CERTIFICATION
MAGAZINE

ANNUAL SALARY SURVEY

DOLLAR$
AND CERTS

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ONCE MORE UNTO THE BREACH

BY CODY CLARK

Cody Clark is the managing editor of *Certification Magazine.*

Here I sit, hours away from the first public screenings of *Star Wars: The Last Jedi*, and the long-ago words of Han Solo from what used to be called simply *Star Wars* are on the tip of my tongue: "Didn't we just leave this party?" It's true that we live in a world that delivers a new *Star Wars* movie every year. Fans won't even have to wait a full 12 months for the next one: *Solo: A Star Wars Story* opens May 25.

What I'm really thinking about, however, is the annual Salary Survey. It's been a whole year since the last time that this rodeo came to town, yet it still feels like the dust has barely settled. Thanks to the ongoing series of Deep Focus articles that we launched on the *Certification Magazine* website last year, the Salary Survey has become a year-round presence. And now it's back.

The survey is a numbers game. Salary is an important, and highly impactful number for all of us. Sussing out how many thousands of dollars are going into the pockets of certified IT professionals, however, is really just dancing on the tip of a voluminous iceberg of data. When you ask several dozen questions of several thousand individuals, well, that leaves you with a lot of raw information.

We've processed some of it already, and we think you'll enjoy reading up on those findings. There's a brand new Salary Survey 75, of course. We also have a list of 50 high-interest certs that many of your certified peers will be working toward earning in the months ahead. And, in a new development, we asked this year whether survey respondents are satisfied with their current pay grade.

We take aim at a number of other topics as well. Microsoft Office certification is sweeping through high schools and junior high schools around the world, so we have some tips about how to help students succeed at mastering some of the most ubiquitous tools in the IT workplace. We also look ahead to 2018, and look around to identify more of the best countries for IT professionals looking for work.

Some of you are almost certainly reading these words as a result of participating in the Salary Survey and getting a free or discounted subscription in return. To you and everyone else who took the time to answer our call: Thank you. This issue wouldn't be possible without your input. Keep certifying, and we hope to hear from you again when it's time for next year's survey. Trust us: It will be here before you know it. ■

P.S. Won't you be our neighbor? Look for *Certification Magazine* on Facebook and Twitter (@CertMag. com).

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STILL CERTIFYING AFTER ALL THESE YEARS

The CertMike of CertMag reflects on his journey from one IT certification to the next

BY MIKE CHAPPLE

Mike Chapple is Senior Director for IT Service Delivery at the University of Notre Dame. Mike is CISSP certified and holds bachelor's and doctoral degrees in computer science and engineering from Notre Dame, with a master's degree in computer science from the University of Idaho and an MBA from Auburn University.

I recently hit a major career milestone: 20 years of working in and around the IT field. As I reflect on that time, it occurs to me that I've held a wide variety of IT certifications during those two decades and they've played important roles as I've moved through different stages of my career.

Allow me a moment to rattle off the list of certifications that I've held at one time or another, if only to offer you some perspective on my career path. I'll explain more about the twists and turns that my career has taken in a moment, but those of you who have been around the industry a while can probably get a sense of it just from analyzing this alphabet soup of certifications, in the order in which I earned them:

1) MCP, 2) MCSE (NT 4.0), 3) MCDBA, 4) MCSE (2000), 5) CCNA, 6) TICSA, 7) CCSP, 8) CISSP, 9) CISA, 10) GCFW, 11) PMP, 12) Security+, 13) CSA+

Can you pick out the path through all of those acronyms? Allow me to express it in terms of four general phases in my career:

Technology Foundation > Security Specialization > IT Leadership > Author and Educator

Allow me to walk you through each of these phases in the hopes that you can learn from my experiences, wherever you are in your career.

Building the Foundation

When I first embarked upon my IT journey, I was like many young professionals. I thought I knew everything but, in reality, knew very little. This hit me hard when I started working with a team of talented professionals at the National Security Agency. I found myself surrounded by some of the world's best minds in computer science, cybersecurity, networking, and mathematics. The most important thing I learned from them is how much there is to learn!

Fortunately, I was in an environment with a culture of learning. The NSA has one of the nation's largest technical workforces, and they committed significant resources to many different types of technical training programs. I quickly latched on to a library of IT training courses they offered to all employees and simply started taking courses in everything that people around me discussed that I didn't understand.

I used that library to build a base of practical IT skills, ranging from Windows administration to databases and networking. Those courses helped me round out the very Linux-focused skills that I had picked up in my undergraduate degree program.

As I look back at that time in my career, I am thankful that the team around me guided me in the direction of general technical knowledge, rather than deepening my cybersecurity skills off the bat. Sure, I was working in security, but 20 years later, I still find myself drawing upon that reserve of foundational IT skills to inform my work.

The IT training library that I used during this phase in my career is long gone, but there are others out there that offer even greater opportunities to today's developing technology professional. Two that I would particularly recommend are Lynda.com and DataCamp.

Lynda.com offers a tremendous breadth of content, releasing dozens of new courses every day. (Full disclosure: I've created many of those courses.) DataCamp, on the other hand, is focused on the realm of data science and analytics, offering a hands-on programming environment. I use it with my own students to help them gain the foundational skills they need before moving on to more advanced material.

Focusing and Specializing

After spending four years working with the fantastic team at NSA, I moved to a private consulting firm based out of Miami, where I had the opportunity to work with quite a few fascinating clients. I spent five years there before accepting a position managing the cybersecurity program at the University of Notre Dame. Both were wonderful opportunities and afforded me the ability to continue developing my professional skills.

I used this period of about a decade to develop the specialization in cybersecurity that began while I was with the NSA. I earned several security-related certifications, including the credential that I consider the most important one that I've held in my career: the Certified Information Systems Security Professional (CISSP) certification.

The CISSP has a high barrier to entry: you must demonstrate five years

> " When I first embarked upon my IT journey, I was like many young professionals. I thought I knew everything but, in reality, knew very little.

of full-time cybersecurity work experi-experience in addition to passing an exam. Earning the CISSP is therefore a ticket to credibility in many corners of the security profession. I think of it as the cybersecurity equivalent of an accountant earning a CPA, or an attorney passing the bar exam. It demonstrates a long-term commitment to the field and a willingness to absorb a breadth of knowledge outside of one's specific work experience.

> " **I had to learn to let go and recognize that not only would it be impossible for me to become a subject matter expert in every discipline in my portfolio, but also that I would spend much of my time in meetings rather than doing what my inner engineer considered 'real work.'**

Moving to Management

In the third phase of my career, I transitioned into leadership roles of increasing responsibility in the IT world, leading teams that became more and more diverse in terms of their own skillsets, experiences, and responsibilities.

This was a difficult transition for me. I had to learn to let go and recognize that not only would it be impossible for me to become a subject matter expert in every discipline in my portfolio, but also that I would spend much of my time in meetings rather than doing what my inner engineer considered "real work."

I did pick up a few certifications during this period in my career, but certifications honestly weren't a focus for me at that stage of my professional development. Instead, I dove into developing my leadership skills and helping my teams grow and flourish.

Giving Back to the Profession

Many of you know me best through the books and courses that I've authored in the cybersecurity certification space. While I'm describing this as the fourth stage of my career, it's actually been a background theme throughout my journey. I've been writing and teaching in this field since publishing my first book 17 years ago and it's been very professionally rewarding.

The reason that I list this phase last is that it answers a question that some of you may have been asking after looking at the chronological list of certifications that I used to open this story. Why would someone with two decades of experience go back and earn credentials like the Security+ and CSA+ certifications?

That's a reasonable question and you're correct that I didn't do it for career advancement purposes. I took those exams because I was developing books and courses focused on those certifications and I won't write a book or teach a course unless I've earned the certification myself.

Thanks for humoring me through this exploration of my own career journey. I hope that, in reading it, you've found some useful nuggets that might help you in your own career. I welcome your feedback and invite you to visit my website at Cert-Mike.com. ■

PEOPLE IN CERTIFICATION

COLIN HAGARTY
STUDENT

PIERCE COUNTY SKILLS CENTER
TECH EDUCATION

SIX WITH ONE BLOW

Savvy IT student enters tech school with no certifications, leaves with six

BY CALVIN HARPER

Calvin Harper is an associate editor of *Certification Magazine*, and a veteran of the publishing industry.

The dictionary defines a "renaissance man" as one with a broad range of talents and intellectual interests. These highly capable individuals face the dual challenge of deciding how to best use their abilities and where to expend their energies. They are good at so many things that they have great flexibility in careers.

It would be great to be one of those fortunate few who have a sense that their destiny lies in a certain field or direction. Most will come along at their own speed, however, attempting and succeeding in a variety of roles before settling on their place in the sun. Colin Hagarty, 34, is one such individual — multi-talented, intelligent, very capable, extremely interested in learning new things and, oh yeah, a friendly and easygoing fellow.

Family first

Born and raised in New Jersey, Hagarty, carries himself with the confidence of a man who knows how to pursue the things he wants. Raised by supportive parents who encouraged him to learn and try new things, and surrounded by lots of extended family who were more than willing to dispense sage advice, he couldn't help absorbing valuable life-lessons early on.

"I come from a large Irish family where everyone was always talking and teaching," he said. Hagarty's parents and extended family constantly shared such axioms of success as "Always leave a place better than you found it," "You are getting paid to do a job, so do it the best you can," and perhaps most importantly, "Learn something new every day."

His family is close and enjoys gathering; holiday events typically draw together 30 or more individuals for food and fun. Each Thanksgiving, the Hagarty clan sets up a milk-carton boat, the S.S. Thankful. Each family member writes something they are thankful for on a slip of paper and places it in the boat. They then enjoy reading off what different individuals wrote.

The 2017 reveal was especially thrilling as a cousin took the opportunity to announce the pending arrival of a baby.

Hagarty does follow the family admonition to daily learn new things. He has already worked more jobs than most people will during their entire lives — and proven capable at all of them. Just to name a few, he has been a groundskeeper, a general contractor, retail sales associate, mason/boulder layer, actor/tour guide, biologist technician, machinist and, probably his favorite, prosthetic make-up artist who specializes in zombies.

Yes, zombies

Hagarty is a fan of horror movies, not for the fear factor, but instead for the special effects. His favorite is George Romero's 1968 cult classic, *Night of the Living Dead*. "I love to do special effects make-up on myself and friends," he said."

His zombie-prepping skills are self-taught by reading books and watching how-to videos online. And he is really good at it: In 2010, he and 4,092 other like-minded devotees of the undead congregated in nearby Monroeville, for what the Guinness World Records deemed the largest gathering of zombies ever. Hagarty was named Best Male Zombie.

Winning such a title takes a great deal of patience, hard work, and

attention to detail, the same attributes Hagarty brings to all of his educational endeavors. In February 2017, his interests turned to IT and he enrolled at Lincoln Technical Institute in Moorestown, with the goal of becoming a computer network and support technician.

"I'd always had an affinity for computers and lots of exposure growing up," he said. "On all my previous jobs, I often did minor troubleshooting and basic stuff like attaching printers."

Devouring IT courses

Like a hungry zombie tucking into a feast of brains, Hagarty jumped wholeheartedly into IT. In addition to maintaining a perfect 4.0 GPA, in less than eight months he earned six TestOut certifications: PC Pro, Network Pro, Client Pro, Server Pro, Switching Pro, and Routing Pro. "I really liked the subjects I was learning and never missed a minute of class time," he said.

Hagarty credits the feedback and hands-on practice of LabSim, TestOut's online learning platform, with helping him earn so many certs in such a short time. "Initially, I was a bit shell-shocked, but once I got used to the subject, the constant feedback from LabSim and the practice exams gave me the confidence to go ahead and pass my first exam."

In addition to being an excellent student, Hagarty was also voted Student Ambassador of the Computer and Network Support Technology program by fellow students and the institute's staff. As student ambassador, he served as liaison for the class, helped guide peers, and documented student feedback to help the program maintain a high level of quality and service.

"Colin [Hagarty] is a true success story for me personally and for Lincoln Technical Institute," said IT instructor Nicholas Mazzagatti. "Not only did he have the drive and determination to gain certifications in advance of his classmates, but he is also a great motivator of students."

Putting IT skills to work

One of the projects Hagarty found most useful at Lincoln involved developing a mock IT service company. "Several students and I put together a pseudo company, complete with a billing and ticketing system," he said. "The things I learned and the knowledge gained will one day help me start my own business in IT."

Since October, when he completed his studies, and with his six certifications in hand, Hagarty has been improving his IT skills working at PCS (Pro Computer Services) in Moorestown, New Jersey. PCS is an up-and-coming organization built

"

Like a hungry zombie tucking into a feast of brains, Hagarty jumped wholeheartedly into IT. In addition to maintaining a perfect 4.0 GPA, in less than eight months he earned six TestOut certifications.

on the premise that "Finding IT help should be easy."

Working with an IT company striving to be the most helpful in the world is a good fit for Hagarty, who enjoys helping others. "I like working at PCS because they value their customers and employees," he said.

An easy-going manner and solid skills have helped Hagarty contribute to PCS. "Colin has proven to be everything we expect with someone with his certs and more," said PCS Field Coordinator Harold Loeffler. "We like his initiative and are really happy to have him here."

A varied background

Prior to landing in the IT realm, Hagarty studied art at Kutztown University of Pennsylvania. After three years, however, he realized his passions and interests lay elsewhere and left school for a lucrative job renovating commercial properties. "I dropped out and just didn't have any ambition to go back," he said.

