



iCIMS 2019 BENCHMARK REPORT

Hiring tech talent for CIOs and CTOs

A practical guide for IT leaders to find and hire talent based on an analysis of more than 25 million technology applicants from January 2016 through May 2019.

Finding and hiring tech talent is getting harder and taking longer. To win, companies need to fundamentally evolve recruitment.

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There are few, if any, organizations not currently undergoing a transformation and aggressively looking for new talent with technology skills to lead the way.

From old-line auto manufacturers seeking to deliver autonomous vehicles and cars-as-a-service to a whole new generation of farmers using drones, smart sensors and weeding robots to increase yields and reduce costs, the future will be won by organizations with the best tech talent.

Hiring tech talent is an existential challenge facing nearly every single organization, and they're finding it harder and harder to find qualified talent. Employers are responding aggressively to meet their needs for high-skilled tech talent. For instance, Amazon, reporting more than 20,000 open positions in 2019, is building a new headquarters in Virginia and investing more than \$700 million to retrain its 300,000 employees, including providing free software engineering classes to all corporate employees.

As the market leader for cloud-based talent acquisition solutions, iCIMS' data provides organizations with actionable insights about job openings, applicants and hiring. To enable CIOs and CTOs to more effectively find and hire tech talent, we analyzed more than 25 million tech applicants from January 2016 to May 2019. ■

1. New York Times: 'Amazon's Next Experiment: Retraining its Workforce,' published July 11, 2019

Key findings:

1. **Companies face a huge technology talent deficit in the U.S.:** Employers were only able to hire six for every 10 open tech positions from Jan. 1, 2016 to May 31, 2019. In stark contrast, companies made 12 hires per 10 job openings for all positions.

tech hire in 2018, compared to all (types) hires. The problem is the quality of candidates. *Attract more qualified candidates by creating and nurturing talent pools of targeted candidates, and step up employee referral programs.*
2. **It's getting even harder:** In 2018, there were 18% more net new technology hires than 2017, outpacing the overall U.S. hiring trend of 14% net new hires. The increasing demand of tech talent is driven by companies in two sectors: telecom/information services and retail.
3. **While software app developers are the most sought-after, they are not the hardest to hire:** Nearly one-third of all tech hires are app developers. But the hardest to hire are security analysts, data research scientists and database administrators, for which employers are only able to hire less than half of their open positions. The good news is that employers are able to hire all of their frontline helpdesk support positions.
4. **Plan for 70+ days to hire key roles:** In the first five months of 2019, it took an average of 80 days to hire the typical app developer. This is a jump from 2016, when it took just an average of 66 days. It takes 50% longer to hire for a tech role than all other types of roles. *Budget for three months from the time you post the job to onboarding your new tech hire.*
5. **There is no shortage of technology applicants. The problem is attracting qualified candidates:** There were twice as many applicants for every

6. **Go beyond Silicon Valley and New York to source talent:** Look at where the tech talent is located versus where you have locations. D.C.–Virginia, Boston–Cambridge and Detroit provide the largest concentrations of tech talent among the biggest metro areas outside of the Valley and New York City. *While CIOs already know to look for tech talent in Austin and Denver, extend your reach to include Baltimore, Raleigh, Madison and Salt Lake City.*
7. **There is a consistent gap between the number of women hired versus applied:** To close the gap between female applicants and hires, promote inclusive initiatives across your company; provide tech opportunities and training internally; and use gender-neutral language in your job descriptions.
8. **Today's candidates communicate differently:** Nearly 40% of all candidates now submit applications by mobile phones. *Build your candidate engagement and application process for mobile devices.*
9. **Google is a rapidly growing source of quality candidates:** In the last 12 months, iCIMS customers experienced significant growth in both the number and quality of applicants coming directly from Google to their career site. *Build a strategy including optimizing career site and job descriptions for Google.* ■

Purpose of this report

This report enables IT leaders to guide and partner with their recruiters to efficiently find and hire qualified technology talent.

Most IT hiring managers tend to limit themselves to reviewing a finite number of resumes and interviewing the short list of candidates provided by recruiters. But recruiters do not hire tech talent. They guide IT leaders on approach and process, as well as inspire best fit candidates. IT leaders who win the best talent take an active and expedited role.

This analysis helps IT leaders get involved strategically in the recruitment process. To provide actionable insights, we mapped thousands of our clients' IT titles, roles and openings to the Bureau of Labor Statistics' standard occupational categories (SOC). ■

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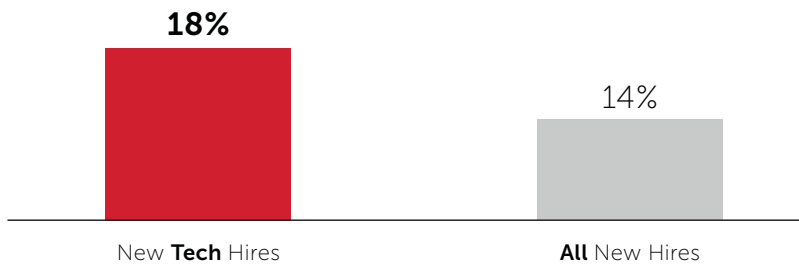
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[I] State of Tech Hiring

[1.1] Growth of tech hires jumps in 2018, outpacing U.S. growth

The daily challenge that organizations experience trying to hire qualified tech talent is not imagined, nor unique to your company. In 2018, there were 18% more net new technology hires than in 2017. This jump outpaced overall U.S. hiring growth, which experienced a 14% increase over the past year. We expect demand for tech talent will continue to outpace other hiring types going forward.

