A Survivor’s Guide to the Developer Shortage

How to hire, train, or be the dream software developer of the future
In this e-guide:

Over the past several years, it's become incredibly tough to find (and hire) (and keep) qualified software developers.

- What new skills should you look for in potential developers?
- How can a new developer find proper training?
- Will this shortage ever be resolved?

Help has arrived in the form of this 2-section developer shortage guide. Learn how to fill your open positions, and why developers are going to need some business experience.

We'll tell you which cities have been hit the hardest and what governments, businesses and schools are doing to get more people coding.

Survive the developer-pocalypse and come closer to finding (or being) your company's dream software developer.
Section I: Developer shortage

Software developer series

The shortage of qualified workers is nothing new, but it’s just as real as ever. This section covers what kinds of developer skills are in demand, which cities have been hit the hardest, how developers can find the right training, and what skillset will make for a dream developer in the future.

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Taking strides in the software developer shortage

Valerie Silverthorne, Senior Technology Editor

Learn about the software developer shortage and the efforts being made to expand training and staffing in the industry.

At a time when seemingly every company is in the software business, demand for software developers today is insatiable. Job postings for coders have jumped almost 90% over the last year, just in the US, and the situation is nearly as dire in Europe, with shortfalls of up to 900,000 developers predicted by 2020.

To get a sense of how hot -- and out of control -- the market is, consider the opportunities for mobile designers today in the United States. There were over 41,000 jobs posted for mobile expertise in the last year, representing a 135% increase over 2011, according to Boston-based market research firm Burning Glass Technologies. And not surprisingly, the average salaries have jumped as well, to $111,380, well above what the U.S. Bureau of Labor Statistics says is the median developer salary of $93,350.

There are simply not enough software developers to hire, and not enough in school either. American universities are going to graduate less than one third of the expected 1.4 million developers required in the next five years,
said Emirali Mustafa, research analyst at UK-based research firm Procurement Leaders.

So the trick is to figure out how to survive -- and perhaps even thrive -- in a developer shortage the likes of which this industry has never seen.

It's a great time to be a developer. Skilled coders can find themselves with multiple job offers in as few as 24 hours (and sometimes that might include an offer from the current employer). They can also afford to be selective about opportunities -- new development is preferred -- and they have unheard of choice when it comes to where they can work. There were more software jobs available in Chicago than Seattle this year, as just one example. But companies also want skilled developers comfortable in a business-facing role, and perhaps with actual industry experience, requirements that might push some developers out of their comfort zones.

Employers, meanwhile, must get very creative in order to stand out from the crowd. Hiring now involves a lot of marketing focused on company values, perks and opportunities. Even with that, employers must pay more, wait longer for some jobs to be filled, and make some serious compromises, like hiring candidates without college degrees. And they can't relax their vigilance even if they do manage to hire. Employee retention -- through personal performance recognition, bonuses and more -- has never been more important.

And coming up with a solution for the developer shortage has become a huge priority for governments, companies, educators and more. Some feel a university degree is overkill for software developers; at the same time a
A growing number of for-profit coding boot camps are turning out developers in as little as three months. Some community college systems are hoping to replicate the boot camp model at a far lower price. And governments are doing their parts, with a variety of tech efforts designed to connect people to education and then ultimately to better paying jobs, including in software development.

In the end, though, the developer shortage is expected to persist for years to come and actually worsen if education efforts don't kick in swiftly. Time will tell what kind of long-term effect it will have on worldwide software development efforts.

Next article
A worldwide shortage of coders has left employers scrambling, but smart software developer training strategies can help fill the gap.

To resolve the worldwide shortage of software developers, the answer is education.

But that doesn't necessarily mean a college degree, or even a vocational-technical school certificate.

The shortage of developers, combined with a surge in demand from nearly every industry, has forced governments, schools and private businesses to cobble together products that will quickly yield more software developer training. But a lack of agreement about how, where and when to educate has led to piecemeal efforts, which many fear will be insufficient to meet demand.

"The shortage is pretty bad from a U.S. perspective," said Emirali Mustafa, research analyst at U.K.-based firm Procurement Leaders. "The current
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**Four years vs. 12 weeks for software developer training**

The obvious place to start is the university system. But perhaps it's too big of a solution for the problem.

"People are really starting to question the value of a university degree, when it comes to software engineering," said Daniel Theobald, CTO at medical robotics maker Vecna Technologies Inc., in Cambridge, Mass. "Technology is changing quickly, so universities do not really provide a whole lot of value there. The economics are also increasingly difficult to justify: $100,000 in debt or make $100,000 with a high school degree next year. Which would you choose? Nobody likes homework."