His varied job experiences taught him more useful lessons including the importance of focusing on the task at hand and planning for potential problems. "I learned to not only look out for what may go wrong, but also for what may go right," he said. "To take advantage of opportunities as they come."

One such opportunity came along after high school, when Hagarty landed a job as a guest experience agent at Adventure Aquarium, hoping to improve his public speaking skills. "I wasn't confident speaking in front of people and decided that job would be a good way to overcome that personal hurdle," he said.

The aquarium contains the world's longest "shark bridge," where visitors cross a rope walkway, a mere 21 inches above the largest collection of sharks on the East Coast, and daring souls touch and feel some of the most exotic shark species in the world. Notwithstanding all that, Hagarty's most unusual encounter at work was not with a toothy shark, but with a

deceptively quick giant octopus.

"Octopi are a lot stronger than you think," he said. "She just reached out, grabbed my arms with her tentacles and tried to pull me into the water. I had to struggle to get her tentacles off me."

Looking ahead

Hagarty's time at the aquarium and other experiences have made him grateful and unafraid to approach others. As an example, upon completion of his six TestOut certifications, he contacted the owner of the company on LinkedIn. "I just wanted to thank him for what he had created and didn't expect a response," he said. A response did come back, along with an invite to join TestOut's LinkedIn network.

Normally, upon hearing of a student achieving six certs within an eight-month period we envision someone who follows a strict daily plan. Not so with Hagarty; rather than adhere to a set plan, he approaches each day with an admirable nonchalance and confidence. "I believe that I have the ability to control what my day will become and that I'll be able to handle all obstacles and potential derailments," he said.

For now, his immediate plans include earning all of TestOut's certifi

> ## " She just reached out, grabbed my arms with her tentacles and tried to pull me into the water.

cations, in order to gain a broader understanding of other aspects of the IT field and "eventually figure out which domain I want to focus in." He is also pondering various Linux credentials to enhance future opportunities.

Whatever path he chooses, whether working for others as a high-priced IT professional or building his own IT company, Hagarty will continue having varied interests and living by his motto: "Always remember to maintain the initial passion that sparked your interest in the first place." ■
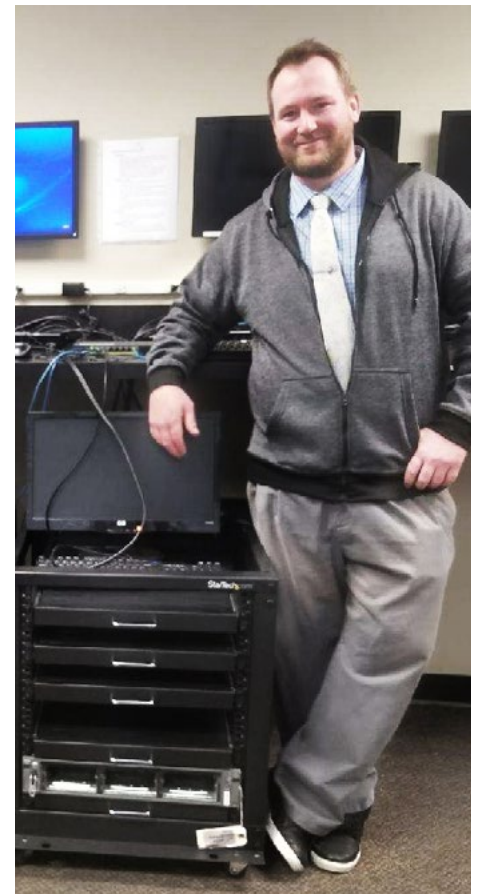
READY

FOR THE REAL WORLD

Washington's Pierce County Skills Center
prepares IT students for actual IT jobs

Monday through Friday, the Pierce County Skills Center, located in Puyallup, Wash., buzzes with activity. The Center's mission is "to provide rigorous technical and professional experiences that prepare students for high demand, high wage jobs and post-secondary education," and the staff does a terrific job.

Annually, the Center serves more than 500 juniors and seniors from 26 high schools with 14 in-demand career programs ranging all the way from Aerospace Composites to Pre-Veterinary Technology. No slackers these students — they want to be in class and are highly motivated to learn. They also understand and accept that the curriculum involves more work

than a typical high school class, is fast-paced, and that they'll get the unvarnished truth from instructors who have "been there and done that."

Nowhere is the truth about a career spoken more loudly and with more conviction than in Room 103, where Adam Scroggins, the Center's PC Networking and Hardware Repair instructor holds court. At the beginning of each term, he declares to his students, "I'm here to teach you technical skills, but five years from now, these skills will be outdated. So, I'm also going to teach you things that will help you keep a job and grow into a better employee."

BY CALVIN HARPER

Calvin Harper is an associate editor of *Certification Magazine*, and a veteran of the publishing industry.

Scroggins clearly enjoys his work and is a no-nonsense mentor and instructor. He expects the best from his students and knows that tech skills alone aren't enough to make one successful in IT — you also need to be able to work well with others.

"I keep in contact with past students. They all say how important soft skills are: talking to others and communicating in written form, and so forth," said Scroggins. "The truth

is that you have to be able to talk to people and often explain tech stuff to those who know nothing about tech."

A workplace background

When it comes to applying soft skills in the workplace, Scroggins is an expert. He joined the Skills Center in 2011 after 10 years as a drafting engineer with a local company. While there, he worked closely with area high schools to develop a pool of future potential employees with an interest in drafting and IT.

His primary responsibility was to identify and place promising students in temporary positions within his company, with the possibility of full-time jobs upon graduation. "It was a win/win for all parties," he said. "Every spring there was a big push to hire kids to help meet production goals. We had lots of success in hiring these kids for permanent positions in drafting and IT jobs for software development."

As much as he enjoyed his time in the corporate world, Scroggins eventually decided to leave the industry because he had gotten "sick and tired of firing people after six months who didn't have soft skills." Scroggins decided to work directly with young people and preemptively teach them the skills to succeed in a corporate environment.

"I felt the need to become a teacher," he said. "I realized that throughout my whole career, I was teaching on the corporate side of things: internal training for new hires, and whenever processes changed, and corporate training for clients and business partners."

Turning to teaching

While working as a drafting engineer and teaching new hires and clients, Scroggins had also gotten involved with SkillsUSA, the national membership association serving more than 400,000 students who are pre-

paring for careers in trade, technical and skilled occupations and future education.

Serving on SkillsUSA's board of directors as an industry representative for five years, Scroggins realized how much he enjoyed working with the high school side of things. "I fell out of love with the job I was doing, and into love with teaching. I knew that I wanted to do something where I could make a meaningful impact and watch kids realize they are worth something and can go on to do great things."

Reaching out to friends in the teaching field, Scroggins let them know of his desire to teach in engineering or IT, and soon landed his current position at the Skills Center. Once on board, he reached out to several respected colleagues for assistance in developing an IT curriculum.

"Frank Media and Brandon Brown are friends and mentors from my time with SkillsUSA," he said. Media and Brown were an immense help provid-

ing guidance and ideas on curriculum development. "They were a great resource my first year."

Help from the experts

Scroggins also assembled an advisory committee of trusted industry professionals who have provided invaluable assistance. Over the past six years the committee has grown to include industry experts, educators and even some former students, all

> " Scroggins decided to work directly with young people and preemptively teach them the skills to succeed in a corporate environment.

of whom provide insights and timely support to the program.

One prominent member is the Central Pierce Fire and Rescue (CPFR) Department. CPFR at the time was already involved with the Center's firefighting training classes as part of their Advisory Committee. A little-known aspect of modern day firefighting is the crucial role information technology plays in saving lives.

Because every truck and EMT vehicle is also a high-tech mobile office linked to a central network via sophisticated wireless devices, CPFR's IT department was a natural fit for Scroggins' advisory committee. Each year, the CPFR IT department purchases new equipment and sells off their old equipment. Whatever isn't bought by the community is surplussed to Scroggins for use in his classes.

"Before CPFR's IT department got involved, I used to have to beg for equipment wherever I could find it," said Scroggins. "Without their help, the Center's IT program would not be where it is today. Single-handedly, they have elevated our program with donated computers, switches and routers. Their equipment allows us to do so much more in class."

Additional support from community partners and advisory members comes frequently in the form of job shadows and even job placements for Scroggins' students.

" **Single-handedly, they have elevated our program with donated computers, switches and routers. Their equipment allows us to do so much more in class.**
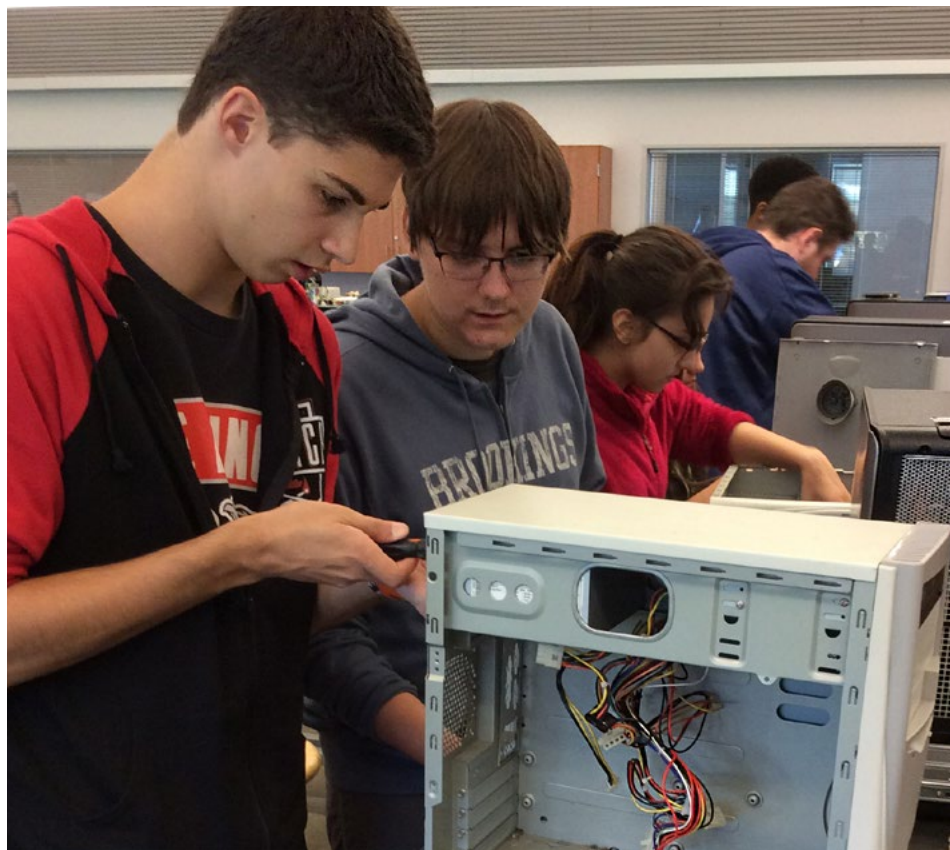
Earning their way in

Scroggins' classes consist almost entirely of juniors and seniors, and the only requirement to enroll in the IT program is that students have to have completed at least two years of high school-level math. Each year new juniors are informed that the only way they will be allowed back for a second year is to earn Scroggins' approval. "I tell the juniors that this is a year-long interview to get into my second-year classes," he said.

First-year students dive into a curriculum focused on CompTIA A+ and basic networking. Second-year students advance to a more in-depth course load of CompTIA Network+ and Security+. Scroggins developed his own personalized curriculum, and for the past five years has utilized TestOut Corporation's PC Pro, Network Pro and Security Pro courseware, all equipped with LabSim simulation technology, to create many hands-on classroom activities.

Because the Center serves students from so many high schools, with different schedules, a one-size-fits-all classroom solution isn't possible. If a student is unable to attend a regular class session, Scroggins tells them to pretend they are on a business trip and that they are still responsible for completing their work back at the office.

"LabSim fits perfectly into my program since students can utilize the online content to supplement any material they miss during a class day," he said. "TestOut also provides generous support for our SkillsUSA efforts regionally and at the state level by providing us with exam vouchers for the state-level competitions."

There are two class sessions daily, each running for two-and-a-half hours. Scroggins spends about 70 percent of his time with the first-year students instructing, and closely supervising their actions. Second-year students are being taught to be supervisors and managers and as such are more self-directed in their learning.

A bonus to Scroggins' curriculum is that students have the opportunity to earn TestOut's own certifications, PC Pro, Network Pro, and Security Pro.

> **'LabSim fits perfectly into my program since students can utilize the online content to supplement any material they miss during a class day,' he said.**

Additionally, since the courseware maps directly to CompTIA's exam requirements, he strongly encourages students to attempt the equivalent CompTIA certifications. As a certified CompTIA training partner, he can purchase exam vouchers for interested students.

Big-picture workplace realities

One facet of Scroggins' instruction that prepares students to hold actual IT jobs is an inter-departmental project that requires them to work closely with students from different programs. Working on joint projects with non-IT students requires coordination of schedules, timely and effective communication, goal setting, and meeting strict deadlines.

During the spring semester, students work together to design and manufacture working arcade systems that require them to work with machining, composites, and programming programs. For the students, participating in these inter-departmental projects is a great learning experience and can even lead to full-time employment.

"Last spring four of our students were pulled aside by members of the advisory board and requested to apply for jobs that were opening," said Scroggins.

Just completing the IT classes can open doors for students. "Typically, a half-dozen or so students go straight into the work force upon graduation,"

he said. "The remainder go on to college at the technical, community or university level, and a number go into the military."

