opposed to a more general skill-building.

Overall, 78% of respondents said they train to build new skills. While this is true across technology roles, it's most common for those early in their career (80%) and then declines for IT decision-makers generally (73%) and executive roles specifically (72%).

Nearly half (48%) of respondents said they train to prepare for a certification exam—consistent with prior year data. Certification training is more common for entry-level IT staff (53%) and skews down for IT executives (37%). More than half of IT professionals in the following functional areas said the reason they took training was to prepare for certification exams: cloud, networking/infrastructure, systems/enterprise architecture, help desk and telecommunications. Developers and business analysts are less concerned with certification training than other IT professionals.

Other reasons respondents participated in training include preparing for a new product deployment (more so for executives and those in senior-level roles), preparing for a new position (more so for IT staff than decision-makers), and learning how to solve a problem (more common with executives than entry-level IT professionals).

REASONS FOR TRAINING

Reasons	IT Decision-Maker	IT Staff	Total
Build new skills	73%	80%	78%
Prepare for a career certification or specialist exam	44%	49%	47%
Prepare me to qualify for a different job	24%	34%	31%
Work with cutting-edge technology	29%	25%	26%
Meet employer's requirement	22%	26%	25%
Prepare organization for a new product deployment or software upgrade	26%	24%	24%
Solve a particular problem	21%	21%	21%
Evaluate new products for possible purchase	17%	12%	13%
Other	4%	3%	4%

TRAINING LIKELIHOOD BY JOB FUNCTION

Job Function	IT Skills-Based	Certification	Project Management	Process Improvement	Leadership
Application Development / Programming	65%	47%	26%	20%	40%
Business Analysis	55%	43%	33%	35%	50%
Business Operations	57%	43%	37%	35%	53%
Cloud	69%	69%	24%	22%	41%
Data Management / Analytics / Business Intelligence	65%	51%	29%	28%	44%
Help Desk / Support /Service Management	65%	63%	23%	29%	40%
Networking / Infrastructure	69%	67%	27%	23%	37%
Project / Program Management	51%	48%	53%	37%	56%
Security	62%	59%	20%	23%	41%
Systems / Enterprise Architecture	66%	59%	21%	19%	33%
Telecommunications	67%	63%	30%	25%	43%
Total (Excludes "Other" Job Functions)	63%	56%	29%	27%	43%

WHY PROFESSIONALS DON'T TRAIN

Not all IT professionals train. Lack of available training budget is the primary reason. Over one-third (38%) of those who did not train said their organizations did not allocate funds for it. According to IT decision-makers, lack of training budget is one of the driving reasons behind skills gaps in IT departments. That percentage is generally consistent across all employee groups, regardless of region, industry and company size.

Other reasons include work demands preventing time away from the office, lack of perceived training benefit by management and lack of relevant training options.

IT professionals are more likely to take skills-based certification, project management, process improvement or leadership training. Respondents whose job functions include cloud, application development, help desk, network infrastructure and system/enterprise architecture are strongly interested in technical skills-based training. IT professionals with job functions that have strong industry support for certifications, including cloud, network infrastructure, security, and system architecture, are most interested in certification-focused training.

The difference in preference of skills-based training over other categories of training is not a knock on certifications or other types of training. It is likely a result of applicability. There is a larger "library" of potential topics and problems to solve, and depth of focus covered by skills-based training than by certification, project management or process improvement training. IT managers, and IT employees for that matter, consider the entire range of training options when considering self-development paths, and choose the training topic and approach that best meets their needs.