And nobody wants to spend time on training that won't get the job done. "[Tech skills] really are becoming more accessible now, with less training than ever before," said Matt Sigelman, CEO of Boston-based research firm Burning Glass Technologies. "We need to make sure we're training for a
range of software development jobs that relate to the skills needed for those jobs and not layering on a whole bunch of other requirements."

One answer to this has been the rise of private for profit schools and boot camps dedicated to training developers in very short order. One of many, AppAcademy, offers a 12-week training program for developers. Those who complete the program and find a job owe AppAcademy 18% of their first-year salary paid over six months. According to the company's website, 98% of its graduates work in technology fields, and the average salary of San Francisco-based alumni was $105,000 in 2014.

"You really can spin more people through these kinds of paths, rather than a four-year university education," said Allan Jones, chief marketing officer of ZipRecruiter Inc., in Santa Monica, Calif., who himself dropped out of school and taught himself Web and development skills. He thinks the market is ready for these kinds of graduates, versus people with four-year degrees. "It's a lot less about the age of the individual and the lack of skill, and more to do with a quicker, emerging acceptance of alternative paths," he said.

In Washington state, the shortage is so severe -- 10,000 unfilled software development jobs just in the Seattle metropolitan area, as of September 2015 -- the community college system is applying for a grant to begin offering a credential program to give residents fast and inexpensive access to coding skills. "This is targeted at people who already have a bachelor's degree, because companies in Washington want employees with college degrees," said Maureen Majury, director of the Center of Excellence for Information and Computing Technology at Bellevue College in Bellevue,
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Wash. "Our tuition can be a lot cheaper than those private programs, and the goal is to eventually have this in most of our 32 locations across the state."

And Majury thinks that not only will this be an easy and cost-effective solution, but it has the potential to be better than what a four-year school could offer. "A degree in computer science from a university can really take a theoretical approach, and community colleges are very hands on," she said, which will may give students valuable real-world skills.

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Younger software developer training

From a government perspective, however, the solution is to start even earlier. In many Eastern European countries, coding is regularly taught in elementary schools and many private companies offer free or low-cost coding classes at the high school level, Kovalyova said. The end result is that nearly anyone who wants to become a software developer can afford training to become one.

The U.K. tried its own version in 2014 and launched the Year of Code, in which every student from ages five to 16 would have software development worked into their curriculum. However, public reaction was skeptical, Mustafa said, with people concerned that most teachers lacked the knowledge to teach the courses and that the program had no true government support.

Meanwhile, in 2015, President Obama introduced the TechHire Initiative, which is aimed at bringing nonprofit coding schools, cities, community
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colleges and industry leaders together with students early to get them on the path to "well-paying technology jobs," including software development.

But some would argue the government doesn't need to create a path, because it already exists. Matthew McCullough, director of field services for GitHub, thinks the "crowdsourced" development site, with its 11 million users, is the obvious platform to teach coding to everyone -- from beginners to seasoned professionals. "We have the raw ingredients on GitHub," he said, to empower developer education. "We offer the archetype for people from inception to a fully delivered software project, so we should be the place for education," he said. "I want to see people explore a page on GitHub, and make a plan [at their company] to go over it at lunch and dissect it together. That's a fabulous start."

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Hiring software developers? Find out what really works

With a global software developer shortage predicted to get worse, hiring software developers has become very difficult. Get expert advice on what works.

Daniel Theobald, CTO of medical robotics maker Vecna Technologies Inc., always had strict standards when it came to hiring software developers: big name college degrees, internships and, perhaps, industry experience.

Today, though, with a worldwide shortage of software developers, Theobald is now looking at high school students.

No one is more disconcerted than he is: "In the old days, if they didn't have a university degree from a top-notch school, I wasn't interested," said Theobald, whose company is based in Cambridge, Mass. "Now if there's a hot-shot graduate from high school looking for a job, I'm going to consider them. I have to in order to compete. But I have not fully embraced this, either."

For Theobald and every manager looking to hire a software developer today, it is the worst of times. Competition for developers has never been higher, in part because there is accelerating demand from nearly every industry, not just traditional software businesses. For example:
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- In the last 12 months, demand for developers has jumped 89% nationwide, based on job postings data compiled by research firm Burning Glass in Boston.
- Almost three out of 10 CIOs recently surveyed by London-based worldwide recruiting firm Harvey Nash said lack of software development skills was holding back their IT strategies.
- IT industry association CompTIA’s recent survey of human resources managers cited the shortage of skilled employees as today’s top business challenge.

So hiring -- and retaining -- software developers today requires throwing away the rule book and rethinking everything. It takes creativity just to find candidates, let alone hire them. And even then there’s no guarantee they’ll stay long. "I’ve never seen a hiring market like this in all the years I’ve been in the business," said Steven Robinson, general manager at executive recruiting firm Lucas Group, based in Atlanta. "Be prepared to change the way you do everything."