% Increase in Net New Hires 2018 over 2017



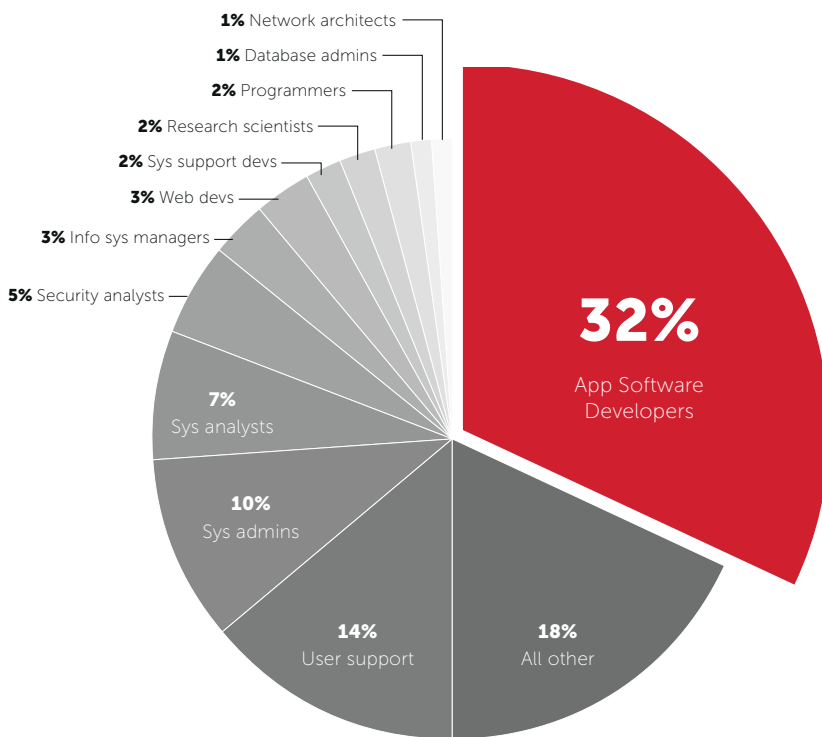
The increasing demand for tech talent is being driven in large part by companies in two sectors, and by three specific tech roles.

[1.2] App developers account for a third of all tech hires

Software application developers are, by far, the most sought-after role, accounting for nearly one-third of all tech jobs, followed by user support (14%) and network administrators (10%).

This table will help you determine the positions to apply recruitment and retention programs, incentives and bonuses.

Most to Least Sought-After Tech Positions



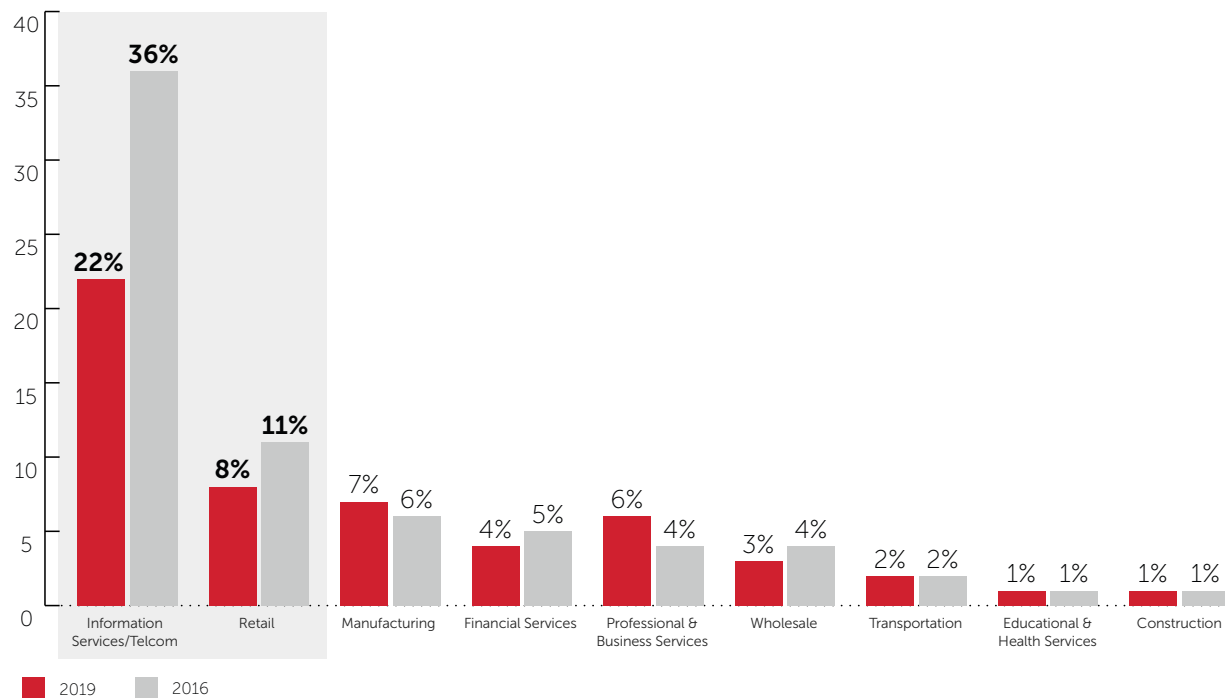
	Mean Salary (BoLS)
App software developers	\$106,710
User support specialists	\$55,050
Sys administrators	\$87,070
System analysts	\$93,610
Info sys security analysts	\$102,470
Info sys managers	\$93,350
Web developers	\$75,580
System support developers	\$114,000
Info sys research scientists	\$123,850
Programmers	\$89,580
Database administrators	\$92,030
Network architects	\$111,130