JOB SATISFACTION

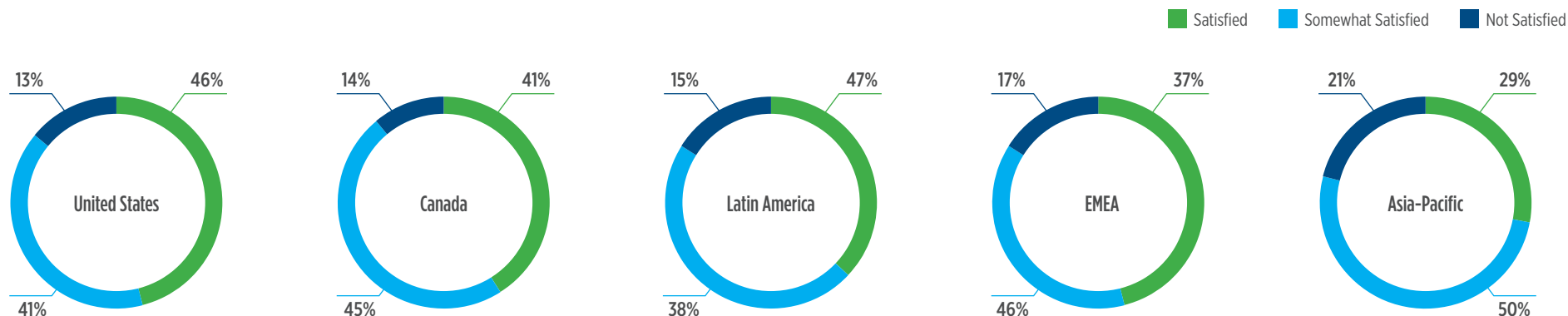
Training is positively associated with job satisfaction. IT professionals who took any IT training in the past year were 30% more satisfied in their roles than those who didn't take training in the past year.

And IT professionals who didn't take any training were 70% more likely to be dissatisfied with their job than IT professionals overall. Forty-two

percent of those who trained reported feeling fully satisfied with their current position, compared to 30% of those who did not train.

TRAINING INCREASES JOB SATISFACTION

GLOBAL IT JOB SATISFACTION



Overall, 84% of respondents worldwide said they are either satisfied (40%) or somewhat satisfied (44%) in their position. This is a small decline from last year. Those who are not satisfied ranged from 13% in North America to 21% in Asia-Pacific. Globally, satisfied IT professionals earned about 20% more in annual salary than IT professionals who are not satisfied.

Frederick Herzberg, a psychologist who studied motivation in the workplace and found that compensation is a low predictor of satisfaction, might explain that satisfaction comes from achievement, and achievement is often recognized with compensation. While Herzberg made his observations more than 50 years ago, more recent research suggests his findings remain valid.*

The satisfaction gap between IT decision-makers and staff is significant in all regions. Respondents in Asia-Pacific reported the largest gap with 35% of IT decision-makers being satisfied, compared to 27% of their staff. Gaps in EMEA and Latin America are slightly less.

The association between low job satisfaction and likelihood to pursue a new position is also strong. IT professionals who are unsatisfied are five times more likely to be looking for a new position in the next 12 months. Sixty-nine percent of those who are not satisfied are pursuing another position compared with 14% of IT professionals who are satisfied. Interestingly, IT professionals who changed jobs in the last year are about half as likely to be unsatisfied.

* www.emeraldinsight.com/doi/abs/10.1108/02621710510627064

Junior employees—those in entry-level roles with one to five years of tenure—are the most likely to report a desire to change employers (34% versus the norm of 31%).

Looking for a new job? Optimize your LinkedIn profile

You're going to be Googled. Make sure your LinkedIn profile is up to date. Learn how to make a good first impression, effectively lay out your experience, highlight your credentials, any badges you've earned, and more in our [7 Ways to Optimize Your LinkedIn Profile](#) article.

WHICH INDUSTRIES HAVE THE MOST AND LEAST TURNOVER?

Depending on the industry, IT professionals were more or less likely to look for another position within the next 12 months:

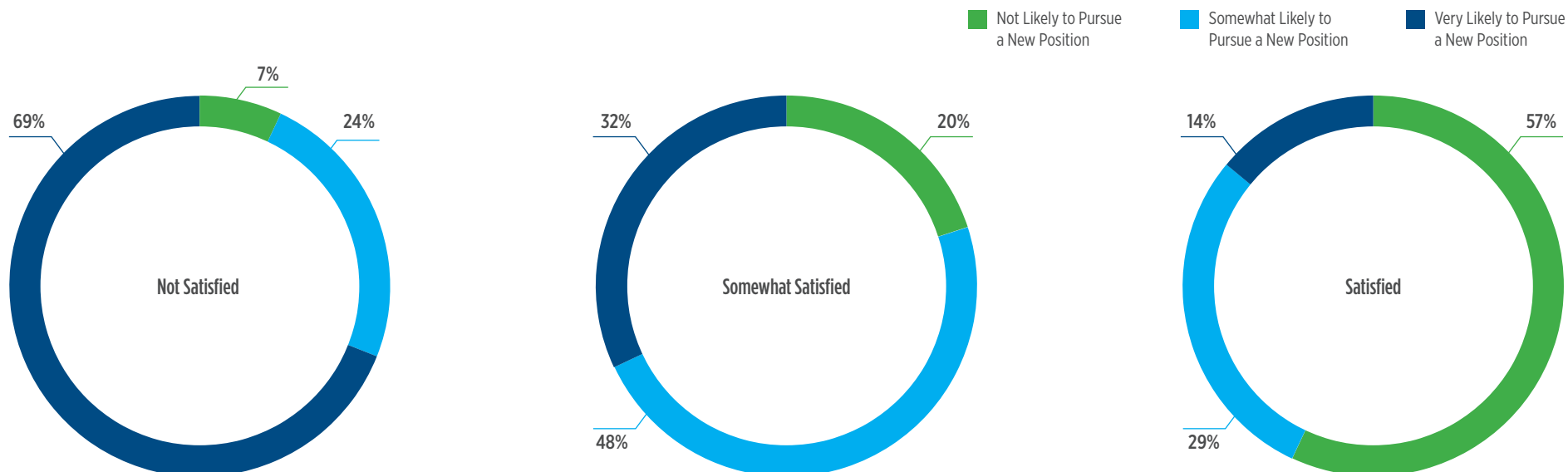
Employees are more likely to leave

- Telecommunications
- Hospitality, travel and recreation
- Media
- Communications, public relations, advertising

Employees are less likely to leave

- Aerospace/Defense
- Transportation
- Pharmaceutical
- Education services

GLOBAL SATISFACTION VS. LIKELIHOOD TO PURSUE A NEW POSITION



LOOKING FORWARD

Respondents around the world rank cloud computing and cybersecurity at the top of the list of technology areas they expect their organizations to invest in. Those two areas, each identified by 50% of respondents, are the dominant technology requirements for 2018. Virtualization technologies, which was not far behind cybersecurity and cloud last year, is now a distant third, being selected by less than 30% of IT professionals globally.

The degree of focus on cybersecurity varies by region. Only 40% of Latin American IT professionals selected it, and 42% of Asia-Pacific IT professionals selected it, compared to 54% of their U.S. counterparts. Cloud computing is

more universally important. There is only a four percent difference between the region with the lowest focus on cloud (EMEA at 49%) with the region that selected it the most often (Asia-Pacific at 53%).



Cloud computing, cybersecurity and virtualization are key concerns for all companies, regardless of their size. And surprisingly, other business technology investment priorities don't vary much by size, with a small number of exceptions. Expanding storage and data availability capabilities rank higher for smaller organizations and generally lower for larger firms. Application/software development also ranks higher for smaller firms than larger. AI, cognitive computing and machine learning rank much high for larger organizations, as does mobile application development.

TECH INTEREST AREAS FOR 2018

Interest Area	North America	Latin America	EMEA	Asia-Pacific	Worldwide
Cloud Computing	50%	50%	50%	53%	50%
Cybersecurity	54%	40%	51%	42%	50%
Virtualization	28%	32%	30%	28%	29%
Networking & Wireless LAN	28%	30%	28%	26%	28%
Internet of Things (IoT)	22%	37%	29%	32%	27%
AI, Cognitive Computing & Machine Learning	22%	32%	25%	35%	26%
Mobility & Endpoint Management	20%	17%	18%	18%	19%
Mobile App Development & Deployment	18%	16%	18%	19%	18%
Software Development	19%	18%	18%	14%	18%
Business Process Management	19%	16%	17%	14%	17%
Storage & Availability	18%	16%	17%	12%	17%
Service Management	15%	13%	17%	15%	16%
Blockchain	12%	18%	17%	18%	15%
Video, Voice & Telephony	13%	14%	13%	9%	12%
Web Development	14%	10%	12%	11%	12%
Open Source	10%	12%	10%	12%	11%
Hyperconverged Infrastructure	10%	12%	11%	9%	10%
Customer Relationship Management (CRM)	10%	6%	10%	8%	10%
Enterprise Resource Management (ERP)	9%	6%	9%	9%	9%
Other	4%	4%	4%	3%	4%