Or, to think about it another way, a skilled developer in London can, on average, get multiple job offers in just 24 hours, said Bhavin Joshi, associate director at Harvey Nash. That’s a wake-up call for companies that are used to doing things the old way, Joshi said. "This shows how quickly you need to move in this market to not lose out."
Study your target audience

If you want to hire developers, get to know them, and that starts by leaving the basement-dwelling, video-game-playing stereotype at the door. They take their craft seriously: More than 70% of developers actually write code when they're not at work, either for personal projects or to learn new skills, according to a recent Forrester Research Inc. study.

They also are likely to socialize with other developers. "The software development community is more closely knit and more engaged than any other facet of technology," Joshi said. And while developers generally love their jobs, they're also socially conscious, said Jeffrey Hammond, vice president and principal analyst at Forrester, which is based in Cambridge, Mass. "They want to write code, but they want to write code that matters," he said. "They want to spend time volunteering and making life better."

Therefore, money alone may not be enough to hire or hang on to a skilled developer, warned Robinson. "You really have to remember developers are going to look at the culture of the company and think about a much broader set of factors than just salary."

That is the main reason Vecna launched a bold "Code something that matters" hiring campaign in the Boston area looking for developers who were interested in more than just a paycheck. Using ads on the subway system and many local university campuses, the company told potential candidates about 10 reasons why they'd want to work there, from being able...
to volunteer on company time to free food, a transit pass and the opportunity to work with like-minded people.

Although Theobald says hiring software developers remains a challenge, the campaign really brought in the kind of people he wants most. "We really pushed the concept of doing good in the world and being part of a team that's solving tough problems and really giving back," he said. "People want to be part of that for a really long time, and we don't see the [turnover] churn that other organizations do."

Find them where they are

Running an ad on Craigslist just isn't going to cut it anymore, Robinson said, because skilled developers are probably already getting up to 15 voicemails a day from recruiters -- and he speaks from experience. He recommends companies have a long-term relationship with a head-hunting firm, but there are other options to consider. Attending weeknight developer gatherings offers a great opportunity to soft sell a company's culture and values. Internships are another possibility, though Theobald said even that has become competitive. Vecna used to hire interns only in the summer before their senior year; now it's challenging to get freshmen as interns.

Or there's the strategy Atlassian uses to hire new developers. The software maker, based in Sydney, Australia, literally goes to where the developers are, to sell them on the company experience, said Jeff Diana, chief people officer at Atlassian.
Here’s one example: The company rented old Volkswagen "bug" vans, surfboards and surf shops around Australia recently with a goal of hiring five developers in two weeks. The hiring group -- which included recruiters and HR people -- traveled around, surfing, meeting people and "condensing the process, connecting personally and getting the first few steps of hiring done right there," Diana said.

That personal connection, or what Diana calls “the human touch,” is at the heart of how Atlassian sells itself to the marketplace. Between the "buzz" about its mobile surfing tour and media coverage, the company ended up with "a great pipeline" and met its goal of five new hires, he said. "Actually going to the candidate and meeting them where they are versus the cold electronic meeting is really working for us," Diana added. He acknowledged the company had hiring challenges in a couple of areas, but said overall it has not been hard hit by the shortage.

Get ready for "the scarcity tax"

Software developer salaries have jumped nearly 17% over the last two years, according to a recent Foote Partners IT Skills & Certifications Pay Index survey. A Harvey Nash survey shows an even bigger increase: The average software engineer is making $83,117 this year, a more than $27,000 jump over last year.

Robinson called the salary bump "the scarcity tax" and said companies need to be prepared with a flexible hiring salary -- because most skilled candidates get multiple offers, meaning there can be a bidding war -- and
with a war chest of raises, bonuses, stock options and other perks to be used in case a valuable developer gets another offer.

And for those companies working with headhunters, expect to pay a premium of 35% or more on top of the usual hiring commission when looking for in-demand skills like C++, Java, mobile or cloud.

Hanging onto developers for dear life

Hiring software developers is hard now, and retention can be even harder. Whether motivated by money or by factors like location -- a big draw for Vecna since the company is steps from a popular subway stop -- or work/life balance, developers are nearly unanimous in their desire to do challenging work.

It's far easier to hire a candidate for exciting "greenfield" work, Hammond said, but when that's done and job duties involve maintenance, the developer is more than likely done, too.

Structuring development in a way that keeps everyone happy and moving forward can be tricky, he said. And it's important to remember that unlike a lot of other IT specialties, tight-knit software developers talk to each about salary and perks. "It's only going to take a newbie a month or so to figure out if he or she is underpaid," Joshi said. "That's when they start to look around."