[1.3] Tech hires are not increasing as a higher proportion of total hires in most sectors

iCIMS found that only companies in telecommunications/information services and retail have increased the number of tech hires as a proportion of the total workforce since 2016 in the U.S. The widely held assumption that every company is increasing the number of technology employees as a percentage of their total workforce is false. Companies are keeping the lid on the relative size of their IT workforce for several reasons, including:

- The switch from installing and supporting software and data centers inside corporations to cloud-based solution providers reduces the need for IT resources in-house, especially system administrators and database administrators.
- Transfer of back-office IT support from the U.S. to shared service centers located abroad.
- Outsourcing IT development to third-party consulting firms like Tata and IBM.

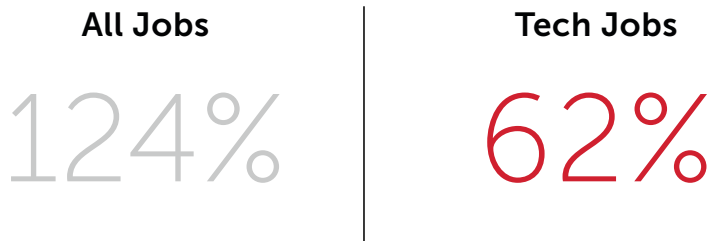
% Tech Hiring by Sector



[1.4] Employers are only able to hire six people for every 10 tech openings

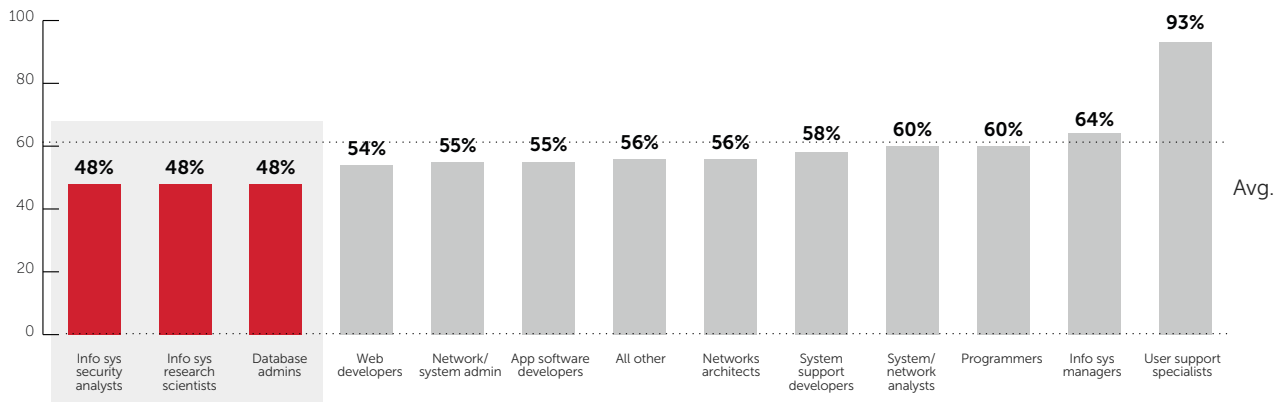
In the last three and a half years, employers were only able to hire six for every 10 open tech positions. In stark contrast, companies made 12 hires per 10 job openings for all positions. Companies hire more people than ‘openings,’ because they open one job requisition when they’re looking for, say, three user support specialists or five sales representatives. In short, it is now twice as hard to hire for tech positions than all other roles.

Hires as % of Openings



When we take a deeper dive by type of tech position, employers are able to fill nearly all of their front-line user support specialists, but only half of nearly every other tech role. The hardest to hire are more specialized technology roles, specifically **system security analysts, research scientists and database administrators**. This trend appears to be driven, in part, by the nature of the work. Roles with an increasing amount of automation are proving a little easier to fill, while employers find it harder to hire for the more strategic, value-add positions such as security analyst.