TECH INTEREST AREAS BY NUMBER OF EMPLOYEES

Interest Area	Up to 49	50 - 249	250 - 999	1,000 - 4,999	5,000+	Total
Cloud Computing	43%	44%	43%	49%	58%	50%
Cybersecurity	43%	46%	49%	53%	53%	50%
Virtualization	29%	31%	29%	27%	28%	29%
Networking & Wireless LAN	31%	32%	33%	30%	22%	28%
Internet of Things (IoT)	22%	23%	21%	24%	33%	27%
AI, Cognitive Computing & Machine Learning	18%	17%	19%	21%	36%	26%
Mobility & Endpoint Management	16%	17%	19%	22%	20%	19%
Mobile App Development & Deployment	15%	14%	14%	18%	21%	18%
Software Development	18%	18%	17%	17%	18%	18%
Business Process Management	14%	18%	18%	20%	17%	17%
Storage & Availability	17%	19%	18%	19%	14%	17%
Service Management	14%	15%	15%	18%	16%	16%
Blockchain	12%	9%	9%	11%	21%	15%
Video, Voice & Telephony	11%	14%	14%	15%	11%	12%
Web Development	14%	13%	13%	13%	12%	12%
Open Source	12%	10%	10%	10%	11%	11%
Hyperconverged Infrastructure	10%	11%	10%	10%	10%	10%
Customer Relationship Management (CRM)	9%	11%	10%	10%	9%	10%
Enterprise Resource Management (ERP)	7%	8%	10%	10%	9%	9%
Other	5%	4%	4%	3%	4%	4%

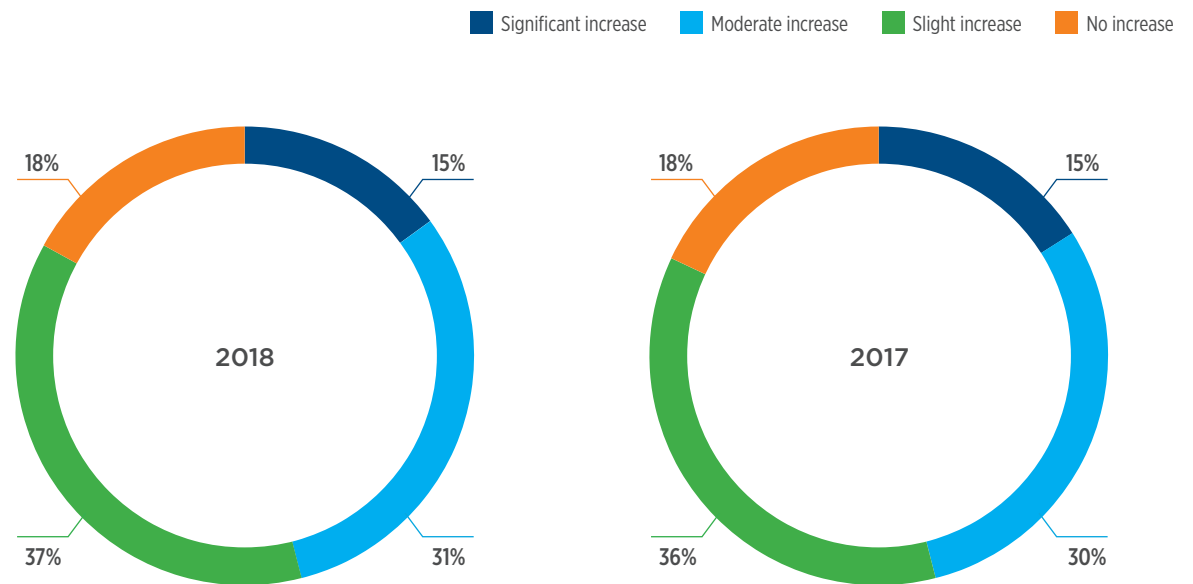
Cloud computing delivers unparalleled value and agility compared to traditional on-premises data centers. Developing and nurturing cloud IT skills is an absolute imperative. In fact, many organizations today are held back on major IT initiatives because of their cloud skills gap. An interesting trend that we are observing is companies using training courses as a part of their cloud provider vetting process. The training can help the organization's key IT stakeholders better understand the function and use cases for a given cloud platform. Once a decision has been made, Microsoft Azure and Office 365 training provides essential skills that enable organizations to begin their migration to the cloud. Additional training will develop the necessary skills to manage and scale existing workloads en route to achieving their evolving business objectives.

