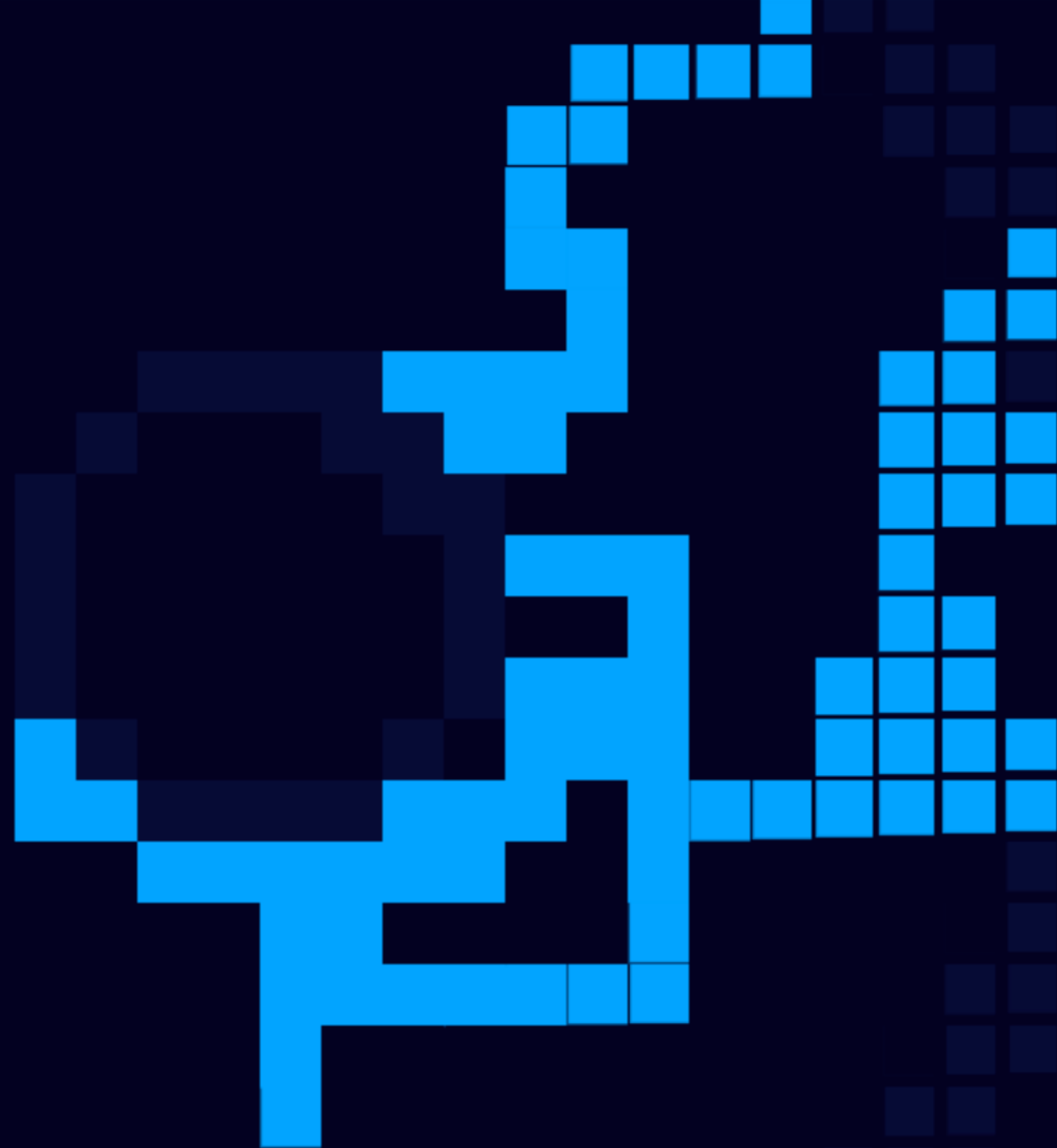


2020

# HackerRank Developer Skills Report

Insights based on 116,648 developers



## INTRO

At HackerRank, we have over 7 million developers in our community. That's over 25% of the world's developers who are using HackerRank to level up their coding skills.

We're fortunate to play a part in expanding and growing the developer community during this time of rapid change. Our mission at HackerRank is to help accelerate the world's innovation as more and more companies shift to tech-focused approaches to running and building their businesses. Since 2010, 22 newcomers have entered the Fortune 100—a seismic shift—driven largely by technical innovation. Since that time, tech-first giants like Amazon, Google, and Facebook have joined the list, and they're not slowing down.