Hires as % of Openings



[1.5] Plan for up to four months to hire developers

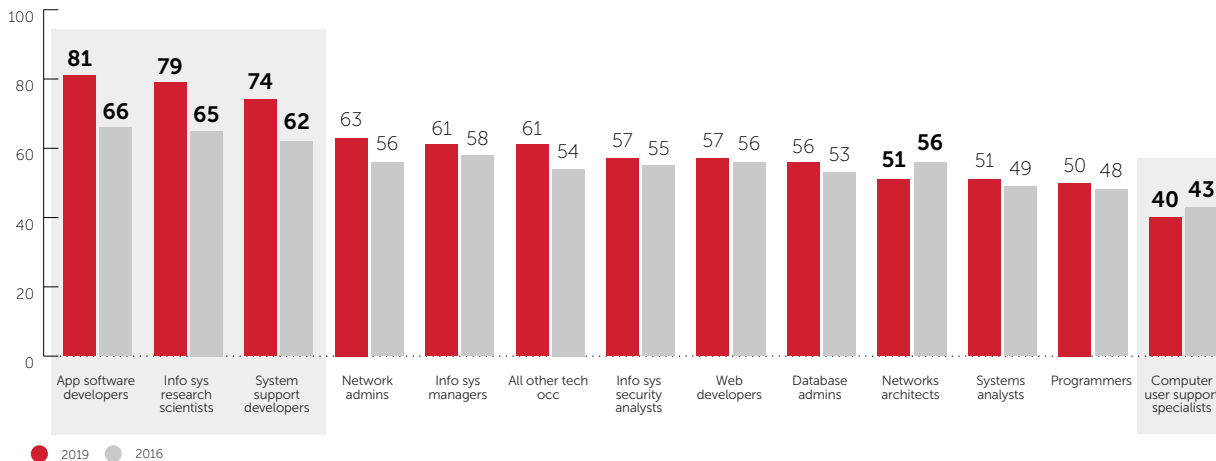
It took on average 43 days for employers to fill a (non-tech) position during the first half of 2019. This is an improvement from 2016, when it took 46 days, as employers are fast tracking recruiting in order to win talent in today's tight labor market.

Time-to-Fill (days)



In stark contrast, it is taking considerably longer to hire for key tech roles. The average time-to-fill jumped from 66 and 65 days in 2016 to 81 and 79 days respectively in 2019 for app developers and research scientists. This is just from when the job requisition was opened to when the offer was accepted. When factoring in the notice period and onboarding, employers should plan for 100 days – up to three months – to add a software developer to their team.

Time-to-Fill (days)



This trend poses a very real challenge for organizations. In addition to forcing IT departments to delay deliverables and increase reliance on contingent workers and consulting firms, it places additional strain on the current IT team along with pressure to increase salaries.

Recommendation:

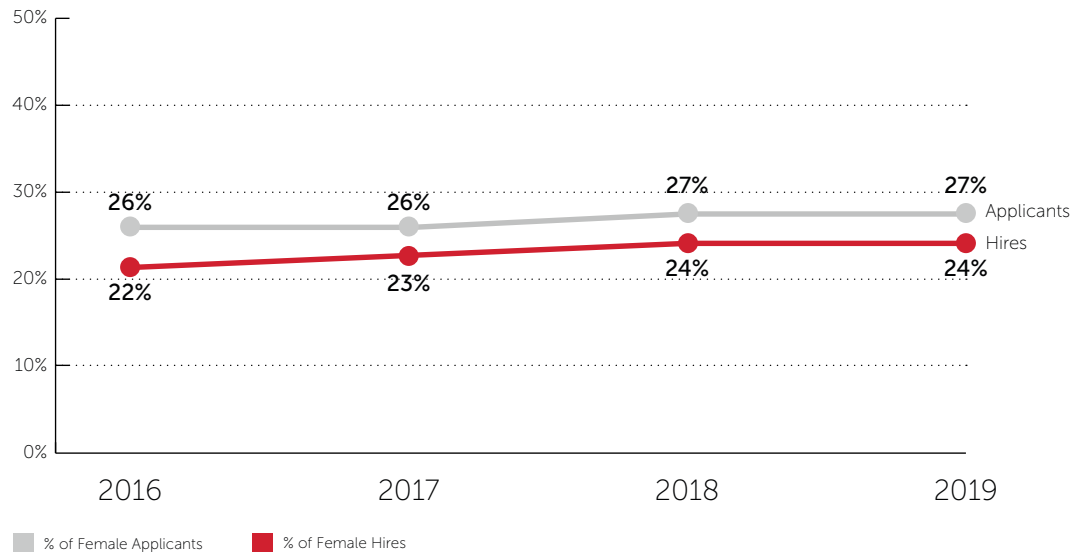
- 1. Re-train existing employees, beginning with those on the helpdesk:**
Organizations of every size are investing in retraining employees. Start by putting your frontline support staff into fast-track training for more critical areas of IT, given that companies are not struggling to hire helpdesk talent (page 9).
- 2. Attract non-traditional candidates:** Seek out and hire candidates who have demonstrated aptitude, even though they may not have a four-year degree in technology. We have found that recruiters often feel a coding boot camp is as meaningful as a college degree in the technology field.
- 3. Target hiring incentives only for the most difficult-to-hire:** As detailed above, not all tech positions are proving as time-consuming to hire. In fact, time to hire for several roles, including support specialists and security analysts, remains unchanged.