Perhaps not surprisingly, Atlassian addresses this issue with the same "human-touch" approach used when hiring. The company gives annual
equity awards to 15% to 20% of employees, but what really makes the most difference, Diana said, is the personal note written by the manager on high-end card stock and signed by the founders, oftentimes accompanied by a bottle of champagne. “We have an-everyone-is-an-owner culture here,” he said. “And we encourage peer-to-peer recognition, too. These really high-touch efforts drive retention. And they've really allowed us to weather the storm.”
Software developer skills for the future's dream programmer

Valerie Silverthorne, Senior Technology Editor

The hot software developer skills of the future might not involve as much coding as you think. Find out how you can be that in-demand dream developer.

He or she is a coder, a tester and a marketing whiz -- and has the strength of 10. Meet the dream developer of the near future and what nearly every employer is looking for today. We're only sort of kidding about the strength of 10.

The rise of interest in this "dream developer" comes at a time when there is a severe, worldwide shortage of software developers. Is there really a shortage of people, or is it of software developer skills? Perhaps it's both.

"There is a shortage of skills, but the nature of what's a software job has also broadened," said Matt Sigelman, CEO at Boston-based consulting firm Burning Glass Technologies. "We used to see a bunch of jobs for people who were software people, and the skills were closely correlated to that. Now, there are a lot of jobs that aren't software jobs, but require software skills. The demand for this skill set has extended significantly, and that's what has put pressure on this market."
How can you fine-tune your software developer skills to fill these changing roles in the future? We asked experts around the world for their best advice.

## Know the hot languages

If you have in-demand skills, including Apache Cordova, JiRA, Drupal or F#, your value in the market went up 10% or more in the second quarter of 2015, according to the Foote Partners LLC's *IT Skills and Certifications Pay Index 2Q 2015*. That's also true if you're a certified Oracle Professional Java SE programmer, a TIBCO certified architect or a JBoss certified developer -- just to name a few. (See the related chart for more data.)

But you lost 10% or more of your market value if your talents are limited to less-called for C++/CLI, Objective-C or SAS, or you're a Microsoft Office Specialist or SAS-certified base programmer.

No programmer has just one set of skills, but the point is how important it is to keep up with the trends and stay educated. "You've got to look at what's hot in the job postings right now -- like Java, SQL, JavaScript, sharp.net, Linux, XML -- and tie that back to the macro trends going on in the market," said Tim Herbert, senior vice president for research and market intelligence at IT industry association CompTIA, based in Downers Grove, Ill.
Do you own a suit?

But just the latest software developer skills aren't enough, because today's employers -- most of whom aren't traditional software businesses -- want that extra "something" from developers that can be hard to put a finger on, said Jeffrey Hammond, vice president and principal analyst for application development at Forrester Research Inc., in Cambridge, Mass. For those employers, "one developer is not necessarily equal to another," he explained, even if there is a shortage. Call it creativity, soft skills or just a willingness to speak with customers -- it's a sea change in what developers have been asked to do, Hammond and others said.

"The level of engagement [developers have] with stakeholders and business people is higher than I've ever seen it before," said Bhavin Joshi, associate director of worldwide recruitment firm Harvey Nash in London. Mix the ability to work with "the suits" with in-demand software developer skills -- mobile, UX and Android, to name a few -- and that's someone who can easily find a job in 24 to 48 hours, he said.

Sigelman refers to those folks as "hybrids," and said they are the hottest new hiring trend. Take user interface or user experience developers, for example: "That's a few parts product marketing, with a few parts design and with a few parts of software, yet there is that software element to it," he said. "These are hybrid jobs that really fall out of the scope of the traditional software role, but for which there is increasing demand."
But there's a troubling side to this: "We're definitely seeing overall combinations of skills that don't necessarily occur in nature," he said. Companies are eager to get people with real industry experiences who are also developers, but in many cases, that can be a tough sell. "There's a sizable percentage of clinical software development jobs asking for [healthcare] experience. In other words, I want a software developer who's been a clinician. Really?"

**Location, location, location? Not so much**

Dream developer jobs have traditionally been on the coasts of the United States, but that is changing rapidly due to the booming demand. So, the opportunity to get a challenging, well-paying software job in, say, Detroit, is now a real possibility. The Burning Glass report showed more job openings at Detroit's automakers for software developers than production people. And in the list of top 10 cities with the highest demand for developers, Chicago is fifth -- well ahead of eighth-ranked Seattle, which traditionally has been a software hotbed.