As companies evolve to embed tech into the heart of their products, the need for skilled talent is growing exponentially. To meet that demand, companies will have to become experts in developer hiring—not by relying on developers' pedigrees or resumes, but by objectively evaluating their skills and placing them strategically throughout the organizations they work for.

To understand the state of developer skills in 2020, we're launching our third annual Developer Skills Report: the largest survey of its kind ever released. We asked for input on coding bootcamps, pay equity, and more—and over 116,000 developers from 162 countries responded. The data provides unparalleled insight into what employers and employees know, what they're looking for in their work, and how they see their roles evolving as technology sweeps across industries of all sizes.

I hope you enjoy our findings. Please feel free to tweet us [@hackerrank](https://twitter.com/hackerrank) or email us at [research@hackerrank.com](mailto:research@hackerrank.com) with comments or questions.



Vivek Ravisankar  
Co-founder & CEO  
[HackerRank](#)

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## LEARNING &amp; EDUCATION

# For learning to code, C is overtaking BASIC

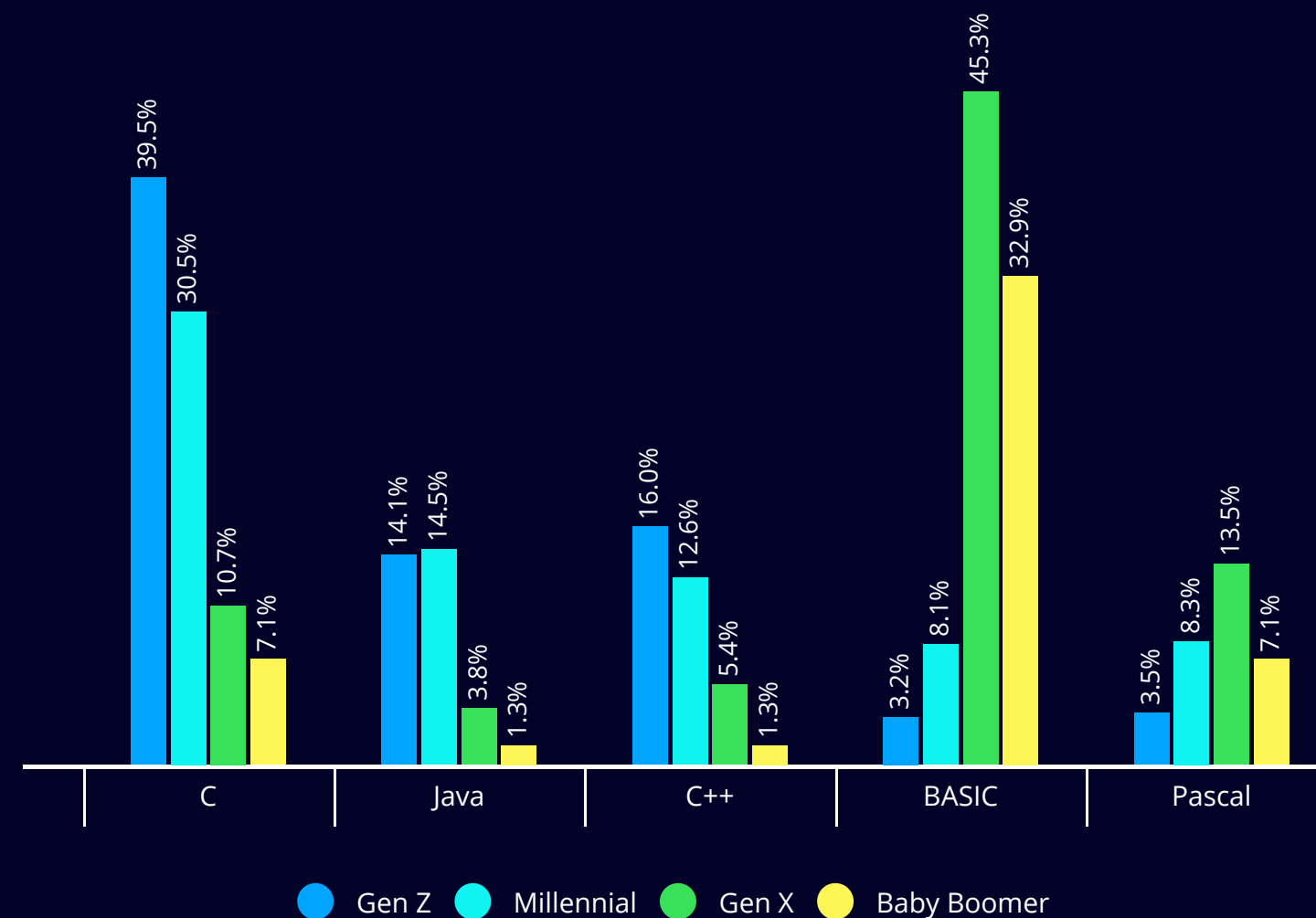
Under the age of 39? Odds are that most of your peers learned to code in C.