Help from the higher-ups

One pillar of the program's success is the Center's administrative team. "Our administration is the foundation of what drives our success," said Scroggins. "In my opinion, we are the best skills center in the State because our administration is always there to provide direction and support."

Since most of the Center's instructors came directly from industry, they have had little if any formal teacher training. According to Scroggins, instructor training is the administration's strong point. "Our professional development training is always relevant and specific to our needs," he said.

"They are great at listening to us about what training we need and then going and finding it. I just can't say enough good things about the Center's admin team."

Administration takes pride in Scroggins' efforts and success with the students. While the national average for high-schoolers passing their certification exams is 63 percent, during the last three years, 90 percent of the Center's IT students passed their exams

on the first or second attempt.

"I tell them I'm not running this like a high school class. We are competing against the colleges — that is my expectation," said Scroggins.

Skills Center officials value that outlook. Scroggins' success, said center director Michelle Ledbetter, is largely because of his "commitment to ensuring that students not only understand, but demonstrate, the leadership and employability skills required by our business partners.

"He continually integrates, and models, professional communication, customer service, and a strong work ethic. As a result, our students successfully transition to direct employment and post-secondary training programs."

Molding young minds

Scroggins enjoys teaching young people because "they are eager to learn and not set in their ways," and feels he learns as much from his students as they do from him. "I'm challenged every day with questions and requests for projects," he said.

"Several times a year I have to tell the students 'I've never done that, but I think we can figure it out,' and then we as a class (myself included) research, plan and implement the project."

According to Scroggins, the biggest hurdle to teaching high school students is overcoming their short attention spans and lack of "grit." He bemoans the overreliance on digital assistants like Apple's Siri. "Students use technology as a crutch and have difficulty using it as a tool," he said. "If they can't find an answer on Google or YouTube in five minutes or less, they want to give up."

Because real world projects take weeks and often months to complete, Scroggins teaches students to take notes, chart a course, track their progress, and remain focused. "Students who figure out this aspect of my classes and the industry are the ones that I give personal references to, because they are the ones who will be able to invest in the long run and see success," he said.

Certifications serving students

The emphasis on real world skills is why certifications play such a prominent role in Scroggins' classes. "I believe in certifications as a demonstration of a skill set, and would like to see the industry go away from mul-tiple-choice memorization style exams and focus more on practical testing," he said.

"I like to say don't tell me you know something, show me you know it. I believe certifications will continue to be a growing part of the industry as more niche markets open up. And with each certification you can show, your wages will go up."

Feedback from the community supports Scroggins' view of certifications. Local colleges and universities report that students with certifications succeed at higher rates in their programs, and local employers report that his students who enter the workforce upon graduation rarely stay in entry-level positions for long.

"I believe in teaching more than the students need to know to pass their certifications and, as such, the certification exams become almost a formality. It sets them up for success at the next stage in their education or work life," said Scroggins.

The impact of Scroggins' approach extends beyond certification. "He has established a classroom culture that allows students to take risks, to understand that failure is part of the path to success, and that perseverance is what's required for improvement," said Ledbetter.

Remembering what's important

Teaching young people isn't always smooth sailing. There are days when the computers fail to do what you want, a student is upset and distracted about something outside of class, or a "new and exciting" piece of curriculum turns out to not be so new and exciting. At times like these, it's understandable that an instructor may question their choice of a career.

Like all good teachers, Scroggins has a tried-and-true means of reminding himself why he is teaching. He maintains a wall of photos of past and present students, and reflects on how his classes helped changed the course of their lives.

One student he often thinks of had a particularly rough upbringing. Although not a top student, he was a good student who joined the U.S. Air Force upon graduation. The student maintained contact with Scroggins and on one visit told him how much he had hated learning protocols in his IT classes.

Upon enlisting, this former student took a placement test and realized that "the questions on the placement test were all about protocols" that he had learned under Scroggins. He scored so high on the test that he was selected to work in encryption and cryptology.

During their visit, Scroggins showed him that what he was doing in the Air Force would earn him a lot of money in the corporate world. The young airman was surprised and somewhat doubtful of deserving that level of success. "My family doesn't do that," he said.

Scroggins' response is what every teacher wants to say to students who glimpse new horizons, "Your family didn't do that," he said. "But you just changed your family, and you will now be very successful." ■

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ANNUAL SALARY SURVEY

U.S. tech compensation bounces back while international IT salaries slump

BY CODY CLARK

Cody Clark is the managing editor of *Certification Magazine*.

As we learn from careful and rigorous analysis of the battlefield maneuvers of storied tactician the Grand Old Duke of York, in some circumstances one is ascendant, while in other circumstances one is subjacent. Such conditions, of course, are not uniquely present during military engagements.

At this time last year, the average annual salary of certified IT professionals in the United States was down, having tapered off from the previous mark established at the start of 2016. The past 12 months, on the other hand, have brought about a pretty impressive reversal of fortune, and the average annual salary of certified IT professionals in the United States is up — way up.

It's all the way up to $115,670, a year-over-year increase of almost $7,000. The salary tide is ebbing, on the other hand, outside the United States. The average annual salary of

IT professionals in non-U.S. countries tailed off from a four-year high of $59,000, dipping down a little less than $5,000 to $54,360. When you're up, you're up — and when you're down, you're down.

Another notable uptick from this year's data comes on the employment front. Of the more than 4,100 IT professionals who responded to this year's survey, 95.1 percent are employed full-time, versus just 1.6 percent who don't presently hold employment of any kind. (Part-time employment, sabbaticals, retirement and school enrollment accounts for the rest of our IT crowd.)

That's an increase of 1.7 percent from last year, when just 93.4 percent of respondents claimed full-time employment. If you have IT-certified skills, then there's very little reason to find yourself stewing over employment listings, unless maybe you're looking for a job that's even better than the one you have now.

The boom in data storage and analysis, the urgent and ever-present need to secure and protect sensitive information, and exploding demand for connectivity and IT infrastructure are just some of the pressing reasons why the world needs more certified professionals.

Steady demand for IT professionals also manifested in other survey readings. A notable 55 percent of those surveyed got some level of bonus or incentive pay in 2017, while 71 percent of those surveyed got a raise. (A shade more than 40 percent double-dipped at the well of prosperity, both getting a raise and taking home bonus or incentive pay.) That's compared to just 4.1 percent who took a pay cut.

All three of those figures are improvements over the prior year. Just 65 percent of survey respondents got a raise in 2016, while only 47 percent were given bonuses or incentive pay. At the same time, 5 percent of those surveyed last year saw their pay cut. So things are looking better all around as we move into 2018.

U.S. Salaries Soar, Setback Dings Growth Abroad

U.S. IT pro average annual salary

	Salary
2017	$115,670
2016	$108,790
2015	$113,350
2014	$107,900
2013	$100,120

5-Year Net Gain: +$15,550

All non-U.S. IT pro average annual salary

	Salary
2017	$54,360
2016	$59,000
2015	$55,310
2014	$53,260
2013	$49,310

5-Year Net Gain: +$5,050

One other item of interest: Bonuses and incentive pay were equally common in 2017 among both U.S. workers and IT professionals in other countries — about 55 percent of respondents were given additional compensation no matter where you look. Pay raises were more common among U.S. workers, however, with about 73 percent getting a salary bump, compared to just 63 percent among workers from all other countries.

Even with all of the good news going around, however, there are some certified IT professionals who want more. A solid 65.3 percent of all survey respondents are either completely satisfied (6.3 percent), very satisfied (17.5 percent), or satisfied (41.5 percent) with their current salary. On the other hand, 27.7 percent of all respondents are not very satisfied with their current salary, while 7 percent are not at all satisfied.

There's much more to tell than we have room for in print, and we're not stopping here. Keep your eyes glued to CertMag.com in the months ahead, and we'll check in there with new survey data every week. ■

Simmering Salaries

What is the value of an IT certification? Keeping old skills sharp, adding new ones, and remaining in the habit of learning is probably worth more than any amount of money. Certifications can drive salary, however, as an indication to employers of commitment and specialized knowledge. Below is a random sampling of 20 certifications from the more than 900 addressed in our survey. For these 20 certs, average annual salary of the credential holder increased by at least 5 percent — from 2016 to 2017 — in 40 percent of all cases.

HOT
(Average increase of more than 5 percent)

Pegasystems Certified System Architect (CSA)
2017 Salary (U.S.): $102,090
2016 Salary (U.S.): $95,070
Average Gain/Loss: +$7,020 (UP 7.5 percent)

EC-Council Certified Ethical Hacker (CEH)
2017 Salary (U.S.): $122,470
2016 Salary (U.S.): $114,960
Average Gain/Loss: +$7,500 (UP 6.5 percent)

SAS Certified Base Programmer
2017 Salary (U.S.): $86,560
2016 Salary (U.S.): $81,330
Average Gain/Loss: +$5,180 (UP 6.5 percent)

CompTIA Security+
2017 Salary (U.S.): $107,330
2016 Salary (U.S.): $101,460
Average Gain/Loss: +$5,870 (UP 6 percent)

Red Hat Certified Engineer (RHCE)
2017 Salary (U.S.): $128,750
2016 Salary (U.S.): $121,590
Average Gain/Loss: +$7,160 (UP 6 percent)

HEATING UP
(Average increase of 3 to 5 percent)

F5 Certified Technology Specialist (F5-CTS) GTM
2017 Salary (U.S.): $130,000
2016 Salary (U.S.): $124,000
Average Gain/Loss: +$6,000 (UP 5 percent)

(ISC)² Certified Cloud Security Professional (CCSP)
2017 Salary (U.S.): $138,610
2016 Salary (U.S.): $131,730
Average Gain/Loss: +$6,880 (UP 5 percent)

Okta Certified Administrator
2017 Salary (U.S.): $133,850
2016 Salary (U.S.): $127,600
Average Gain/Loss: +$6,250 (UP 5 percent)

HP ATP – Storage Solutions
2017 Salary (U.S.): $128,210
2016 Salary (U.S.): $122,500
Average Gain/Loss: +$5,710 (UP 4.5 percent)

GIAC Penetration Tester (GPEN)
2017 Salary (U.S.): $137,360
2016 Salary (U.S.): $132,290
Average Gain/Loss: +$5,070 (UP 4 percent)

VMware Certified Professional (VCP) 6
– Data Center Virtualization
2016 Salary (U.S.): $107,500
2015 Salary (U.S.): $103,130
Average Gain/Loss: +$4,370 (UP 4 percent)

Amazon Web Services Certified Solutions Architect
– Associate
2017 Salary (U.S.): $146,960
2016 Salary (U.S.): $142,140
Average Gain/Loss: +$4,820 (UP 3.5 percent)

IAPP Certified Information Privacy Professional (CIPP)
2017 Salary (U.S.): $139,380
2016 Salary (U.S.): $134,840
Average Gain/Loss: +$4,540 (UP 3.5 percent)

Oracle Database Professional
2017 Salary (U.S.): $123,410
2016 Salary (U.S.): $119,320
Average Gain/Loss: +$4,090 (UP 3.5 percent)

HOLDING STEADY
(Average change of 2.5 percent or less)

Esri ArcGIS Desktop Associate
2016 Salary (U.S.): $78,970
2015 Salary (U.S.): $76,910
Average Gain/Loss: +$2,060 (UP 2.5 percent)

ISACA Certified Information Security Manager (CISM)
2017 Salary (U.S.): $133,980
2016 Salary (U.S.): $130,460
Average Gain/Loss: +$3,520 (UP 2.5 percent)

GRC Professional
2017 Salary (U.S.): $132,760
2016 Salary (U.S.): $130,520
Average Gain/Loss: +$2,240 (UP 1.5 percent)

Microsoft Solutions Associate (MCSA) Office 365
2016 Salary (U.S.): $88,060
2015 Salary (U.S.): $87,190
Average Gain/Loss: +$870 (UP 1 percent)

Teradata 14 Certified Professional
2017 Salary (U.S.): $119,380
2016 Salary (U.S.): $118,330
Average Gain/Loss: +$1,050 (UP 1 percent)

Cisco Certified Design Associate
2017 Salary (U.S.): $127,880
2016 Salary (U.S.): $128,330
Average Gain/Loss: -$450 (DOWN 0.5 percent)