So, flexibility about location is now a must. And it won't hurt to also be flexible in your choice of employer and willing to take a chance. Take Aaron Hammond, the son of Forrester's Jeffrey Hammond. He is a junior at MIT, double-majoring in computer science and literature, and may arguably be the face of the future dream developer. He's been coding since eighth grade, has had summer internships coding since high school and his last summer job paid him what would have been six figures if he'd worked the entire year.
He's done his homework on employers and said he believes the bigger tech companies, such as Facebook and Google, no longer have the lock on higher paychecks and interesting work. "There's no real reason for me to pick IBM over a startup anymore," he said. "If it starts hurting, I can just go to a different one."
How low-code development makes building mobile apps easier

Valerie Silverthorne, Senior Technology Editor

A new category of mobile software developers is coming, and, surprise, they're not actually developers. Thanks to a growing number of low-code development platforms, nearly anyone with some enthusiasm and patience can build mobile and web applications today. And they can do it quickly.

These new tools essentially do the hard work developers had to do -- from data management and integration to visual configuration of business logic tools, built-in rules for development and delivery, and emphasis on drag-and-drop elements, according to the Forrester Research Wave report, "Low-Code Development Platforms, Q2 2016." This is a way companies can "bring people in to the development organization and rapidly drive innovation and compete with the unicorns," said Robert Stroud, principal analyst for infrastructure and operations professionals at Forrester. With these new platforms, Stroud said so-called citizen developers are for the first time "really able to leverage IT."

And the timing couldn't be better. A worldwide shortage of software developers has made it difficult to hire -- and keep -- talented software pros, while demand for applications has never been higher, particularly in the mobile arena. Demand for mobile apps is expected to see a 21% compound
annual growth rate and be worth $101 billion by 2020, according to an "App Annie Forecast Intelligence" report.

So it may indeed be that low-code/no-code development platforms are coming to the rescue. Here's a look at four different scenarios.

**Ordinary people.** Referring to issues like user interface, data storage and connectivity, Richard Rabins, CEO of low-code platform developer Alpha Software, said, "Mobile software development is fundamentally much harder than desktop development." His customers not only lack the time and money to develop mobile apps natively, but in many cases, they simply can't hire a hot shot mobile developer. "If you're a 23-year-old developer, are you going to go work for a startup or at a large company in Deerborn, Mich.?" he wondered. Instead of software pros, Rabins said most users of his platform are office administrators and people. "They aren't coders, and they're never going to be coders," he said.

**Coming together.** But that's not necessarily true for all low-code platform companies. Zudy CEO and co-founder Tom Kennedy said his customers often benefit from having a "younger" developer leading the charge. These companies aren't familiar with the pace of low-code development "and this was disrupting their organizations and making them need to change," Kennedy noted. "Really, we're finding we're spending more time on organizational change management" instead of training on the tools. Ideally, Kennedy recommended pairing a developer and businessperson so they can learn from each other, along the lines of what some think of as BizDevOps.
Best of both worlds. Oracle, which first talked about its low-code development offering at Oracle World 2016, had the nontechnical business user in mind with its cloud-based Project Visual Code but created it in a way developers could get into the code easily, said Bill Pataky, vice president of product management for platform as a service, mobile software and developer tools. "We do expect professional developers to use this and augment the applications with back-end systems and other complex integration," he explained, "but at the end of the day, it's a full-spectrum offering. The reality of no code is there, but you do need a development platform broad enough and flexible enough for developers to get into it if they need to."

Broadening horizons. IT departments are definitely "into" low-code development, according to Appian CTO and chief customer officer Mike Beckley. Whether it's a mobile app or just something for internal use, CIOs like the ease and speed low-code development brings, Beckley said. "You now have the ability to delegate work to the business that should be with the business," he explained. Appian just announced add-ons to its platform designed to work specifically with companies concerned about compliance and other operational risks, he reported. Going forward, "if a low-code platform is going to be relevant beyond the citizen developer," he said, "it needs to be open to working with the enterprise and in a DevOps environment."
Section II: In the industry

Taking back the software development industry

The software industry is changing. New trends include difficulty hiring non-U.S. citizens, a decrease in pay, the rise of the citizen developer, and transitions in defined roles. Get a better understanding of what is happening on the inside of the software industry.

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Automation vs. the H-1B visa program: Which matters to employees?

Valerie Silverthorne, Senior Technology Editor

If you're wondering how talk in Washington, D.C., about the H-1B visa program is going to affect the software industry, you're not alone. Although nothing is settled or clear, Patrick Heffernan, a practice manager at Technology Business Research and a former diplomat, predicted automation is going to be a bigger disruptor than any changes in the law.