Most Baby Boomers and Gen Xers—or, those between the ages of 40 and 74 in 2020—learned to code in BASIC. Developed for educational use in 1964, BASIC was a popular instructional language in college classrooms.

But that began to change in 1972, when Bell Labs invented C, allowing portability of the Unix operating system. Though it wasn't an instant hit, the language rose to popularity in the late 70s and early 80s alongside the growth of Unix.

Today, the language is celebrated for its longevity, flexibility, and ease of use—just some of the reasons it's still popular for Gen Zers learning to code today.

What was the first language you learned to code in?



# Gen Z is utilizes bootcamps to learn new skills

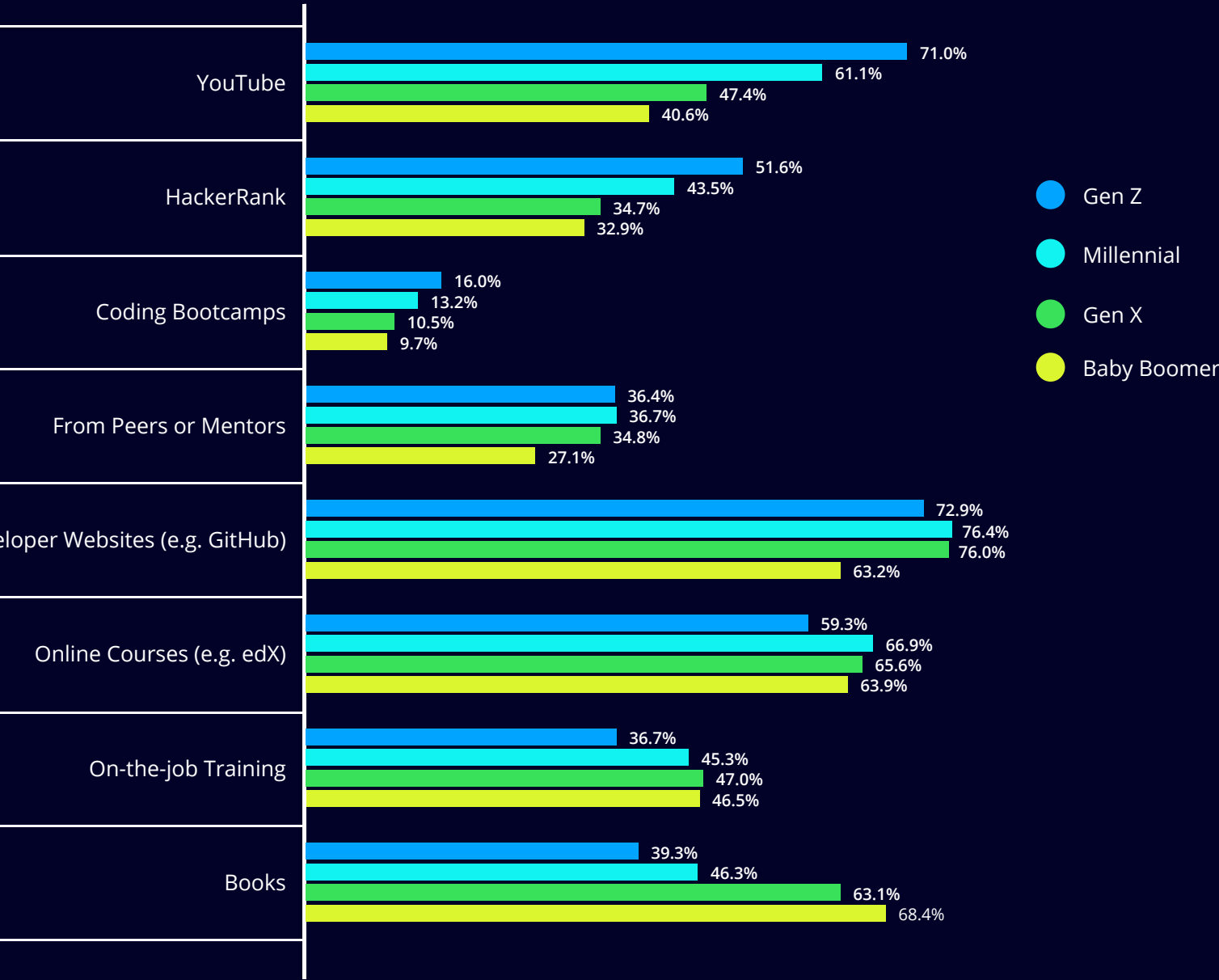
Gen Z is more likely than any previous generation to learn coding skills from bootcamps. Nearly one in six say they’ve leveraged bootcamps to learn new skills.