The Salary Survey 75

CERTIFICATION	SALARY (U.S. ONLY)	SALARY (ALL NON-U.S.)	SALARY (U.S. AND WORLD)
1) Amazon Web Services Certified Solutions Architect – Associate	$146,960	$55,380	$91,580
2) (ISC)² Certified Information Systems Security Professional (CISSP) Engineering	$145,940	N/A	N/A
3) (ISC)² Certified Information Systems Security Professional (CISSP) Architecture	$144,700	N/A	N/A
4) Check Point Certified Security Administrator (CCSA)	$144,580	$65,840	$108,790
5) ISACA Certified in Risk and Information Systems Control (CRISC)	$143,810	$107,630	$131,960
6) ISACA Certified in the Governance of Enterprise IT (CGEIT)	$142,500	$103,750	$127,020
7) IAPP Certified Information Privacy Professional (CIPP)	$139,380	N/A	N/A
8) (ISC)² Certified Cloud Security Professional (CCSP)	$138,610	$92,220	$127,010
9) Cisco Certified Design Professional (CCDP)	$138,440	$80,440	$108,560
10) GIAC Penetration Tester (GPEN)	$137,360	$102,500	$131,430
11) ISACA Certified Information Systems Auditor (CISA)	$136,160	$44,000	$116,160
12) GIAC Certified Intrusion Analyst (GCIA)	$136,090	$95,000	$124,380
13) Microsoft Certified Solutions Associate (MCSA) Cloud Platform	$135,890	$59,660	$94,090
14) ISACA Certified Information Security Manager (CISM)	$133,980	$95,240	$120,410
15) Okta Certified Administrator	$133,850	$63,600	$117,990
16) GIAC Web Application Penetration Tester (GWAPT)	$133,380	N/A	N/A
17) GRC Professional	$132,760	$77,580	$116,610
18) Okta Certified Professional	$132,640	$71,000	$117,230
19) (ISC)² Certified Authorization Professional (CAP)	$131,100	N/A	N/A
20) (ISC)² Certified Information Systems Security Professional (CISSP)	$131,030	$90,640	$115,100
21) Pegasystems Certified DCO Architect (CDA)	$130,440	$75,490	$105,620
22) F5 Certified Technology Specialist (F5-CTS) GTM	$130,000	$75,660	$94,400
23) PMI Project Management Professional (PMP)	$129,630	$74,440	$109,900
24) GIAC Certified Incident Handler (GCIH)	$129,330	$104,620	$125,100
25) GIAC Certified Forensic Analyst (GCFA)	$128,940	N/A	N/A
26) Red Hat Certified Engineer (RHCE)	$128,750	$45,900	$76,020
27) Cisco Certified Networking Professional (CCNP) Routing & Switching	$128,510	$63,500	$94,530
28) HP ATP – Storage Solutions	$128,210	$55,400	$76,640
29) Microsoft Certified Solution Expert (MCSE) Cloud Platform and Infrastructure	$127,980	$62,320	$94,390
30) Cisco Certified Design Associate (CCDA)	$127,880	$62,390	$96,100
31) Red Hat Certified System Administrator (RHCSA)	$126,730	$44,460	$65,020
32) F5 Certified Technology Specialist (F5-CTS) APM	$126,250	$77,560	$92,330
33) Pegasystems Certified Lead System Architect (CLSA)	$124,770	$56,890	$85,610
34) Oracle Database Professional	$123,410	$46,110	$86,600
35) F5 Certified (F5-CA) BIG-IP Administrator	$123,390	$66,830	$87,670
36) EC-Council Certified Ethical Hacker (CEH)	$122,470	$59,400	$104,500
37) EC-Council Computer Hacking Forensic Investigator (CHFI)	$122,330	$80,420	$101,790
38) Pegasystems Certified Customer Service Systems Architect (CCSA)	$121,670	$44,570	$62,830

This year's Salary Survey included more than 900 certifications. (Seriously, people, stop creating new IT certifications.) This list of 75, ranked by average base salary among U.S. credential holders in 2017, was drawn from the most statistically relevant certs in the survey — those held by the largest numbers of survey respondents. Yes, even years after the last time that you rented a powder blue tuxedo or bought a new dress for the high school prom, life is still a popularity contest. (Some things never change.) The Salary Survey is global, but 56 percent of all respondents this year checked in from the United States, roughly 6 times as many as came from any other country. Accordingly, our results are shown with average U.S. salaries listed separately, followed by an average of all non-U.S. salaries, followed by a global average that combines those two groups. Because of the high volume of U.S. respondents, some certifications yielded a U.S. average but were not held by enough IT professionals from other nations to produce global averages.

CERTIFICATION	SALARY (U.S. ONLY)	SALARY (ALL NON-U.S.)	SALARY (U.S. AND WORLD)
39) CompTIA CTT+	$120,180	$58,040	$92,840
40) Teradata 14 Certified Professional	$119,380	$44,780	$55,300
41) GIAC Security Essentials Certification (GSEC)	$118,660	$91,750	$114,450
42) F5 Certified Technology Specialist (F5-CTS) LTM	$118,130	$70,700	$91,780
43) Microsoft Certified Solutions Associate (MCSA) Windows Server 2012	$114,740	$49,960	$79,680
44) Pegasystems Certified Senior System Architect (CSSA)	$114,600	$36,940	$56,350
45) Teradata 14 Certified Technical Specialist	$114,170	$69,700	$79,580
46) F5 Certified Technology Specialist (F5-CTS) ASM	$113,990	$65,800	$80,390
47) Pegasystems Certified Pega Business Architect (CPBA)	$113,330	$68,930	$88,360
48) IBM Certified Administrator	$113,060	$49,300	$74,250
49) AXELOS ITIL Foundation	$112,920	$58,250	$84,910
50) CompTIA Project+	$111,790	N/A	N/A
51) Juniper Networks Certified Associate (JNCIA-Junos) Junos	$111,390	$60,510	$78,910
52) Linux Professional Institute Level 1 (LPIC-1)	$111,090	N/A	N/A
53) Cisco Certified Networking Associate (CCNA) Routing & Switching	$110,620	$55,430	$82,920
54) Cisco Certified Networking Associate (CCNA) Security	$110,600	$60,010	$84,810
55) CompTIA Linux+	$110,380	N/A	N/A
56) VMware Certified Professional (VCP) 6 – Data Center Virtualization	$107,500	$51,130	$78,820
57) CompTIA Security+	$107,330	$70,960	$102,540
58) Pegasystems Certified System Architect (CSA)	$102,090	$33,620	$50,350
59) Microsoft Technology Associate (MTA) Database	$99,110	$52,380	$75,740
60) CompTIA Server+	$98,060	$51,380	$82,120
61) Microsoft Technology Associate (MTA) IT Infrastructure	$97,370	$43,770	$75,590
62) CompTIA Network+	$97,260	$59,020	$91,750
63) VMware Certified Associate (VCA) 6 – Data Center Virtualization	$97,120	$69,060	$82,090
64) CompTIA A+	$94,730	$62,570	$90,850
65) Microsoft Office Specialist	$92,920	N/A	N/A
66) Microsoft Certified Solutions Associate: Windows 10	$90,180	$35,590	$64,810
67) Cisco Certified Entry Networking Technician (CCENT)	$88,710	$37,520	$74,420
68) Microsoft Certified Solutions Associate: Office 365	$88,060	$55,740	$67,860
69) SAS Certified Advanced Programmer	$87,050	$49,190	$64,610
70) SAS Certified Base Programmer	$86,560	$40,200	$64,130
71) Esri Enterprise Administration Associate	$86,040	$52,660	$66,960
72) Esri ArcGIS Desktop Associate	$78,970	$51,670	$64,560
73) TestOut Network Pro	$64,360	N/A	N/A
74) TestOut Security Pro	$60,150	N/A	N/A
75) TestOut PC Pro	$52,740	N/A	N/A

FACTS AND FIGURES: SALARY AND CERTIFICATION

BETTER PERFORMANCE, MORE MONEY — GET CERTIFIED AND GET THE BENEFITS

You don't have to have a certification to work in IT. And not every worker who has a certification is inarguably better equipped to do his or her job than folks with no professional credentials. Unless your job description is literally "Drink this but savor it," however — not likely, given the exceedingly low demand at technology firms for qualified wine tasters — then you are going to need tech skills.

And there does seem to be broad agreement that certification can both teach and sharpen tech skills. A substantial 50.4 percent of all Salary Survey respondents report that they use skills "learned or enhanced through certification" several times a day at their current jobs. A further 36.1 percent rely on their certified skills either several times a week (25.6 percent) or several times a month (10.1 percent).

That leaves just 13.5 percent of respondents who reap a direct workplace benefit from certification only occasionally (10.2 percent) or rarely (3.3 percent).

The boon to certification holders isn't strictly limited to IT skills entrenchment, either. A strong 67.6 percent of those surveyed either agree (42.4 percent) or strongly agree (25.2 percent) that getting certified has increased their ability to solve problems, while 64.6 percent either agree (40.6 percent) or strongly agree (24 percent) that getting certified has improved their workplace productivity.

Certification can also make you more attractive to potential employers. More than 70 percent of survey respondents either agree (40.1 percent) or strongly agree (32.7 percent) that they've experienced greater demand for their skills since becoming certified.

Certification can have a positive impact on salary, of course — you may have read about that somewhere. As indicated by the annual income figures given at the start of this section, IT is probably a pretty good place to be whether or not you have a list of credentials as long as your forearm. Even having just one certification, however, can make a big difference.

MONEY FOR SOMETHING

Did you receive a raise in the first year after receiving your most recent IT certification?		
RESPONSE	U.S. RESPONDENTS	NON-U.S. RESPONDENTS
Yes	47.4 percent	33.3 percent
No	52.6 percent	66.7 percent
About what percent increase did you receive?		
RESPONSE	U.S. RESPONDENTS	NON-U.S. RESPONDENTS
More than 15 percent	8.2 percent	15 percent
13 to 15 percent	2.6 percent	7.3 percent
10 to 12 percent	9.2 percent	16 percent
7 to 9 percent	11.4 percent	15.6 percent
4 to 6 percent	27.8 percent	26.4 percent
3 percent or less	40.8 percent	19.7 percent
How important do you think getting your most recent IT certification was in regards to your receiving that raise?		
RESPONSE	U.S. RESPONDENTS	NON-U.S. RESPONDENTS
Getting promoted was a direct result of my certification	7.5 percent	7.7 percent
My certification was a key factor	18.1 percent	17.8 percent
My certification was one of several key factors	41.7 percent	52.7 percent
My certification wasn't really taken into account	19.6 percent	12.4 percent
My certification had no effect at all	13.1 percent	9.4 percent

The Next Big Thing

It's always tricky predicting the future, even if you're only predicting what will happen to you (and only you) in the next year. Given that 79 percent of survey respondents are planning to earn at least one additional certification in the next 12 months, however, it's only natural to wonder what's on their minds. So we asked that, too: Which IT certification is next on your to-do list? These are the 50 most frequently cited answers.

1) (ISC)² CCSP

2) (ISC)² CISSP

3) Pegasystems Certified Senior System Architect (CSSA)

4) Pegasystems Certified Lead System Architect (CLSA)

5) Amazon Web Services Certified Solutions Architect – Associate

6) Pegasystems Certified Pega Decisioning Consultant (CPDC)

7) Cisco Certified Network Associate (CCNA) Routing & Switching

8) CompTIA Security+

9) EC-Council Certified Ethical Hacker

10) Pegasystems Certified Customer Service System Architect (CCSA)

11) Amazon Web Services Certified Solutions Architect – Professional

12) ISACA CISM

13) Teradata 14 Certified Technical Specialist

14) Pegasystems Certified Pega Marketing Consultant (CPMC)

15) Microsoft Certified Solutions Associate: Windows Server 2016

16) Offensive Security Certified Professional

17) PMI Project Management Professional

18) (ISC)² CISSP Management

19) (ISC)² CISSP Architecture

20) ISACA CRISC

21) F5 Certified Technology Specialist (F5-CTS) LTM

22) F5 Certified Technology Specialist (F5-CTS) APM

23) Microsoft Certified Solutions Associate: Cloud Platform

24) SAS Certified Advanced Programmer

25) CompTIA Network+

26) Cisco Certified Network Associate (CCNA) Security

27) Pegasystems Certified System Architect (CSA)

28) Amazon Web Services Certified SysOps Administrator – Associate

29) F5 Certified Technology Specialist (F5-CTS) ASM

30) VMware Certified Professional (VCP) 6 – Data Center Virtualization

31) CompTIA Linux+

32) ISACA CISA

33) Cisco Certified Network Associate (CCNA) CyberOps

34) Cisco Certified Network Professional (CCNP) Routing & Switching

35) Microsoft Certified Solutions Expert: Cloud Platform and Infrastructure

36) Red Hat Certified Engineer

37) CompTIA Advanced Security Practitioner (CASP)

38) F5 Certified Solution Expert (F5-CSE) Security

39) Okta Certified Administrator

40) Amazon Web Services Certified Developer – Associate

41) Pegasystems Certified Pega Business Architect (CPBA)

42) Microsoft Certified Solutions Associate: Office 365

43) GCIH - GIAC Certified Incident Handler

44) Red Hat Certified System Administrator

45) Microsoft Technology Associate: IT Infrastructure

46) Microsoft Certified Solutions Associate: Data Engineering with Azure

47) SAS Certified Data Scientist

48) (ISC)² CISSP Engineering

49) Amazon Web Services Certified DevOps Engineer – Professional

50) Cisco Certified Internetworking Expert (CCIE) Routing & Switching

(Incidentally, Some survey respondents do indeed have a list of credentials that might even exceed forearm length: 4.2 percent of those surveyed have 16 or more current IT certifications.)

According to the U.S. Bureau of Labor Statistics, the average weekly income for a U.S. "information" worker at the end of 2017 was $1,393.10. Among salary survey respondents who hold just one active certification, however, the comparable figure derived from our data is $2,078.98. The comparison isn't exact, but it does give a sense of the extent to which certification can increase earning power.

Whatever its impact on salary, certification isn't only about short-term gains. More than 42 percent of those surveyed have been working in a job role that directly utilizes one or more of their certified skills for longer than 10 years. That kind of longevity suggests that earning and maintaining a certification can keep your moving forward in your career, perhaps indefinitely.

And while bias is certainly a factor, who better than certified IT professionals to look around at the IT certification landscape and assess its ongoing potential? There are naysayers among the total survey population who think that the overall worth and impact of IT certifications will either diminish (8.1 percent) or disappear (1.3 percent) over the next five years.