The H-1B visa program allows workers from other countries to be employed in the United States for a set period of time. And although it has always been surrounded by at least some controversy, it's widely used by many high-tech companies in hard-to-fill jobs. As part of a re-examination of immigration, officials in the White House have said they plan to look at the H-1B visa program. According to published reports, executives in several large Silicon Valley companies are very unhappy about the possibility.

But that doesn't mean employers aren't already in the process of making changes that might make this less painful than it might have been, Heffernan said. Most of the larger companies with employees on an H-1B visa have already been working on streamlining their processes -- through automation and the cloud -- with the net result that they should need fewer people.
Heffernan pointed to Accenture as a company employing a lot of folks with H-1B visas, but that is also aggressively working on automation. The result, Heffernan predicted, is any changes aren't going to hurt as much, or for as long. "Automation is going to partly kill off the need to have as many jobs back in India," he said. Companies are realizing "they need people here to get the training and experience, and [to] stay here and work."

But if you're in the industry and have H-1B employees, how is it feeling? TechTarget asked a number of companies for comment. Many declined, but three shared their experiences.

**Tasktop**

Software lifecycle integration company Tasktop operates around the world and has used the H-1B visa program in the past, according to Neelan Choksi, COO and president at the company, based in Vancouver, B.C.

"Our U.S. operation has relied on the H-1B visa program in the past to fill specific roles where we've struggled to find suitable U.S. candidates. In addition, we had plans to further use the program in the current year," Choksi said. "Any changes to the program that impacts already issued H-1B visas or makes it harder to obtain new visas will result in our U.S.-based operations being impacted negatively.

"Based on previous challenges we've faced in recruiting for certain positions, we may end up having to hire in Canada, rather than filling those positions again in the U.S.," he continued. "The demand for talent in the technology
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**Section I: Developer shortage**

The software development sector is so great at present and the competition for qualified individuals so intense that some of our open positions have been left unfilled for long periods of time.

As far as a backup plan goes, "the H-1B program is not something we rely on, other than where all options have been exhausted. However, without this option, should we find ourselves unable to fill a position in a timely manner, we may end up defaulting to trying to hire those positions outside of the U.S."

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**ScaleArc**

ScaleArc, which makes database load balancing software and is based in Santa Clara, Calif., has also used H-1B employees, according to CEO Justin Barney.

"We appreciate the value of H-1B visas and have leveraged them to grow our talent base," Barney said. "We have both transferred employees who originally came over on another company's H-1B and sought and been granted new H-1B visas for overseas employees. These visas are invaluable for finding unique skill sets."

What's ScaleArc's backup plan? "We also use L-1B visas. The advantage for the employees is that their spouse can work in the U.S. The disadvantage, of course, is that it's not transferable to another company."
Tegile Inc.

Flash storage array vendor Tegile employs engineers with H-1B visas in its headquarters in Newark, Calif., according to CEO Rohit Kshetrapal.

"It will start affecting us in slightly different ways along the path here. A big part of this is H1 visas and green cards," Kshetrapal said. "So, while this doesn't affect us, the next one will, and the one beyond that will. Go to any tech company and you will see a lot of H1 visas. We have engineers in India that have a desire to move here. To us, it's about meritocracy, and that's what the United States is about."

This story includes reporting from executive editor Jan Stafford, news director James Montgomery and editorial director Dave Raffo.
New software developer resume must-haves

Valerie Silverthorne, Senior Technology Editor

Burning Glass CEO Matt Sigelman explains why your software developer CV should incorporate the human factor. It's not enough to be a hot coder -- you need to include soft skills too.

Yes, there's still a shortage of software developers. But there's even more of a shortage of developers who can write well, communicate effectively and comfortably meet with customers. New research from Burning Glass Technologies shows that nationwide, employers are looking for the so-called soft skills more than ever before, according to a recent interview with CEO Matt Sigelman. It's time to polish up that software developer resume.

Over the last several months, Burning Glass looked at millions of job postings around the country to see what skills employers pined after. The results were somewhat surprising to Sigelman, who had seen demand for soft skills trending, but not to this degree. In fact, his research report -- titled "The Human Factor: The Hard Time Employers Have Finding Soft Skills" -- showed on average one in three skills listed in job postings were "baseline skills," such as organization or communication. In highly technical fields like IT or engineering, the proportion was one in four.
Employers are asking for those skills, but they're not necessarily finding them, Sigelman explained. By looking at how much emphasis employers put on soft skills when advertising for a position, and comparing that level of emphasis to standard occupational profiles, Burning Glass concluded that the out-of-proportion presence of soft skills shows companies are struggling to find employees with those attributes in software developer resumes.

Here's the good news: If you're organized and can write and communicate well, you're in demand in nearly every profession. And that holds even truer of IT folks, Sigelman explained. The well-rounded developer has skills that are the basis for another trend Burning Glass has unearthed: the rise of hybrid jobs included in developer CVs, such as when people with clinical medical experience note they can also code.