On the flip side, they’re less likely to learn coding skills from older generations’ go-tos, like books and on-the-job training. As Gen Z comes to rely more heavily on non-traditional education sources like bootcamps, they’re poised to become a key talent pool.

So which coding bootcamps are they turning to? Among respondents, the most commonly attended bootcamps were:

- Codeworks
- AppAcademy
- Hack Reactor
- Coderhouse
- Byte Academy

How do you learn new coding skills?



## LEARNING &amp; EDUCATION

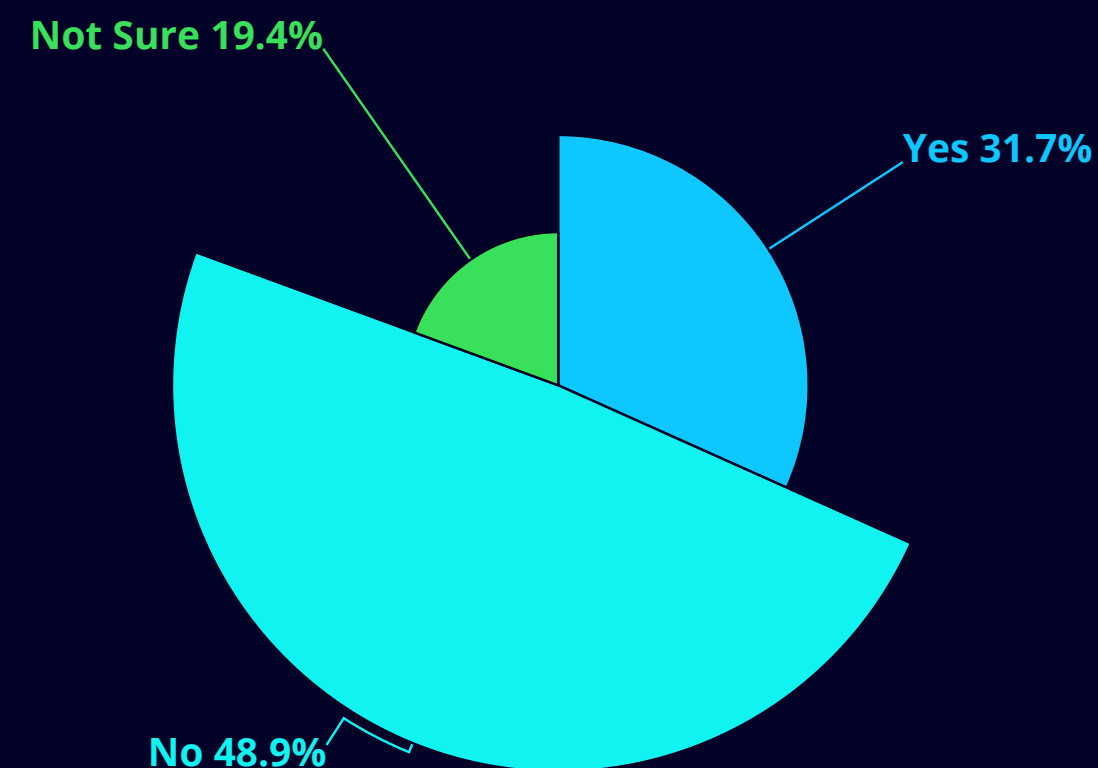
## Nearly 1 in 3 hiring managers have hired a bootcamp grad

Hiring managers are bringing on bootcamp grads: 32% of them have hired a developer who learned their coding skills from a bootcamp.