The vast majority of those surveyed, on the other hand, think the glass is half-full: 38.2 percent feel that worth and impact of certifications will remain the same over the next five years, while 52.4 percent predict that certifications will become more valuable and impactful. We like the optimism. As *Star Trek* creator Gene Roddenberry once said, "The human adventure is just beginning." ■

FACTS AND FIGURES:
DEMOGRAPHICS AND WORKPLACE

THESE ARE THE PEOPLE IN YOUR (CERTIFICATION) NEIGHBORHOOD

A lot can happen in five years: The Roman cavalry commander Aurelian became emperor, expelled two barbarian hordes from lands controlled by Rome, and reconquered breakaway empires in Gaul and Syria — restoring Roman rule from the North Atlantic to the Red Sea — all between 270 and 275.

Your average certified IT professional probably won't lead an army to Palmyra and back (twice!) in the next five years, but he or she may change jobs, quite possibly more than once. There's a core of survey respondents, 11.3 percent of those surveyed, who clearly value stability and have been with their current employer for more than 15 years. Quite a few others, however, are far more nomadic.

A whopping 65 percent of survey respondents have worked for their current primary employer for five or fewer years. It's two or fewer years for 43 percent of all respondents, and zero years (1 to 11 months) for 17 percent of all respondents. With that many folks just settling in, relatively speaking, it seems clear that IT professionals, probably for a variety of reasons, are prone to change jobs.

Some might argue that all of those new and relatively new arrivals are merely the vanguard of a rising generation of IT workers flooding in from

Snapshot of Salary Survey Respondents

If you brushed past a fellow Salary Survey respondent at an open-air market in Cairo, or sat next to one on a 12-hours flight from Seoul to San Francisco, you'd probably never know. People who work in IT don't stand out like, say, soldiers in uniform, or members of a religious order. They do have a few things generally in common, however, as you can see at a glance from this snapshot of age, gender and educational norms, both among those in the United States, and IT pros in the world at large. How does your individual profile match up?

WHAT IS YOUR GENDER?

U.S. — Male (86 percent), Female (14 percent)
All Non-U.S. — Male (90.2 percent), Female (9.8 percent)

HOW OLD ARE YOU?

U.S.	All Non-U.S.
25 to 34: 13.4 percent	19 to 24: 8.9 percent
35 to 44: 26.8 percent	25 to 34: 38.2 percent
45 to 54: 30.6 percent	35 to 44: 34 percent
55 to 64: 24 percent	55 to 64: 14.7 percent
All others: 5.2 percent	All others: 4.2 percent

WHAT IS THE HIGHEST LEVEL OF EDUCATION YOU HAVE COMPLETED?

U.S.
High school diploma: 3.5 percent
Technical training (no college degree): 9 percent
Two-year college degree: 10.2 percent
Bachelor's degree: 37.1 percent
Master's degree: 34.3 percent
All others: 5.9 percent

All Non-U.S.
High school diploma: 5.2 percent
Technical training (no college degree): 8.5 percent
Two-year college degree: 3.8 percent
Bachelor's degree: 44.2 percent
Master's degree: 32.2 percent
All others: 6.1 percent

colleges and high schools. Weighing rather heavily against that line of reasoning, however, is the fact that most of those who responded to the survey are not spring chickens.

A topic of concern for many in the tech industry is the general aging of the workplace population, and this year's survey, like the last few we've done, bears out that trend. A sobering 40 percent of those who responded to this year's survey are 45 or older, and 30 percent are between the ages of 35 and 44. By contrast, just 4.9 percent of respondents are younger than 25.

That's 70 percent of today's working professionals who were either born, coming of age, or (gulp) already in the workforce the year (1982) that the first *Blade Runner* movie was released.

Speaking of timing, 21 percent of survey respondents worked in IT for less than a year before getting their first certification. And you don't have to stretch that timetable very far to capture a much larger slice of the pie. Exactly 43 percent of those surveyed earned their first certification after working in IT for between 1 year and 5 years.

As we've learned from past surveys, there are IT jobs at every rung of the corporate ladder. We've found pretty consistently, on the other hand, that the highest concentration of skilled tech professionals tends to reside at the senior specialist level.

That was the case this year as well, with 40.1 percent of all survey respondents declaring themselves senior specialists. The next largest group is the one immediately below on the standard-issue company org chart: 16.4

percent of those surveyed are specialists, followed by comparably sizeable contingents of rank-and-file employees (14.5 percent) and managers (11.8 percent).

No matter what job title accompanies the picture on their I.D. badge, there's a pretty strong degree of confidence and satisfaction among most survey respondents. A sturdy 64 percent of those surveyed have no intention of seeking a different job in 2018. (Given the indicators discussed a few paragraphs above this one, it sounds as though at least some IT workers who are about to change jobs just don't know it yet.)

And though the IT industry as a whole has certainly been subject to employment upheavals in recent years, most workers are feeling secure, at least in the short term. A remarkable 93 percent of respondents do not anticipate being laid off in the coming year, while 95 percent are confident they won't have to deal with a pay cut. ■

PERKS OF THE JOB

The benefit my employer provides that I would be least willing to do without is:

Medical insurance — 42.8 percent
Paid time off — 16.7 percent
Flexible scheduling — 12.3 percent
401k or other retirement/pension benefit — 9.6 percent
Child care — 8.8 percent
Paid sick leave — 4.3 percent
Vision insurance — 3.0 percent
Dental insurance — 2.5 percent
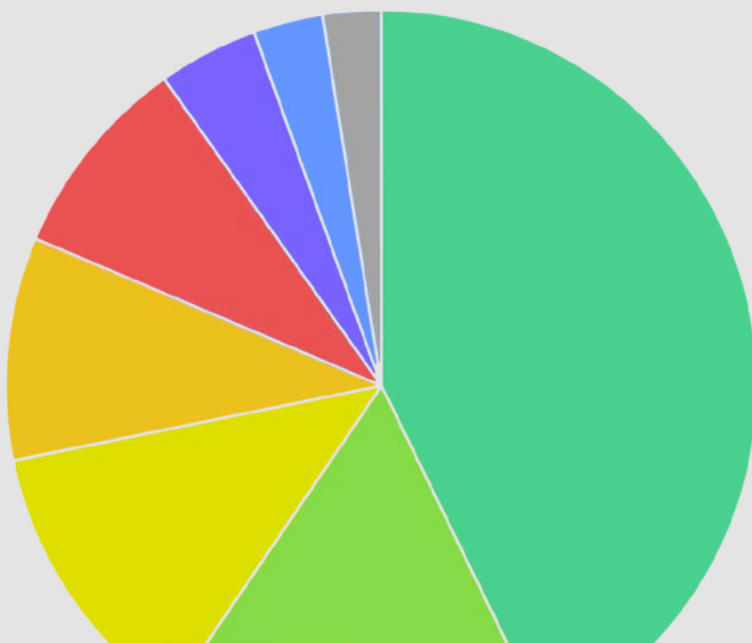
MAKING THE MOS-T OUT OF MICROSOFT OFFICE

Help your students gain a valuable life skill by mastering the Microsoft Office certification exams

BY JEFF RANDALL

Jeff Randall is a product manager at TestOut Corporation. He has worked in the IT certification industry for nearly a decade.

Last year, more than 1 million Microsoft Office Specialist (MOS) certification exams were taken by students all over the world. (That's according to Certiport, a subsidiary of Pearson VUE that administers the MOS exams for Microsoft Learning.) MOS is a very popular certification, especially with high schools, and that popularity is exploding as more states are purchasing certification exams for high schools.

This mean a lot of teachers will be asked to prepare students to pass the MOS exams. Those doing so for the first time are likely to find themselves asking some or all of the following questions:

- What are the exams like?
- How are the exams administered?
- What will I need to add to, or take away from my current lesson plans?
- Where do I go to learn about MOS best practices?
- When are students ready to take the exams?

- How do I give individual remediation to students?

Answers to questions about how to administer the exams and details about each exam can be easily found at Certiport.com. Tracking down answers about best practices, tips for instructors, and best materials to use can be more difficult.

Publishers and vendors love to say that they "map" to this or that certification, but they rarely provide best practices, tips, or a step-by-step guide for individuals seeking certification. It's often left up to educators and trainers to figure things out for themselves.

The help you need

Over the past 10 years, I have been around almost every part of the MOS exams. I've met with teachers, and worked with publishers, resellers, practice test companies, and Certiport itself. In that time, I've learned a few things about getting students certified. What follows are some of the tips I have picked up over the years.

Commitment — Getting students certified means being committed to making it happen. There will be plenty

that, once a student can score 900+ in the Gmetrix test certification mode at least three times, then they are ready to take the exam.

Confidence — When teachers are confident, students become confident. The best way to gain that confidence as a teacher is to study for and pass the MOS certification exams yourself. Having that experience is critical. You'll also have an excellent answer when students ask, "Are you certified?" Finally, by actually preparing and taking the exams, teachers will become both comfortable and familiar with the process and materials they will be using to help students get certified.

Use Great Courseware — Choosing the right MOS courseware, will have a huge impact on the overall experience — and, ultimately, the success — of both teachers and students. School budgets may limit choices, but if possible look for a publisher that uses technology to teach technology. It makes learning more engaging and generally save teachers valuable time.

Look for a courseware that offers the following: a variety of learning materials, self-paced course progression, plenty of practice and review tools, remediation, assignments, assessments, and reporting tools. Here's a tip: Give smaller companies a chance, because they are typically hard at work solving the thorny issues and up-to-the-second challenges that big publishers may be reluctant to tackle.

At TestOut, we offer an MOS training solution, Desktop Pro Plus, that covers all of the suggestions on the list above. Even better, however, is that Desktop Pro Plus includes fully integrated MOS practice tests at no additional cost. Schools on a tight budget can now have access to both study materials and practice tests in the same low-cost package.

Self-Paced Learning — A great teacher can have success with any approach, but there are some advantages to using a self-paced model when

of obstacles to overcome, including a not insignificant learning curve for first-time teachers. It is important for everyone involved to be committed to the end goal of certification.

From teachers to principals and, at times, district administrators, everyone needs to support the effort. Being committed to the end goal is the only way to break through challenges, and keeps everyone focused to boot. It also doesn't hurt if teachers receive a bonus for students getting certified.

Learn, Practice, Certify — This three-step outline is a proven model for helping students pass certification exams. It works best if you size up the various Microsoft Office applications and tackle them one at a time. Start with the easiest Office tools, like Outlook and PowerPoint, and work your way toward the hardest exam: Excel.

Practice tests are a huge help in knowing when students are actually ready to take the exams. Gmetrix practice tests are often purchased with the exams, and look and feel a lot like the real exams. The recommendation is

certifications are the goal. This is not an easy transition for some teachers as, when students tackle the material at their own speed, teachers may feel they are no longer teaching at all.

The opposite is true, of course: While some students race ahead, teachers are able to concentrate on students who need individual help and encouragement. The exceptional students, meanwhile, stay engaged and move through the material without falling victim to boredom.

Students who need more time generally feel less anxious and frustrated when they can proceed at their own pace, and become less likely to fall behind and give up mentally. Teachers can also enlist the best students, those who consistently finish their work early, to help others who are struggling. Star students who are shy about helping others can often be enticed by extra credit and classroom recognition.

Teach beyond the certification — I spoke with a teacher in my community recently who talked about teaching to the exam questions. I had heard this before, but I thought about it for the first time as a parent. Our kids need to learn how to use the Office tools beyond just what is required by the exams.

Students should learn the 80 objectives outlined by Microsoft, and not just the 25-to-35 that are tested by the MOS exams. In addition, teachers who use the Gmetrix practice tests to both teach the material and train for the exam practice aren't really helping their students prepare to succeed in the real world. Those kids may excel at taking (and passing) the MOS exams, but they won't excel at actually using Microsoft Office.

No substitute for practice — This is not referring to the practice tests, but to the importance of day-to-day practice in applying new skills. Like math, students need to learn by doing. Watching a lecture or video is not enough. They need time to practice skills in different ways, and do it over and over.

The more they click on the ribbon, tabs, and dropdown lists, the more they will learn, even if they are making mistakes. The more they practice the skills they are learning, the more proficient and confident they will become. This also comes back to using great courseware: Be sure that what

> " **Students should learn the 80 objectives outlined by Microsoft, and not just the 25-to-35 that are tested by the MOS exams.**

you are getting comes with practice labs that both help students learn the right way, and eliminate confusion.

Competitions — Once a year, Certiport hosts an incredible worldwide student competition. It is the Olympics for Microsoft Office, as students compete to be the best in the world at using Word, Excel, and PowerPoint. Participating countries send their best students (those who had the highest scores and fastest times).

In the United States, Certiport holds a separate competition to determine who will represent the nation. Each school should strive to have some students qualify for the competitions. In addition, schools (and ideally districts) should have their own competitions and recognize students who get the highest scores and the fastest times in each application.

Here's a tip for teachers: Students who show promise should take the exam over and over and over and over again. It doesn't cost anything, but Certiport chooses students with a perfect score at the fastest times. The more they take the exam, the faster they get — and to be in the competitions they need to be fast!

Worth the effort

While MOS certification has challenges, it is worth it in the end. Not only do students earn a certification that is valued in the workplace, but teachers and students both gain the satisfaction that comes when a student who has struggled, but kept working hard, passes their first exam. Seeing those smiles and excitement, and watching as self confidence blossoms and grows, makes it all worthwhile. ■

ALL EYES ON ME

Having a great certification program doesn't mean much if no one is paying attention to what you're doing

BY PETER MANIJAK

Peter Manijak is a training and certification consultant and also serves as Certification Chair for CEdMA (Computer Education Management Association). An innovator and pioneer of IT certification, Peter specializes in building global, world-class certification and training programs from the ground up. Certification regimes he was worked on include those affiliated with EMC, Storage Networking Industry Association (SNIA), Hitachi Data Systems, Acquia, and Pegasystems. Peter can be contacted at petermanijak@gmail.com.