Download this podcast here.

"What it means to be a software developer is changing," Sigelman said. "Employers are definitely looking for skill set combinations not found in nature."
Tips to build a collaborative software development team

Valerie Silverthorne, Senior Technology Editor

At JavaOne, GitHub's Matthew McCullough will explain why the future is collaborative software development. It's not just about the one rock star any more.

When Matthew McCullough, director of field services at public repository host GitHub, speaks at JavaOne 2015, he's going to try hard to forget the three times he's been a "rock star" at the conference.

This year it's all about the collaborative software development team, not the individuals. His JavaOne presentation, "Patterns for Collaborative Development in a Social World," will address what is nearly a universal issue: Developers who work on distributed teams across countries, continents and time zones.

His goal is simple: Create a truly united team. Or to put it another way, he wants to end the "handoff."

"In the software lifecycle today you have the design architect hand off ... to the developer, who hands off to the testers, who hand off to the performance testers, etc.," he explained. While every team needs specialists,
the problem is those specialists can become silos, and that's a huge disadvantage when applications and updates have to get out the door fast.

"If you're pushing out changes 100 times a day, you're not going to want to be handing stuff over the wall to the tester 100 times a day," he said. Having testers right at hand when they're needed would dramatically speed up the process. "You need different talents in a unified pool rather than in separate departments."

Collaborative software know-how

That notion of open-ended cooperation isn't always easy to achieve. Jutta Eckstein, an IT communications consultant, specializes in long-distance collaboration, albeit from an Agile perspective. She's personally done it often, and she's worked with a number of companies trying to get it right.

"Wholeness is really defined by the team itself and not where the team resides," she said. "All the roles need to have the know-how required to do the work. Teams can find their own way of working, and that can mean all kinds of things," she said. Challenges include, but are not limited to, cultural, language and time zone differences, all of which take work to conquer.

McCullough knows this battle, and he's looked back into history for inspiration. Huge breakthroughs in science and medicine have taken place over the years without scientists working shoulder to shoulder, he said. Now, as the software world is expanding, there's going to be more collaboration possibilities -- and those will be without borders.
"GitHub is looking to remind people that geography is important, but it doesn't have to be massively restraining," he said. "If we do it right, we can have a talented person in Romania and a talented person in Chattanooga working together, and they're going to forget where the other person is but remember the work they did together."

The avenue to software collaboration

Software developers hold a major advantage here: the universality of the code. "It's a language of its own accents and it transcends any given language," he said. Language differences can make reading scientific papers across cultures tough, but Java pro or Python are the same no matter what native language the coder speaks. "We really need to think about the full potential of this universal language," he said.

McCullough thinks the stakes here are huge. With a worldwide shortage of software developers and no end in sight, companies and their teams need to get collaborative software right. "Today software is involved in every aspect of every business, whether it's a tire company or a grocery store," he said. "So if your company wants to stay in business it must have a software advantage."

And that advantage, he explained, can be found in cooperation. "Software development really isn't a job title any more. It's a department in most companies. So we have to make it work better."
How the developer role needs to evolve

Joel Shore, News Writer

At Gartner Catalyst, Kyle Hilgendorf discusses the changing roles of developers and architects and the competitive IaaS market.

San Diego -- The annual Gartner Catalyst Conference covers computing trends and technologies that will impact every CIO, developer, architect and even end user for years to come. Gartner research vice president Kyle Hilgendorf, who specializes in cloud and Internet of Things (IoT), sat down with SearchCloudApplications for a wide-ranging interview, starting with how the developer role will evolve.

SearchCloudApplications: If you are a developer or architect, what is your job going to look like a year or two from now, and what will you need to know that you don't know today?

Kyle Hilgendorf: The developer role at the fundamental level doesn't really change except for more of a demand on them. The way the role will change for specific individuals is the way in which we've developed applications in a traditional IT environment that doesn't really fit a cloud-first world. There's a variety of different characteristics and principles that developers have to start figuring out how to build into their applications. The way you'd do that in .NET might be different from Java or Ruby. It's the concept that no longer can we build applications that are tightly coupled, that are dependent upon
static configurations, like IP addresses and DNS names. They need to be parallelizable and they can no longer have sub-millisecond latency. You might have to get comfortable dealing with 30 milliseconds of latency in a global cloud deployment.

What about the architectural aspect?

KH: From an architecture perspective, it depends on what you oversee. The network architect is going to have to start thinking a lot less about the internal LAN and a lot more about global integration, more work with Internet service providers and carrier-neutral colocation facilities. Identity architects need to think about the dissemination and federation of a variety of different identity domains. The integration architect needs to think about data translation between multiple SaaS providers and infrastructure providers. Data architects need to think about data movement. It's the evolution of those roles, which are more important than they've ever been.