Peter O'Keefe
Microsoft Global Portfolio Director

BUSINESS CONDITIONS

Forty-six percent of respondents reported a moderate or significant increase in the volume of projects they're working on, and 37% reported a slight increase. Good news: these are no worse than last year. These trends are largely consistent across regions, although Latin American respondents were somewhat more likely to report seeing moderate to significant increase in project volume (52%).

STATE OF IT AND BUSINESS PROJECTS



Respondents were six times more likely to report that business is good compared to those reporting they are seeing the worst ever conditions (21% versus 3%), about the same as last year. Overall, about 30% of respondents indicated business conditions are good or significantly improving.

Respondents reported significant challenges in workload and hiring. Nearly two-thirds (65%) of respondents indicated their workloads are challenging, with 37% reporting workloads that are either very challenging or the worst they've seen. Sixty-five percent reported that hiring qualified talent is a significant issue. This echoes the challenges IT decision-makers report in finding the right people for open positions.

CONCLUSIONS

Business conditions are improving, more IT professionals are receiving raises and a large majority are satisfied in their roles. But global skills gaps and heavy workloads are delaying organizations' abilities to overcome business challenges and seize market opportunities.



When looking for reasons why a global skills gap epidemic has emerged, it's easy to point to the 54% of IT decision-makers who aren't approving training. But we need to dig deeper. Over one-third of organizations do not allocate funds for training. There needs to be better support.

Technology is changing at breakneck speeds and these men and women are constantly jumping between budgets, identifying skill needs, trying to pay competitive salaries and managing numerous other demands. So when 88% of IT professionals are finding ways to train, despite the lower approval percentage and minimal organizational funds, it shows the perseverance of our industry and you.

Talent is the heart of every organization and you want your talent happy. While it's widely assumed, our data supports the negative relationship between job satisfaction and one's desire to change jobs or companies. And one way to increase job satisfaction is through training, which improves quality of work, productivity and innovation.

As technology continues to evolve, agile organizations and professionals will find success. IT professionals who are well-skilled are best prepared to take initiative and solve critical business problems, and be compensated handsomely.

Organizations that are serious about enabling success need to equip their people with the skills to thrive.

ABOUT GLOBAL KNOWLEDGE

Global Knowledge is the worldwide leader in IT and professional training, providing the skills that individuals and organizations need to succeed in an ever-changing world.

To meet customer needs, Global Knowledge has the unique flexibility to deliver a broad portfolio of courses online, in classrooms, and through a worldwide partner network.

Established in 1995, Global Knowledge has 1,500 employees worldwide, including award-winning instructors widely considered as the best in the industry.

Confirmed as the world's leading training provider, Global Knowledge enables the success of more than 300,000 professionals in more than 100 countries each year.

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SURVEY METHODOLOGY

The 2018 IT Skills and Salary Survey was conducted online from September 12, 2017 through January 3, 2018, using the Qualtrics Insight Platform.

Global Knowledge and partner companies and organizations emailed survey invitations to recipients from their databases. Links were also provided in online newsletters. The survey yielded 16,208 completed responses, with 48% coming from the United States and Canada and the remainder from countries from Afghanistan to Zimbabwe. The online survey was tabulated using IBM SPSS and Q Research software.