This article is a follow-up to my previous two-part article about how to create and build your own IT certification program. Once you've done the heavy lifting and gotten an IT certification program off the ground, what's next? Let's take look at what can be done to make your certification program attractive to students and IT professionals.

For starters, we need to make a few assumptions. Let's take for granted that you've already been successful at each of the following:

- Your exams are of high quality and are effectively measuring the skills and knowledge of your exam candidates.
- The goals of the program have been approved by the leadership of your company or organization.
- You have the support of your stakeholders.
- You are either the training manager responsible for the program, or the certification manager running the program.

Okay, now that we've outlined the foundation on which we can effectively build a marketing message attractive to outsiders, let's get to it. What are the key ways to make your program stand out? I've assembled a laundry list of points to ponder as you move forward:

Understanding: A key element is always understanding what your audience is looking for. This understanding must be both internal and external. What is motivating the individual? Do they want to find a new job? Comply with a company directive? Get a better salary?

Whatever the case, your program needs to be easy to find, easy to understand, easy to sell, and, most importantly, easy to consume. One of the most important items on your action list is to promote the value of the certifications along with the value of the training. Tell consumers how your certification answers the questions in the preceding paragraph. If possible, bundle in your exams with training offers.

Visibility: If your training and certification information is buried on your website, one of the first missions you must undertake is to elevate it. Show the management team how often those pages have been visited already. Then ask them to imagine how much those numbers could increase with a little promotional wizardry.

In my experience, training and certification pages are usually one of the highest visited areas of any IT company's web site. If you make your certification information high-profile and easy to find, then you are doubling down on that advantage.

Visibility, Part II: Participate in salary surveys. Get your program into the annual *Certification Magazine* Salary Survey. (That's a rule I drew up long before writing any articles for this magazine.) If the program makes the cut, the results can be used as a promotional tool in social media and company events, as a recruitment tool for your HR team, and as a sales tool to engage with universities that are considering offering your curriculum.

Exam Levels: Are your entry-level exams, truly suited to entry-level candidates? If there is no easy starting point, then think about creating an associate level exam or tier with a lower price point.

You should also consider providing the training content for that level either free or at a nominal cost — especially if you want to use a lower-level exam to build a pipeline to your more advanced credentials. This type of free training could be short YouTube videos, a webinar series, or free e-books. If someone is going to make time to learn, make it as painless as possible for them to get started before you go deep.

Pricing: Take a long look at your exam pricing. If your exams are priced

> **Take a long look at your exam pricing. If your exams are priced too low, then they may not be taken as seriously as they should be.**

too low, then they may not be taken as seriously as they should be. This is not a matter of profit, as most companies primarily strive to break even with certification and training. Your certification represents your organization and its products. Exam pricing is a matter of market perception.

Pricing Part II: India and its thriving population of tech-savvy up-and-comers is, or should be, on every IT certification program's radar, especially if growing your ecosystem is important. This is where having a training partner who can meet the demand and keep the pricing low makes more sense. If not, seriously consider slashing the training costs by 90 percent for the India audience.

The price of your exam should stay the same — remember the importance of perception. An IT worker in India who knows he or she will become employable (or get a better-paying job) as a result, will find a way to pay for the exam.

Marketing: This is a very important aspect of helping your program stand apart. There are both "push" and "pull" strategies to consider. What should you push to your audience? What do you have to offer that will pull them in?

If you don't think about marketing, nobody else will — it's as simple as that. No matter the size of your organization, a weekly marketing meeting will get everyone to focus. Some key categories helpful to track and report on are:

Collateral — Brochures or data sheets need to be developed, even if only created as a PDF, as they can serve as great leave-behinds for your sales team.

Events — What events should be attended or created? Many times, people have no idea there are others out there just like them, and want to be part of a community, as this will help them in their jobs and careers. Be the unifier; help build your real-world communities and you can plant the seeds for greater online participation. Some ideas:

- An after-work meet-up in a more casual setting to encourage networking (providing refreshments will boost attendance) is a great way to help grow the communities out there.
- Be sure that your certification program has a booth at company events, such as conferences.
- Offer a test center at company events, if possible. Make this the only time exam candidates can get a free retake.

Advertising — Place an ad where the IT professionals are looking. *Certification Magazine* and other similar industry publications are a great place to advertise. It shows you are a player. The graphics can also be used in your social media campaigns.

Social Media — If you have a Twitter account for your academy or learning group, tie this into your corporate efforts. Get some training on how to be effective with it, and use appropriate tools to schedule posts and promote your content on regular basis. Always include a call to action, preferably to sign up for something like a class or exam.

Communications — If you decide on an e-mail campaign, first be sure you are complying with spam laws. After that, make sure that any links you include allow people to register and sign up for training courses, which is essentially where the revenue is with any program.

Promotions — Offer an exam discount for people who agree to answer a short survey. This works! You can get valuable data from a short 3-to-5-question survey (data that can be

shown to leadership), and you also get a bump in test taking. Don't make the discount open-ended. "Limited time" are the magic words here.

Ad Hoc Projects — Is your certification program listed in Wikipedia somehow? Can you present your program at the new hire/onboarding training held by employers that use your products? Should you have awards? Constantly seek input for ideas.

Testimonials — Get these whenever you can, especially if someone inquires about a "freebie." It is always worth the trade.

Registry: A registry of certified individuals is a great tool to use to promote the professionals already in your ecosystem. It can be set up for all people to see. You can encourage certified individuals featured in the registry to pass along links and spread the word. Partner programs might not like to see an open registry, as it could potentially lead to poaching of talent, but I've yet to see that fear come to fruition.

Test Preps: Offer them with a subscription, or as part of on-site training. Spending a half-day to full-day with a live instructor boosts the confidence of a test taker. Why let the test cheat sites take advantage of a hole in your program?

Badging: This is a very interesting topic these days. Sales professionals and other non-technical professionals could use a lower technical type of learning/testing vehicle. The great news is that it gains mind share: One does not sell what one does not know. Everyone in your company should know the value-add of its products. This is a low-pressure way to achieve that, and it's something easy to track and report on.

Badges could also be earned as a specialization, built on top of core certification exams. In that way, it can keep your participant pool more actively engaged. It is also a great tool for recertification.

Exam Delivery: Remotely proctored online testing has been in place for a few years now, and it could very well be worth investigating. It gives test takers more convenience than having to drive into a physical test center. There are pros and cons to this approach (a topic for another day), so proceed with caution.

Performance-Based Exams: Very hard to scale, but this is a differentiator. The drawbacks are the labor and resources needed to put this in place. There is a higher confidence, however, in those earning the certification, and that itself could provide commensurate ROI.

Understanding, Part II: Put yourself in the shoes of the decision makers in your company. Does your program break even? Does it have a great reputation, and therefore enhances the company brand? Is it used for partner programs? Is it used internally? Do you have a sales program besides the technical certification program? Are the exams relevant and up to date? Most importantly: Is it easy to understand?

Ready, set, dive in

You probably couldn't bring all of these tools to bear on a single certification program all at once. Pick and choose what feels right for your situation, and start there. Your training and your exams may be top-notch, but until you capture the attentions of students, educators, and tech professionals, the battle is only half won. ■

MORE TECH AROUND THE WORLD

It's our second list of six top countries where IT pros should look for work

BY REENA GHOSH

Reena Ghosh is an independent professional writer who creates promotional, developmental and explanatory content for individuals and businesses. She came to professional writing with work experience in financial services operations and corporate communication. Reena speaks three languages and hopes to learn Sanskrit

IT professionals have greater career mobility than most other categories of workers, because much of everyday life is dependent on technology. There is a worldwide demand for people who can work with current technologies, offering suitably skilled tech pros the opportunity to work in countries as diverse as Israel, Sweden, and Canada.

Though Silicon Valley is still the mecca of tech innovation, it is no longer the preferred destination for IT professionals. This is primarily because of the high cost of living, including very high rents, poor work-life balance, and recent visa restrictions.

When selecting a destination for employment (and living), one should not consider professional and economic benefits alone. After all, you and your family need to be comfortable living in whatever spot you end up. Safety is of course a key priority, as is quality of life.

In my previous article I listed six top countries for tech pros looking to relocate: Denmark, Germany, Ireland, Singapore, Switzerland, and the United Kingdom. This article looks at six more. Since a language barrier can pose difficulties, only countries where English is the first language, or is widely spoken, are listed here.

Each of the countries listed below has something different to offer in terms of culture, environment and society:

Netherlands

Amsterdam is headquarters to many world-class tech companies. More than 50 percent of the *Forbes* 2000 companies active in IT and telecoms have a presence in the area. The city also boasts a vibrant tech startup scene. If you're a .NET developer or a data scientist, then Amsterdam is currently one of the top cities for your skills.

Salaries are not as high as in the United States, Switzerland, and Israel, and just a bit less than in Germany or the United Kingdon. According to PayScale, the average salary for software developers in the Netherlands is $44,658 (U.S.).

Advantages
- Netherlands offers a great quality of life with a range of entertainment opportunities.
- Rents are relatively reasonable, and one has a variety of accommodations to choose from.

- Healthcare services and the public transport system are good.
- According to the Safe Cities Index 2017 compiled by *The Economist*, Amsterdam is currently one of the 10 safest cities in the world. It has a low crime rate and ranks 4th in digital security, 6th in infrastructure security, and 10th in personal security.

Drawbacks
- Health insurance is expensive
- You might have to get used to traffic congestion and train cancellations.
- Dutch weather can be unpredictable, particularly in summer.

Sweden

Stockholm is one of the best cities in the world for tech startups. Software engineers working in Sweden earn more than their counterparts in most countries, but not significantly more than the average Swedish employee.

According to PayScale, the average salary for a developer in Sweden is $54,872 (U.S.). Sweden is currently one of the top markets for PHP developers.

Advantages
- Currently, Stockholm has one of the most promising tech start up scenes.
- According to the Safe Cities Index 2017 compiled by The Economist, Stockholm is one of the safest major cities in the world, ranking 9th on personal safety, 4th on infrastructure security, and 10th on health security.
- The country is known for its strong work culture.
- Swedes enjoy a high standard of living.
- Most public services are subsidized.

Drawbacks
- Sweden has a relatively high cost of living, including high personal income tax rates.
- Accommodations of any sort can be difficult to find, especially in the center of Stockholm.

Israel

According to Bloomberg, Israel ranks 6th on the list of preferred destinations for high-tech companies. Over the years, Israel has developed a robust ecosystem for startups. Tel Aviv, in particular, is a hub of financial tech startups.

Salaries for software engineers in Israel are among the highest in the world, and much higher than the average salary for Israelis working in other occupations. According to PayScale, the median annual salary for software engineers in Israel is $65,000 (U.S.).

Advantages
- The dynamic startup scene appeals to professionals looking to work at a startup.
- Israel enjoys a Mediterranean climate. Winters are cool and relatively short. Summers are long and dry, and can get very hot at times.
- With its beautiful beaches, outdoor cafes and thriving art scene, Tel Aviv offers abundant opportunities for recreation. There are art galleries and museums every where in the city.

Drawbacks
- The cost of living is high. According to an Israel National News report, the Israeli Finance Ministry acknowledged that "The level of prices in Israel is higher than in countries with similar GDP per-capita".
- Housing is expensive in Tel Aviv. Most people live in apartments. A detached house with a garden is out of reach for most.
- Healthcare services are good,

but expensive.
- The country has a moderate crime rate. Violent crime is rare except in a few areas, but incidents of bag snatching, car theft and domestic burglaries are not uncommon.
- Due to the conflict with Palestine, political violence can occur suddenly in certain areas. Many expats do live and work in Israel. One needs to be careful and avoid trouble spots.

Australia

Software engineers in Australia earn more than in many other countries, but the high cost of living takes some of the shine off those handsome salaries. If you're a Java or PHP developer, it's one of the best countries to look for work.

Advantages
- Australian society is egalitarian.
- Tech pros looking for a laidback lifestyle are likely to be quite pleased with life in Australia.
- The Australian countryside and coastline offer abundant opportunities for outdoor/adventure recreation.
- Australia has a varied climate and winters are relatively mild.
- Both Melbourne and Sydney have made it to the Top 10 in the Safe Cities Index 2017 compiled by *The Economist*. Melbourne ranks within the Top 10 on personal safety, as well as infrastructure and health security. Sydney ranks 6th on health security, 9th on infrastructure security, and 12th on personal safety.

Drawbacks
- The cost of living is high in cities like Sydney and Melbourne. Groceries and utilities are not cheap.
- Though public and private

healthcare are of a good standard, private health insurance is expensive. Expats who are not eligible for Medicare will need to purchase private insurance.

United States

Though the United States ranks 27th in the work-life balance rankings for all countries, it still attracts tech workers from around the globe. In large part, that's because the American tech industry is one of the most inventive and advanced in the world.

Salaries for software engineers in the United States are also much higher than in most countries. PHP, .NET, and Java developers are particularly sought after in the United States. Data scientists are also in demand.

Advantages
- California's Silicon Valley has traditionally been home to the nation's highly innovative tech industry and an incubator for startups. Texas (especially Austin), the Carolinas, New York, and such western states as Utah, Colorado, and Washington have all emerged as major tech hubs, however, offering a high quality of life for professionals looking for a less expensive alternative to the west coast.
- Across the country, travel and recreational activities abound.