[1.6] As a % of total hires, fewer women are hired than applied

In 2018, women made up half of the total U.S. college-educated workforce, but only 28% of the science and engineering (STEM) workforce.

Therefore, it is not surprising that 27% of tech applicants were women. However just 24% were hired. This gap has remained unchanged for the last three years, despite employers' concerted efforts to attract more women to tech.

Tech Applicants and Hiring by Gender



Recommendation:

1. **Empower women:** Correct the imbalance with measures such as training staff in unconscious bias awareness, removing gender from resumes, insisting that shortlists include women, improving referral incentives, enhancing maternity rights, showcasing female role models on social media and implementing mentoring programs.
2. **Write job descriptions that attract women and are more inclusive:** Job descriptions in tech have a lot of jargon and macho language. Changing job advertisements is a small but effective way to help correct gender bias and encourage women to apply. Replace words such as "win," "kick," "aggressive," "premier" and "outstanding" with "improve," "bold," "top-tier" and "extraordinary."
3. **Separate required skills from "nice to have" skills:** Women are unlikely to apply for a position unless they meet 100% of the requirements, while men will apply if they meet 60% of the requirements. A/B testing job descriptions is also an effective way to identify unbiased verbiage.
4. **Training:** In the same vein that Amazon is enrolling all their corporate employees in coding classes, consider hosting internal boot camps to interest more women in pursuing opportunities in technology.

[II] Hiring Tech Talent

[2.1] The truth is, there is no shortage of tech applicants

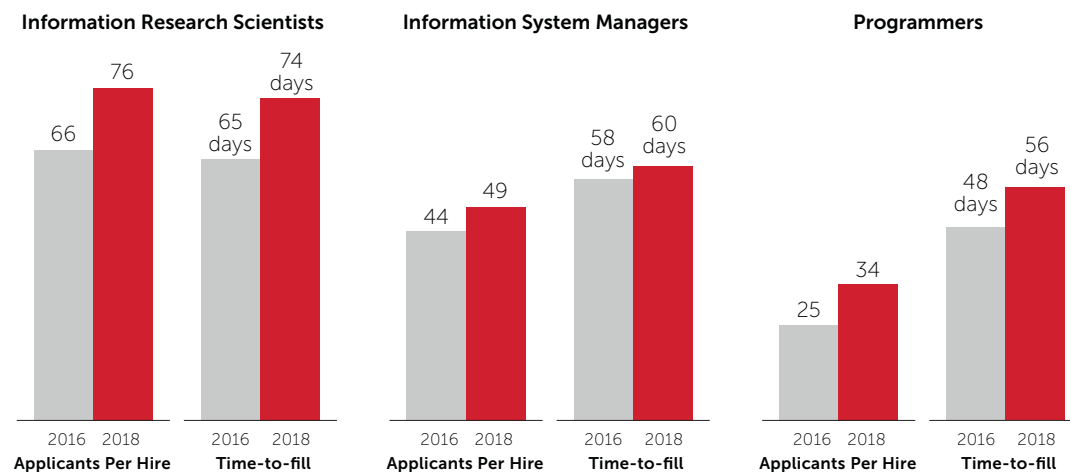
The prevailing view that there are fewer applicants for more tech roles is simply false. The number of tech applicants for every hire has increased over the last three years, while there were fewer applicants per hire for non-tech jobs. There were, on average, 43 applicants for every tech hire versus just 21 for every non-tech hire in 2018. The increasing number of tech openings is attracting an increasing number of tech applicants.

Average Number of Applicants per Hire

	2016	2018
Average number of tech applicants per hire	36	43
Comparison: Average number of non-tech applicants per hire	23	21

In fact, there is an increasing number of applicants for several of the most-needed positions, which also drives up time to fill, because it takes longer to review, screen and ultimately hire the right candidates.

Because employers find it increasingly hard to find qualified candidates, recruiters solicit as many resumes as possible. But parsing through unqualified applicants is a time-consuming experience for employers.



Recommendation: Improve the quality of your tech candidates by:

1. **Using a nurture program:** Don't wait for the perfect candidate to apply. Instead, proactively identify and engage top targets and invite candidates to stay in touch by joining your talent pools expressly for IT. Add candidates referred by employees and those who applied previously but they didn't get the role. Keep in touch with them with your latest news, insights and job recommendations based on their specific skills and interest.
2. **Limiting the number of always-open job requisitions:** Candidates see when positions are open for months on end and think you're not really looking. It's important to refresh open job requisitions.
3. **Going beyond generic job descriptions:** Most job descriptions are written by IT, and they're incredible detailed. Instead, have a marketer review them. They'll focus only on core responsibilities and the top three deliverables so candidates can better self-select and highlight their relevant experiences and skills specific for your needs.
4. **Sharing salary ranges:** Few organizations are upfront about the salary ranges, in order not to limit people's interest or their own abilities to negotiate. Publishing the salary range will help to attract only the right level of talent and candidates, who will appreciate your transparency. It will also enhance your position with Google for Jobs, which is becoming an important source of candidates (page 16).
5. **Applying analytics to improve targeting and recruitment:** Despite spending millions on recruitment marketing, few companies track the source of their tech hires. In addition to providing candidate resumes, ask recruiters to provide you with the source of candidates. Focus on high-performing channels and activities that convert the highest quality candidates to fill roles cost-efficiently.