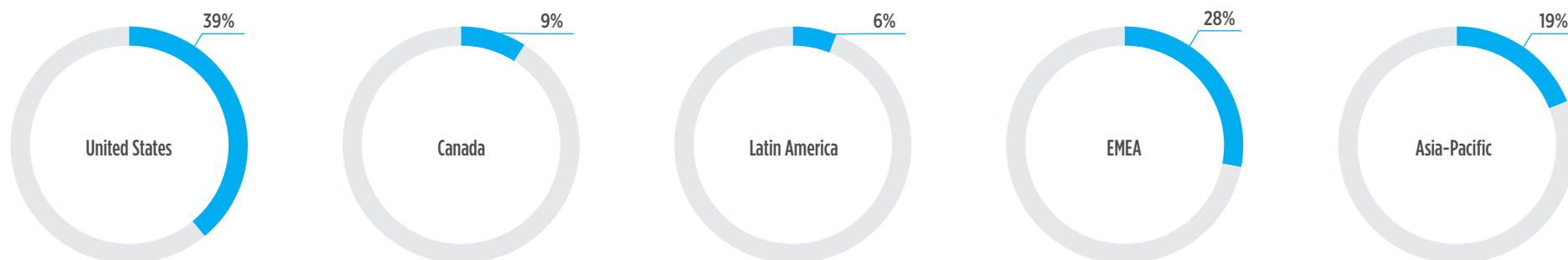
THANKS TO OUR PARTNERS

Global Knowledge extends a special thank you to our partners for helping make this year's survey possible:

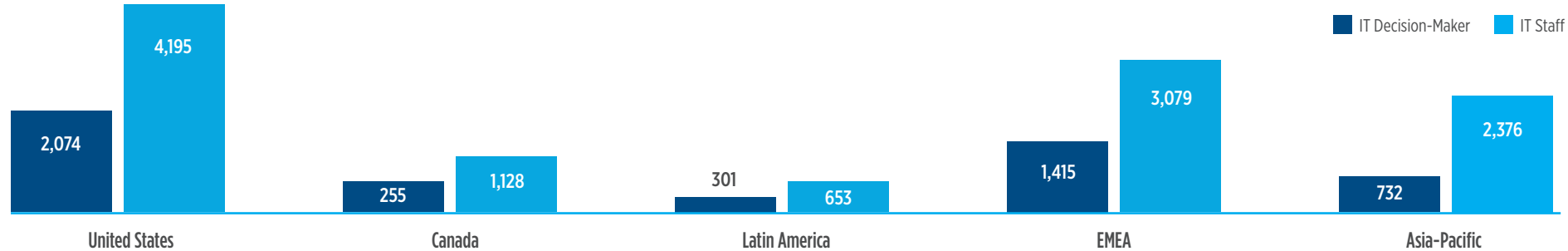


RESPONDENT DEMOGRAPHICS

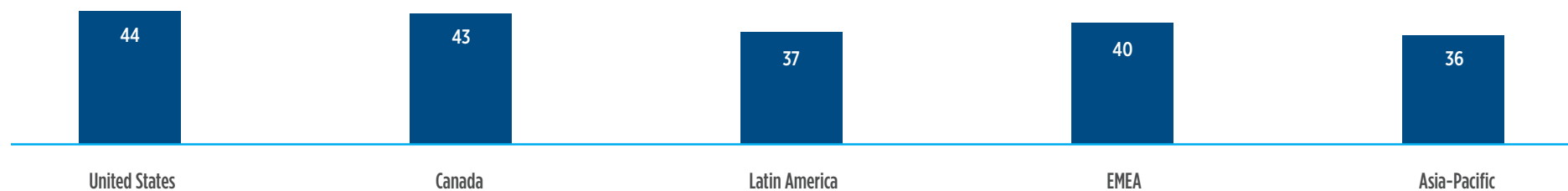
Residing Country or Region



Job Role



Average Age



RESPONDENT DEMOGRAPHICS