Drawbacks
- Work-life balance is poor, leading to high stress levels.
- Rents are typically very high in large U.S. cities on either coast. The average software engineer can end up spending substantially more than 30 percent of salary to rent an apartment within a few miles of Google, Uber, and other established tech companies.
- H-1B employment visas have recently become more difficult to obtain.
- American cities generally lose out to European, Asian, and

Australian cities as far as overall security is concerned. San Francisco ranks highest among U.S. cities in the Safe Cities Index 2017 compiled by *The Economist*, but with a ranking of 15, it doesn't rank among the world's top 10.

Canada

Canada's tech industry is currently benefitting from a favorable economic ecosystem. The Canadian government has introduced fast-track visas for tech professionals, is funding research in artificial intelligence, and is encouraging investment in startups.

According to Bloomberg, Google, Uber, and Microsoft are developing artificial intelligence capacities in the country, and a number of Silicon Valley venture capitalists are investing in Canadian startups. Facebook, Amazon, and other tech majors have offices in Vancouver, which is fast becoming a tech hub in North America. Toronto, Montreal, and Vancouver are currently promising destinations for software developers. Perl coders, .NET developers, and data scientists are also currently in demand in Canada.

Advantages
- Canada offers a fairly good quality of life.
- Toronto comes in at number 4 in the Safe Cities Index 2017 compiled by *The Economist*. The city ranks 5th on personal safety,

and 6th on digital security.
- Healthcare services are quite good and mostly free.

Drawbacks
- Renting or buying a home is expensive in major cities like Toronto and Vancouver.
- Setting aside Vancouver, the rest of Canada can get very cold in winter. You could be in for five months of very cold weather per year.
- There is a perception that Canadian tax rates are relatively high, but this depends on where you're relocating from. Income tax rates are higher than in the United States, but lower than in many European countries.

Where will you end up?

Depending on your tech skills, the market for your area of expertise will differ from country to country. Relocating can mean not only advanced career prospects, but an enhanced quality of life, improved work-life balance, better health, different and enriching cultural and social experiences, new friends, and a new life.

If you have a naturally adventurous spirit, then don't hesitate to take advantage of the freedom to relocate made possible by your hard-earned IT skills. ■
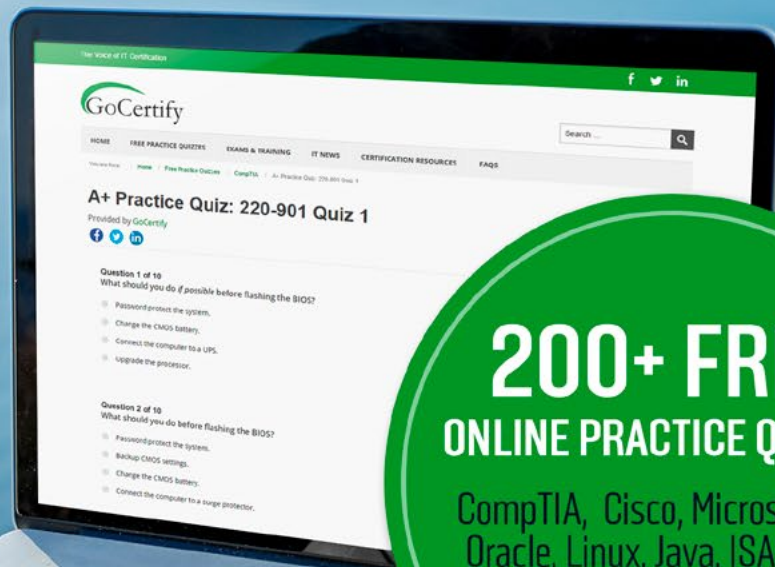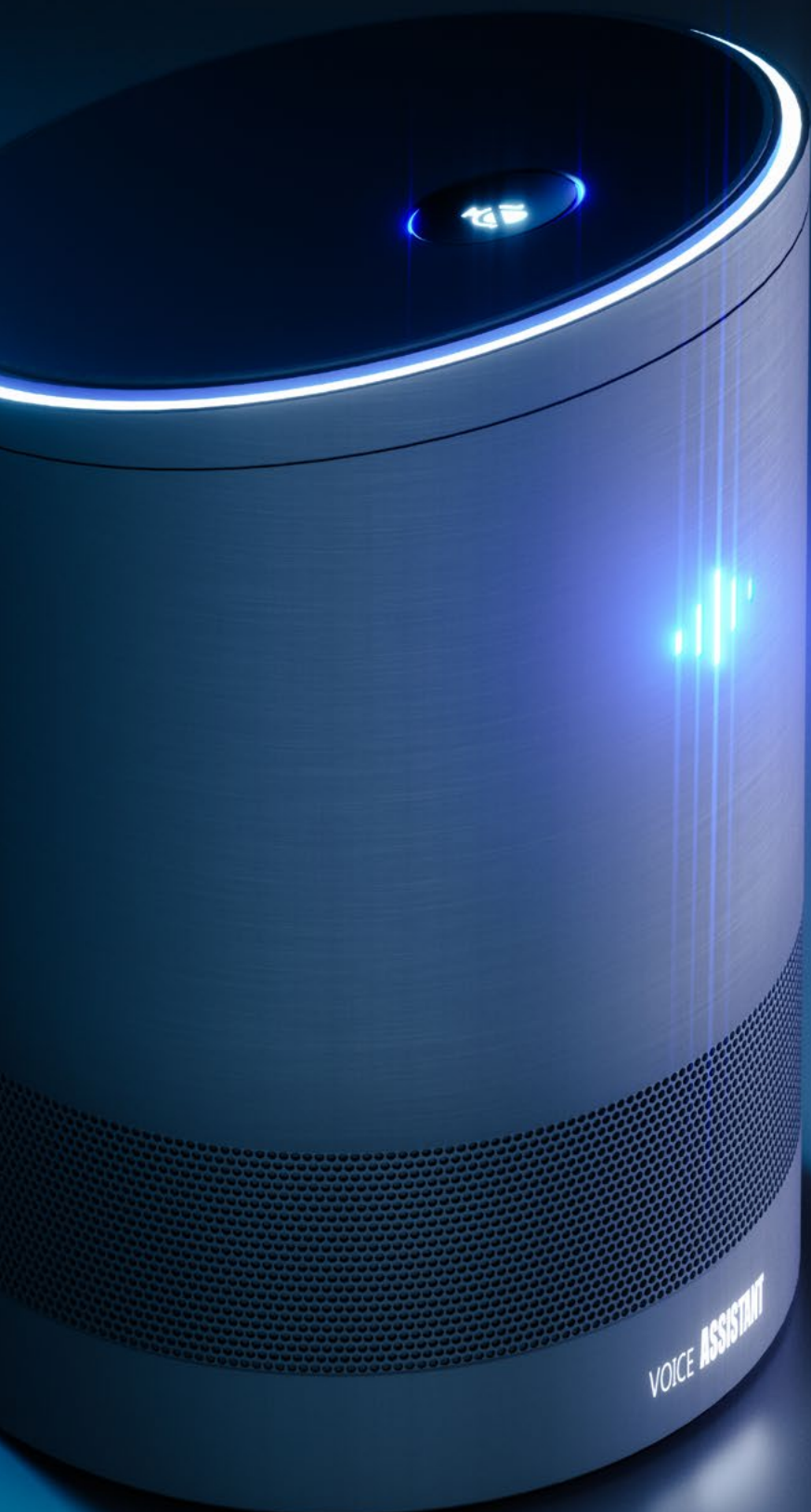
COMING SOON?

Looking ahead at six technology trends that could shape 2018

BY NATHAN KIMPEL

Nathan Kimpel is a seasoned information technology and operations executive with a diverse background in all areas of company functionality, and a keen focus on all aspects of IT operations and security. Over his 20 years in the industry, he has held nearly every job in IT and currently serves as a Project Manager in the St. Louis (Missouri) area, overseeing 50-plus projects. His certifications include PMP, CISSP and CEH.

As we all turn the page on 2017, I, like many others, have looked back and said, "What did I do wrong," and "What could I have done better?" As a gadget-loving nerd, I have also been reflecting on the Amazon Echoes, video door locks, drones and wireless headphones I picked up during the year.

All of this has me wondering what 2018 has in store. As a new year dawns, every IT professionals should be asking herself or himself, "What technology trends should I be paying attention to, be afraid of, or be excited to dive into?"

I have some bright ideas — a handful of tech trends that I believe will be prominent in the coming year. As you read through my potentially prophetic forecast, keep in mind that almost everything here will require updates to existing IT certifications, or possibly drive the creation of certifications yet unimagined.

Wearables

Thus far, wearable devices haven't really caught on. I think it's because they aren't small enough or quite invisible enough to outside observers. Expect this to change in 2018. The convergence of hearing-aid-sized devices and satellite-fueled internet service (more on that later) will make it possible for anyone to feel like a superspy, or maybe Tony Stark.

Imagine that friendly "Siri" voice repeating the results of an internet search directly into your ear, or a contact lens that projects a composite social media overlay across the face of every person you meet. These products are already being developed and prototyped.

And bear in mind that we're just getting started when it comes to wearable devices. The tech will continue to shrink in size and increase in speed, leading to a shift in design to make wearables more convenient, useful, unobtrusive, and affordable.

More smart devices

I can remember a time when technology didn't rule my life, when everything was "dumb" and kicking an appliance just might get it to resume normal function. Now, I often find myself wondering, "Why isn't (device) already smarter than this?"

In 2018, I predict we will see a sharp increase in "smart," inexpensive everyday items. Imagine a fan that senses airflow and temperature, and activates a water-mist when appropriate. Or what about a TV that learns your favorite programs from your viewing habits and automatically records and stores them for you to watch at your convenience? (See what I mean? You just thought, "Why don't TVs do that already?")

Artificial intelligence

AI won't be taking over the world in 2018, but we're making big strides. For developers and engineers, this holy grail of IT is becoming more of a reality every day. Consider all the talk about AI by our politicians and scientists. Why do you think they are talking about it? Because it's close — the stuff of sci-fi. We may soon see our first (I'm doing my best Arnold Schwarzenegger voice here) learning computer.

If you aren't already paying attention to the spread of AI, make 2018 the year you start. AI will most likely be implemented on manufacturing and production lines before it shows up anywhere else. Smart machines will better understand error rates, progress from predictive to perspective fixes, and ultimately to "understanding" what they are doing.

The tech will jump from seemingly harmless beer can production, to self-driving cars and trucks, to everyday items, and then to ... robots. 2018 will move us further down the road to using things that "think" from a true "AI" perspective.

In the future, instead of typing out articles, I may just be thinking them into a computer, or dictating them to my live-in robot. IT pros should learn everything they can about machine learning, AI, and all aspects of Big Data. This is not only fascinating stuff, but it will serve you well when our robot overlords are running the place.

Currency

Currency, both standard and crypto, will move into a place of transparency, autonomy and convergence — where the use of any denomination will be seamless. 2018 will see crypto-currency move into all the markets via blockchain. Blockchain already has the capability to move bitcoin (the most popular crypto-currency) into the mainstream by making transactions permanent and transparent.

Bitcoin will continue to move further out of the shadows and onto center stage. Once this happens on a widespread basis, I expect that financial institutions will begin marketing it, creating funds around it, and even paying people with it.

Right now, there is a company in the United Kingdom that offers a Mastercard backed by gold. That's already on the table. We are not too far off from a single card that will convert, pay, and receive ANY currency known to man.

For the consumer, this opens up whole new ways to pay and save. For IT professionals, the impact of the tech could not be more promising. Jobs will abound in everything from mining bitcoins to supporting multinationals creating "emerging markets." And, of course, we'll need cybersecurity pros to safeguard the tech. Keep your finger on the pulse of currency. It has the potential to make you very rich.

Attack as a service

In 2017, we saw an unprecedented amount of data breaches. Globally, the average cost of a single data breach was $3.62 million. The damage to a company's reputation can be even more costly. The continual threat of unknown attackers stealing our lives a piece at a time terrifies most of us, and as we move into 2018, the shift toward actively combatting data theft will pick up speed.

Hiring CISOs and security professionals has been on the docket at most companies for a long time now, but what I believe will be new is a trend toward "Attack as a Service" — the continuous adaptive risk thwarting and review, along with sustained auditing and "natural selection" of security services.

Imagine a service where you can just type in your name, or your company's name, and choose an attack vector. For instance, you select "breach firewall" and the system tries everything known and unknown to access your data. Or choose "social engineer-

ing" and the company that runs the service deploys people to get into your company.

This type of security automation on the penetration testing and attack side is likely to be a high-growth area in 2018. Any IT Pro with an interest in cybersecurity would be well advised to jump into this or any other security specialization in the coming year.

> " **Imagine a service where you can just type in your name, or your company's name, and choose an attack vector.**

Science and Big Data

While I don't claim to know a lot about RNA and DNA, anyone can see where IT and science are meeting with CRISPR gene editing technology. CRISPR is a rapid and easy-to-

use gene editing technology that can selectively delete, modify, or correct a disease-causing abnormality within a DNA segment.

"CRISPR" refers to Clustered Regularly Interspaced Short Palindromic Repeats occurring in the genome of certain bacteria, from which the system was discovered. While this is both a mouthful and a brainbuster, one can easily see the underlying value of Big Data to the process. All areas of gene and disease study will be improved by Big Data tools and techniques.

Sooner than some may think, CRISPR will go mainstream, with smaller labs leveraging the data to alter simple things like eliminating known genetic weaknesses within pet lineages. When it comes to humans, 2018 could see us take the first steps to "curing" a disease in quite some time.