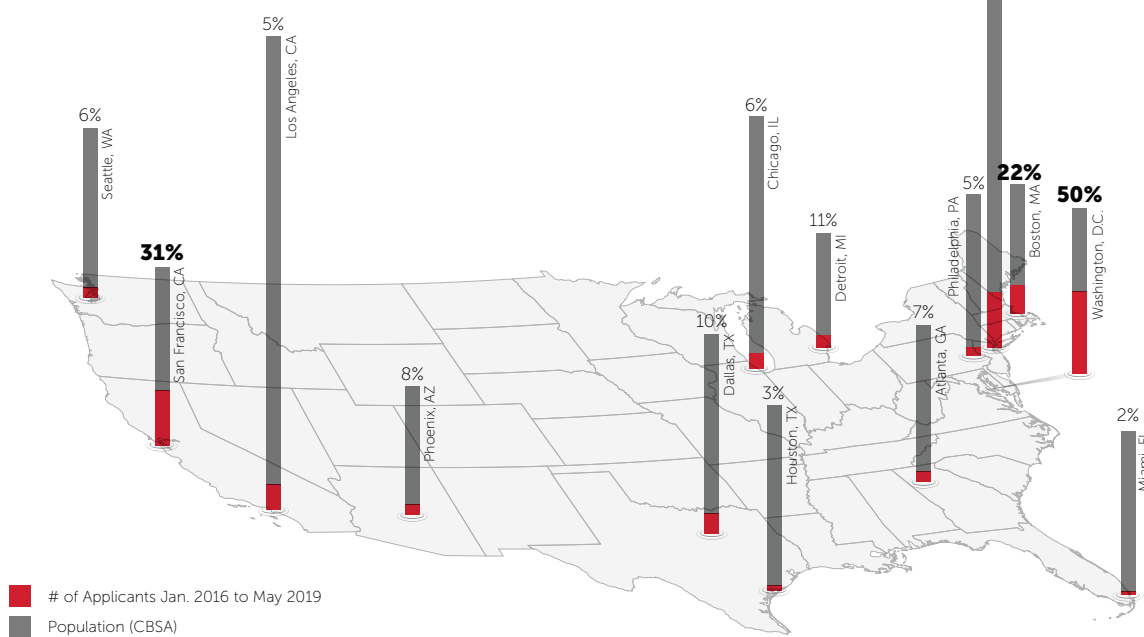
[2.2] Source from the hottest large, mid-sized and smaller cities for tech talent

While it is hardly surprising that the San Francisco to San Jose corridor hires the largest amount of tech talent, it is now closely followed by the greater New York City metro area.

Recommendation: Instead of promoting job openings based on your company’s physical location(s), begin your search by looking at where the talent is located. Source from the biggest concentration of tech talent, measured by the number of applicants as a percentage of total population, which is led by the D.C.–Virginia–Alexandria area, followed by Boston and Detroit. To attract remote workers, clearly state in the job title that you’re hiring remotely.

Major Markets (>4M population):

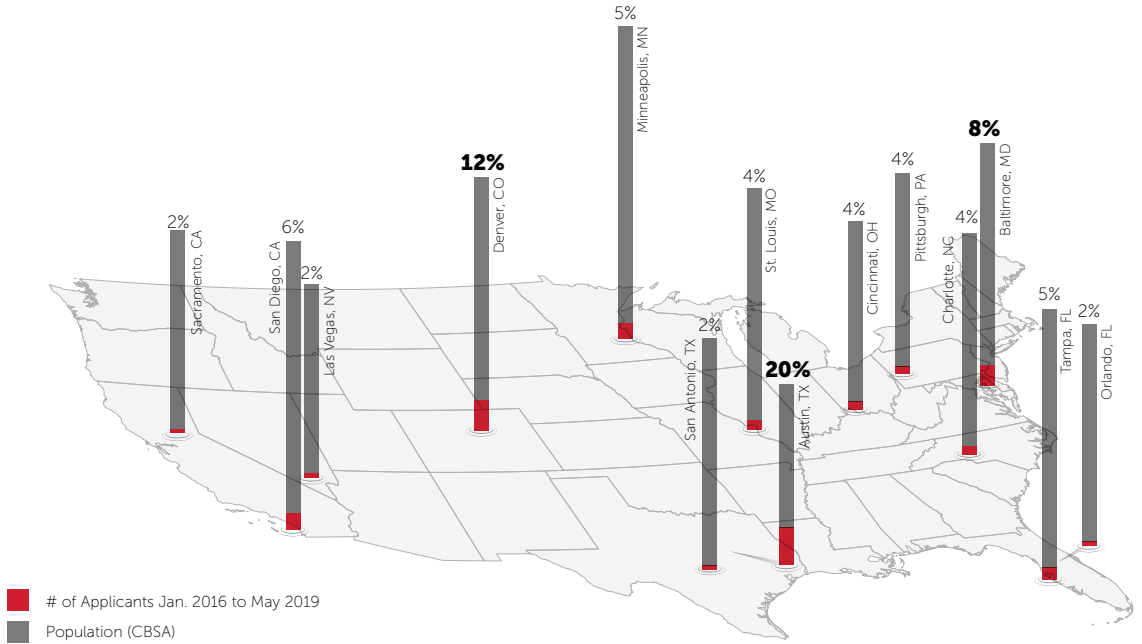
% of Population Applied to Tech Positions