Is it fair to say that Infrastructure as a Service is a two-horse race between Amazon and Microsoft, or are others, including Google, IBM, VMware, Rackspace and others starting to catch up?

KH: Everybody's in the race, but Amazon and Microsoft have a very significant lead. The vast majority of inquiries Gartner gets are from organizations interested in either Amazon or Microsoft, or the combination of the two. That's not to say that the other providers are not winning clients; they are. But, in terms of an aggregated percentage of customer adoptions and wins, it really is becoming an Amazon and Microsoft world.
Can those two leaders plus the second tier satisfy all situations?

KH: I firmly believe we need more providers. I don’t think two providers can last forever and expect the market will adjust and evolve over time. You will see opportunities for some of the other providers to become even more substantial in terms of customer adoption.

We’re also seeing a race to the bottom in terms of pricing.

KH: We are and that’s why we’ve already seen several providers exit the industry. They were not able to compete on the economics, scale and price. I do believe that even though we need more than two providers, there’s just a handful that have the scale, engineering, and efficiencies to compete at that level. Does that mean there won’t be boutique cloud providers at some point that are very niche-oriented or industry specific? I think we’ll have plenty of those, but they are not going to compete at the massive, global hyperscale environments.
How do you hire the right developers — and make them stay?

Jan Stafford, Executive Editor, SearchSoftwarequality.com

The creative side of software development attracted Shalom Keynan to the profession. Now director of application development for Boston Heart Diagnostics, he is still fired up about improving patient care through software creation. To keep the ideas and projects flowing, however, he faces the challenge of hiring and training developers to handle mobile, cloud, microservices and other new technologies.

“Every morning, I feel very excited to get to work because I know I will discover new ways to build better software,” Keynan said. “That’s what motivates me, and I think my excitement and openness to new ideas motivate my development team.”

A day in Keynan’s work life largely consists of engagements with application development team members, who aren’t just developers. The team includes marketing, clinical researchers, scientists, developers, software QA and, most importantly, users of the applications in a project.

While Keynan uses some outside consultants for design work, most development is done internally. The team builds and manages a wide range of health care applications, such as apps that generate personalized reports for specific physicians and patients and physician and patient web portals.
Over the past decade, he and his team have had to increase their mobile development skills to meet the demand for smartphone, tablet and custom mobile device applications. Getting into mobile started a domino effect. “Creating applications for mobile has taken us deeper into the cloud and recently into building microservices,” said Keynan. In most cases, he’s worked on training his existing team on the skills needed for these new technologies.

Skills shortage? What to do?

When recruiting developers, Keynan has not seen a shortage of developers, but too few developers with the skills he needs. In some cases, he’s taken another approach to hiring. “I looked for the qualities we need in a developer, instead,” he said. These qualities include the following:

- Can the developer learn quickly?
- Does her resume show initiative and motivation?
- Does he engage in conversation and sharing ideas easily?

If these qualities are present, a lack of specific advanced skills may not matter. “If you ask me to choose between the developer who knows everything and a developer who learns quickly, I would choose the second one,” he said. “Technologies evolve quickly, and that’s why that quality is so important.”
Advice for job seekers

Keynan advises job-hunting developers to cultivate an understanding of how to relate business objectives and user needs to app requirements. Understand the business needs. Listen carefully and understand who the consumer is. To deliver what is needed, an insightful approach is as important as technology knowledge.

In too many projects, Keynan said, the user sees the end result and says: “You built what we told you to, but that’s not what we wanted.”

Retaining developers

When it comes to retaining employees, Kenyan thinks managers should empower them by sharing responsibilities. “No manager can master everything,” he said. Work in tandem with other developers, not in a separated, top-down way. Also, make sure that team members share their knowledge with each other. “Being exposed to others’ techniques makes people excited about work.” Keep in mind that boredom and developer turnover go hand-in-hand.

Most importantly, Kenyan said, team managers can retain developers by showing them how their work makes a difference in people’s lives. “That feeling that I’m helping people is what gets me to work each morning,” he said. “It’s an important motivator.”
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We are an online community for developers, architects and executives interested in building high-quality software, or are involved in software project management, software testing and quality assurance, application performance management, and application lifecycle management.

We provide in-depth coverage on how to ensure application quality using different development process models and methodologies, like DevOps and Agile development, and we’re home to countless white papers and Webcasts to address the newest trends, problems, and solutions in software quality.

Learn new information on software quality management, application threats and vulnerabilities, software maintenance and bug tracking, and how to build quality and security into the application development lifecycle.

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