It's hard to predict which disease or genetic malady will be targeted first, or what form the cure will take. Again, however, it doesn't require much of an intuitive leap to guess that IT pros who can effectively marshal the resources of Big Data will be invaluable to this effort.

League or *Avengers: Infinity War* not only in their favorite chair, but with friends via social media. There is a growing market for what I call the social media introvert. Making events or services available to these groups is something every IT pro should keep up with.

Stay on your toes

These are only a few of the tech trends that are likely to see significant growth in the coming year. Truthfully, there will be so many cool trends in 2018 that you won't be able to keep up with all of them. (Neither will I.) Instead of feeling fearful or overwhelmed, we should revel in the fact that there are so many areas of growth for IT, and such a variety of services and job functions to be filled.

IT professionals should gravitate to jobs, people, and companies in these areas, as well as adopting new tech that follows these trends. Everything is getting smarter, and not embracing new tech isn't a winning strategy. My advice for 2018 is to pick a tech or two that you think will grow, latch on, and enjoy the ride. It's sure to take you to some interesting places and wonderful possibilities. ■

Low Earth Orbit internet service

This may be a long shot, but I hope that 2018 finds us moving away from land-based internet cables and relays to Low Earth Orbit (LEO) technology. No more wires, no fighting over the net, or endlessly digging up streets, and so forth. I've included this at the end because we still have a way to go to accomplish it, but a guy can dream, can't he?

BONUS: First-run movies

This one's not really a revolutionary tech trend, but it may be the one that affects most people soonest (and most directly). Although social media seems to permeate every aspect of our lives, it seems to me that society has gotten much less social. In many ways, I would prefer to watch a movie at home from the comfort of my couch, instead of going to a theater with friends and breaking the bank on refreshments.

Thankfully, 2018 will almost certainly bring changes in how we watch new movies. We will increasingly view new releases from home theaters. We will also be able to watch with others who aren't in the same room — they will be able to watch the exact same stream from their location, in real time.

Some companies are realizing that some people want to watch *Justice*

CERTIFICATE OF EXPERTISE AT HANGING IN THERE

Technology and the wider world are changing. Can certification keep pace?

To maintain a career in IT, you must constantly acquire new skills and knowledge as you progress. All successful techies understand that being a lifelong learner is a top qualification for any IT-related job posting, whether it is listed or not.

Over the last two decades, IT training and certification programs from vendors and industry associations have played a key role in the ongoing education of tech workers. IT certifications have also been associated with greater employability, career advancement, and increased compensation.

As we march boldly into 2018, it's a good time to take a close look at the current state of IT certifications. Are they still as useful and impactful as they've been in recent years?

BY AARON AXLINE

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Schoolhouse certification

Harry is an elementary school student who is learning how to code. Perhaps he thinks this skill may one day make him successful in the working world, but he is currently more concerned with reaching higher levels in Minecraft, one of the world's most popular video games. "That's really my goal this year," he says.

This anecdote, which originated in a story by *TEACH* magazine, is not unique or uncommon. Children are being taught coding and other technology skills at a remarkably early age. This fast start influences the timing of other tech-related education, helping kids to learn advanced tech skills much sooner than in previous generations.

Students as young as 13 can compete in the annual Microsoft Office Specialist (MOS) World Championship, a global competition that offers challengers a timed exam testing advanced skills and knowledge of Word, Excel, or PowerPoint. The participants have all earned one or more MOS certifications as part of qualifying for the main event.

In high schools across the country, students are taking classes designed to help them earn CompTIA's A+ certification for computer technicians before they graduate. CompTIA's Network+ and Security+ are also popular certifications with high schoolers; they are viewed as a doorway to an entry-level job after graduation.

Other high school students work towards getting a Microsoft Technology Associate (MTA) certification, which is awarded to candidates who pass an eligible Microsoft exam. Earning an MTA can also provide a student college credits from certain schools, thanks to a partnership between Microsoft and the American Council on Education.

These examples do not mean certification programs have been dumbed down to make them more accessible to young people. Rather, modern students are raising themselves up to meet the challenge of these programs — something made possible by the new emphasis on early technology education for young children.

This trend does indicate, however, that entry-level IT certifications have lost ground to traditional K-12 education, as the growing number of grade school students earning certifications represents a potential issue of reputation and credibility for these entry-level credentials.

Part of the value of an IT certification is how it is perceived by employers in the industry. If certifications such as A+ and MTA start being viewed by hiring managers and department supervisors as basic add-ons to high school diplomas, this will impact the perceived value of these credentials, particularly for older adults looking to enter the IT industry.

Have Colleges Upped Their Tech-Ed Options?

Historically, one advantage IT certification has had over traditional college programs is how many different disciplines and specializations it makes available to candidates. Colleges have offered Bachelor of Science degrees for ages, and computer science was slowly folded into such degree programs as it became more relevant over time. These programs, however, initially couldn't offer the same variety and granularity of subjects found in the realm of IT certification.

This is no longer the case. The number of colleges offering highly-specific IT degree programs has bloomed over the last two decades. Here are some of the modern degrees students can now earn:

- Bachelor of Technology in Computer Science and Engineering
- Bachelor of Computer Security in Computer Science
- Bachelor of Information Technology
- Master of Science in Information Technology

The majority of these degree programs are highly configurable in their areas of primary focus. Students can choose to concentrate their studies in any number of IT disciplines, like network design, software development, internet technology, mobile web and app design, and so on.

In addition, many colleges are offering these programs entirely online through distance education initiatives. This is an attractive option for students who live in remote areas and are unable to move away, or who have issues with mobility or social anxiety.

Colleges and universities have greatly improved their IT education options, making them much more competitive in comparison to the IT training and certification programs offered by product vendors and professional associations.

IT certifications do, however, still hold some advantages over college degrees. IT training and certification is generally much more affordable than a two-year or four-year college degree program. Certification programs offer more flexibility in how candidates can do their training and prepare for the related exam. Certification students can choose from classroom-based training, self-paced materials, online distance learning, or any combination of these options.

Additionally, product vendors and professional associations can usually be much more agile and responsive than colleges when it comes to updating curriculum and exams with the latest information on evolving technologies. And any IT professional with the requisite knowledge or relevant work experience can simply take an exam and get a certification. That's an option that more or less doesn't exist in the world of college degrees.

So, while colleges have come a long way in modernizing their computing science degree programs, IT certifications have maintained a number of advantages for students to consider.

What's a certification worth to you?

A lot of ink has been spilled in the media on the value of IT industry certifications. It is a hotly debated topic, with people on both sides passionately convinced their perception of what IT certifications are worth is correct.

Every certification and degree has one thing in common: They are statements of intent, made by people who have chosen a career path and are acting on their own behalf to advance down that path.

Career advancement can be done honestly or dishonestly. The same goes for college degrees and IT certifications. They can be achieved with integrity and through honest effort, or they can be cheated through and attained in a shoddy, fraudulent manner.

Any experienced HR person or IT department manager will treat a certification on a candidate's resume as a mark of potential competency. A certification on its own does not guarantee a candidate is well-trained and a good hire. It does indicate, however, that the candidate has chosen an industry they want to work in, and that they have reinforced their decision by spending the necessary time, energy, and money to earn a relevant certification.

The monetary value of certification is continually proven and reinforced by industry studies and salary surveys. There is a consistent theme in these studies — IT professionals who hold one or more certifications agree that:

- There is greater demand for their skills.
- Getting certified increased their problem-solving abilities.
- Their certification(s) contributed to being hired by an employer.
- Being certified has increased their earning potential.

It's fairly obvious that IT certifications have not lost ground when it comes to their industry value. If anything, certifications have gained a more positive reputation in the industry because they are not overexaggerated in value, as they were during the years of the dot-com boom.

The next phase of IT certification

Major certification vendors like Microsoft, Cisco, and Oracle have maintained the industry status of their programs through aggressive advocacy with their partners and associates. Industry associations like CompTIA, ISACA, PMI, and EC-Council also use strong advocacy strategies, the difference being that these groups aren't linked to sales of specific IT hardware and software products.

IT certification isn't going to fade away any time soon. But, these organizations will need to consider the growing impact of early technology education in traditional K-12 schools, and the improved IT programs available through colleges and universities. These growing trends will continue to take mind share (and market share) away from established certification programs.

A more pressing issue for certification vendors is looming: the waning value of traditional testing methods such as multiple-choice exams.

The mobile computing revolution has forever changed the perceived value of memorizing facts and figures. Everyone has a computer in their pocket that can pull up a ridiculous amount of information in a matter of seconds. The performance of virtual assistants from Google, Microsoft, and Amazon will improve with each iteration, and every year's crop of new graduates will be less concerned with having information permanently stored in their minds.

Many certification vendors still rely primarily on traditional multiple-choice exams to test candidates. Other vendors have tried to address this issue by adding performance-based questions, or by making their exams so esoterically complex that they are sometimes indecipherable — Microsoft is a notorious culprit for this latter practice.

Every workplace is currently dealing with the impact of the growing sophistication of personal technology. The Internet of Things (IoT) has made nearly every mundane object a potential data leak. Full HD cameras are currently concealed in eyeglass frames and watches. It won't be long before this technology is completely undetectable.

For IT certification to remain relevant, it will have to adapt to accommodate the rapidly evolving workforce. Today's young graduates demand to have speedy access to information at all times; in the future, the technology providing this access will be invisible.

Finally, there is the incoming automation of jobs previously thought to be the sole domain of workers. Will a certification in network administration be relevant in a future where that function is performed by an AI or other type of learning machine?

It may be that when the industry reaches that point, the entire structure of information technology education — including IT training and certification — will undergo a dramatic sea change.

For now, IT certifications remain highly relevant, visible, and valued in the industry. With some foresight and skillful management, certification vendors and industry associations can continue to keep their programs from losing ground in the overall arena of technology education. ■

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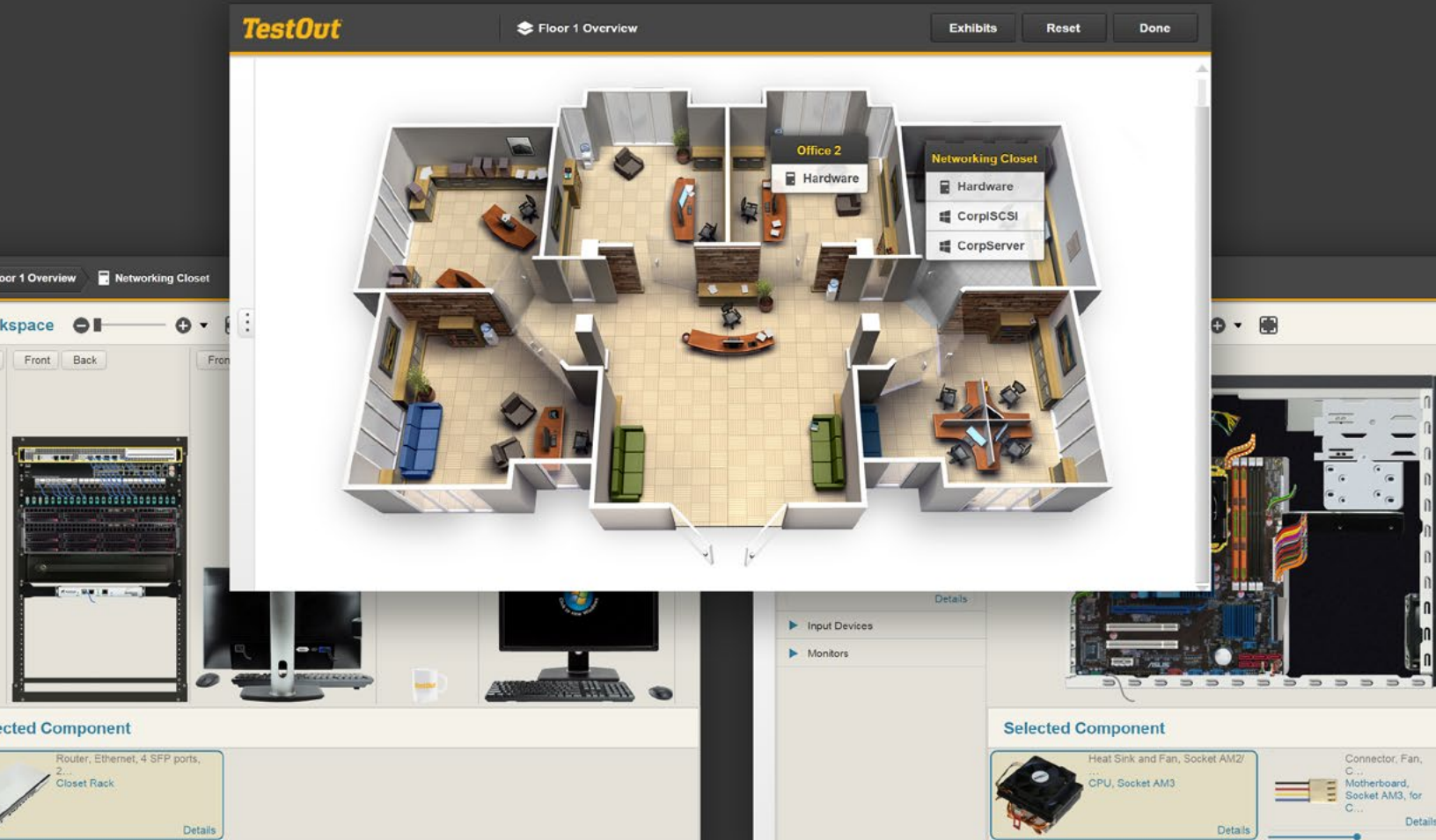- Senior Marketing Consultant
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