For the mid-sized metro areas (2 million to 4 million population), Austin has the biggest concentration of tech talent, followed by Denver and the Baltimore–Columbia areas.

Mid-Sized Markets:

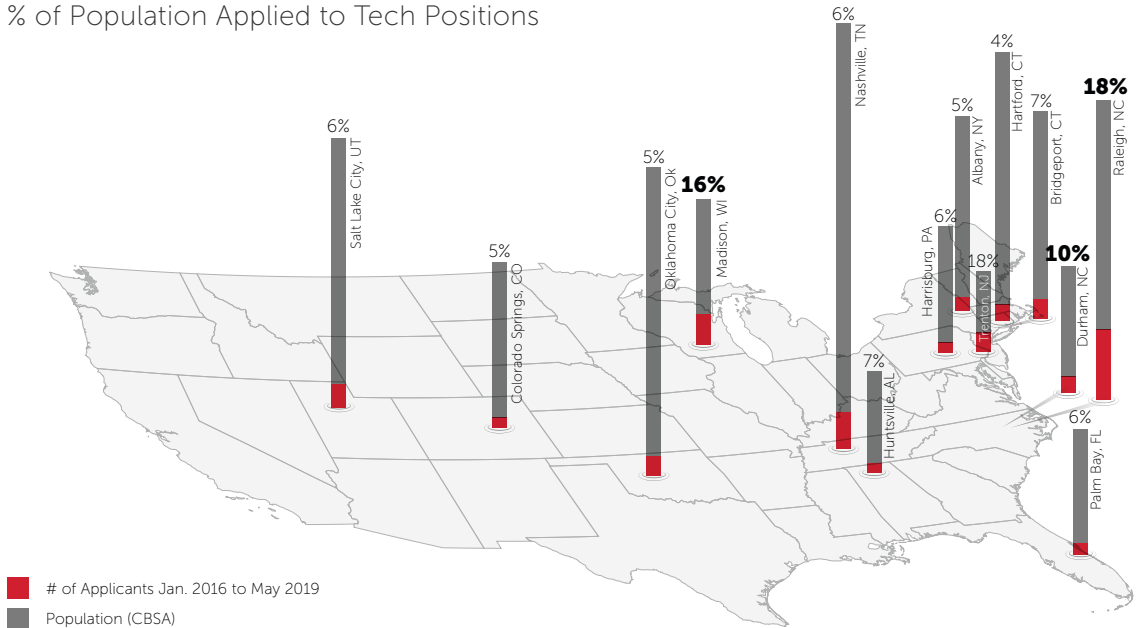
% of Population Applied to Tech Positions



In the population centers of between 500,000 to 2 million people, Raleigh, North Carolina; Madison, Wisconsin; and Salt Lake City provide the largest concentrations of tech talent.

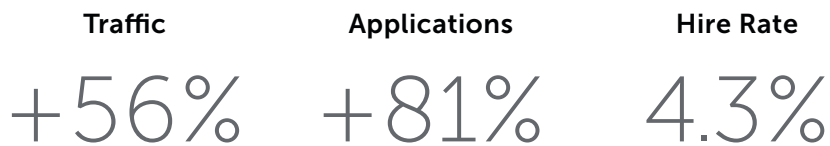
Small Markets:

% of Population Applied to Tech Positions



[2.3] Candidate sourcing is evolving. Create a Google recruitment strategy.

The following table compares the hires as a percentage of the number of complete applications, from the leading sources of talent. It shows where employers find their best-fit candidates.



2018 vs. 2019
(Jan 1 - Aug 31)

In the last 12 months, iCIMS' 4,000 customers have experienced more than a 50% year-over-year increase in candidates going directly to their career sites. This is an important change in how candidates find jobs. Google simplifies your candidates' application process by enabling job seekers to find the best-fitting roles faster. They just complete one application on the employer's career site and bypass any middlemen websites.

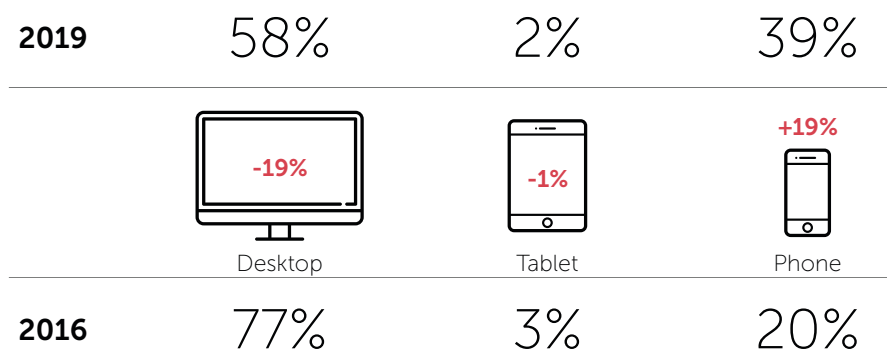
Recommendation: Optimize your career site for Google for Jobs by:

- 1. Establishing a direct link between your applicant tracking system and Google:**
This will ensure the search engine will detect and display your jobs as soon as they're posted to your company's career site. The jobs will be tailored to your candidate's specific interests, including location, salary, responsibilities and experience.
- 2. Getting granular with job descriptions:** The more information you provide, the better the ranking within Google's search results. Google for Jobs filters key criteria including salary, commute time and hours, so include your estimated salary range — which most employers do not include — as well as the company's exact address and typical hours expected for the role.

[2.4] Build your candidate engagement process for mobile phones

The number of candidates using mobile devices to apply has doubled in the last three years. In the first five months of 2019, 40% of all applications came from mobile phones.

Applications by Device



Recommendation: The easier the experience, the better chance a candidate completes your application. Provide mobile-optimized career portals, mobile-enabled job applications, automated communication and mobile recruiting applications. Engage your candidates with text messaging, which has a 87% open rate versus email where recipients open only about 18% of messages.

[2.5] Evolve your recruitment marketing approach

Despite the millions spent on advertising tech positions, according to our data, the most effective way – the biggest bang for your buck – is to engage candidates directly by nurturing talent pools; rewarding employee referrals and proactively identifying and engaging top targets.

Recommendation: Engage high-quality candidates directly by:

- 1. Fostering employee referral programs:** The most credible source of information about a company is, by far, from rank and file employees. Don't let them go to waste. Enable your tech employees to recruit by sharing their experiences with their professional networks on social media and reward them for doing so. Rewards do not need to be elaborate. A small bonus, team lunch, paid time off or even work-from-home days are inexpensive and effective. Provide employees with context for the roles you need filled. Instead of asking them to refer people to open roles on your product team, rather ask, "Who is the best software developer you know in, say, Austin, Texas?"
- 2. Investing in talent pools:** Create and stay engaged with a database of qualified people who have expressed interest previously, along with former employees and talent you've proactively identified. The key to success is staying top-of-mind by sharing company news and invitations to events. When it's time to start actively hiring candidates, send alerts to let your talent pool know about a position that is an ideal fit. The most effective recruiters share proprietary information to help engage top candidates.
- 3. Creating a dedicated career page for tech talent:** Your career site is the absolute best resource for candidates to obtain the information they need to quickly complete and submit a job application. In the same way a marketer displays only relevant products to consumers, deliver personalized experiences by creating unique career web pages to speak directly to your tech candidates based on role, team, level and opportunity.

Appendix

Since there are thousands of unique job titles in technology, all the roles are mapped to the governments' Standard Occupational Categories definition in order to compare like-to-like.

Standard Occupational Categories (SOC)	Responsibility
Application Software Developers	Develop applications software or specialized utility programs
Database Administrators	Administer, test and implement computer databases
Info Sys Research Scientists	Conduct research into information
Info Sys Security Analysts	Plan, implement and manage security to protect network and data
Network Architects	Design and implement LAN, WAN and other data networks
Network/Systems Administrators	Install, configure and support an organization's LAN, WAN or segment
Network/Systems Analysts	Analyze data to improve computer systems
Programmers	Create or test the code, forms and script that enable applications to run
System Software Developers	Design, develop and test operating software and network distribution software
User Support Specialists	Provide technical assistance to computer users
Web Developers	Design, create and modify websites

Methodology

iCIMS' system data is drawn from a database of more than 75 million applications and 3 million jobs posted per year by more than 4,000 customers. The company's customers represent a broad swath of the U.S. economy, with expansive geographic, industrial and occupational representation. This report draws from more than 25 million applicants to technology positions from Jan. 1, 2016 through May 31, 2019.

About the authors



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Keyur has more than 20 years of international experience leading IT teams focused on product management lifecycle, IT operations, digital transformation and cybersecurity for companies including AppDynamics, Secure Terrain and Deutsche Bank.



Adam Feigenbaum

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Adam joined iCIMS shortly after it was founded in 2000, and through a variety of leadership roles in sales and marketing, helped build the company into the world's leading best-in-class talent acquisition software provider enabling more than 4,000 companies to hire 4 million candidates annually.



Rhea Moss

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Rhea leads iCIMS' data science team and program, evaluating a database that processes more than 75 million applicants a year to provide tangible insights and best practices to clients.

About iCIMS

iCIMS is the leading recruitment software provider for employers to attract, engage and hire great people. Established in 2000, iCIMS supports 4,000 customers, including one in every six Global 1000 companies in the US, hiring 4 million people each year and is the largest software provider dedicated to talent acquisition. For more information, visit www.icims.com. ■