But not all hiring managers have tapped into this growing talent pool. Nearly half (49%) of hiring managers have never hired a bootcamp grad. Results were similar across all company sizes.

As younger generations are increasingly drawn to bootcamps, that mentality may have to change. Gen Z is more likely than previous generations to learn coding skills from a bootcamp, while bootcamp attendance rates have [risen 11x](#) over the last decade. Combined, it's a signal that bootcamp grads are slated to grow in number—and may grow as a talent source as time goes on.

Have you hired a developer that learned their coding skills from a bootcamp?



## LEARNING &amp; EDUCATION

## And hiring managers believe they're well-suited for the work

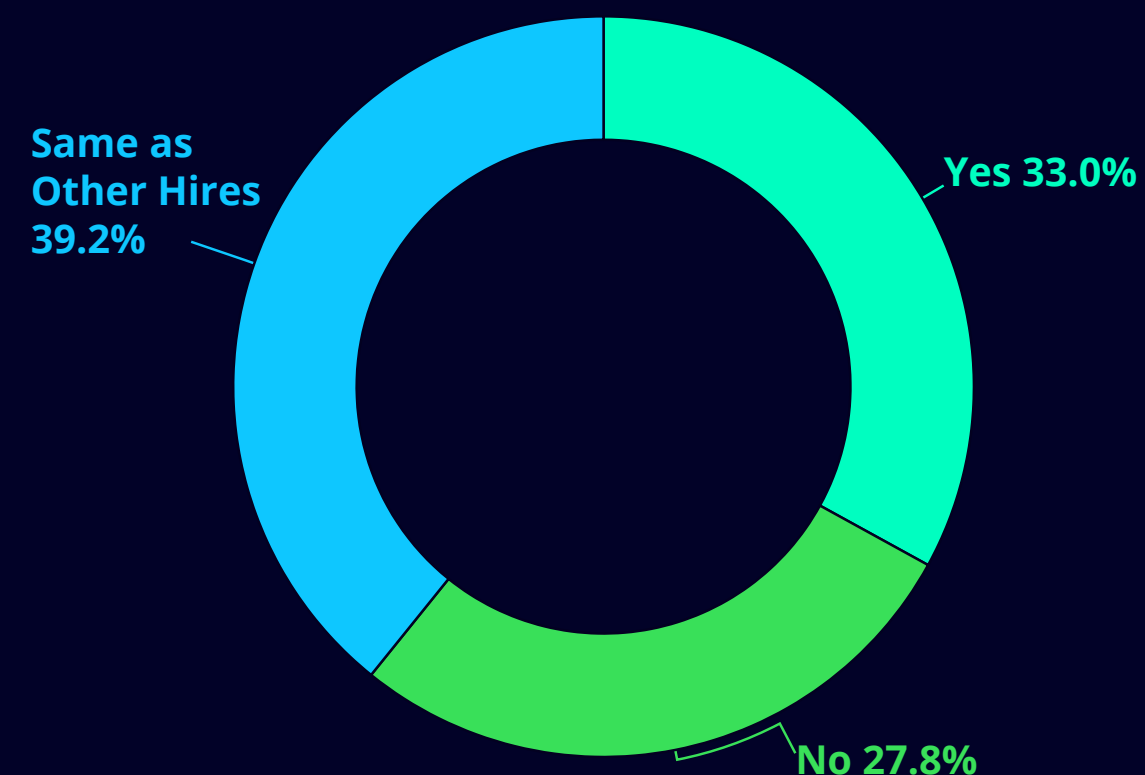
Hiring managers that bring on bootcamp grads reap the benefits.

In fact: 72% of hiring managers that have hired a bootcamp grad felt they were equally or better equipped for the job than other hires. According to managers, the top reasons bootcamp grads exceed are:

- Ability to learn new technologies & languages quickly (71%)
- Strong practical experience (61%)
- Eager to take on new responsibilities (52%)

It's a strong endorsement for this fast-growing form of coding education. While the first coding bootcamps emerged in 2011, their popularity has exploded over the course of the decade. [A recent study](#) counted 20,000+ bootcamp graduates in 2019 from 110 full-time programs—and that's just in the United States (US) and Canada.

Do you find bootcamp grads are better equipped for the job than other hires?



## LEARNING &amp; EDUCATION

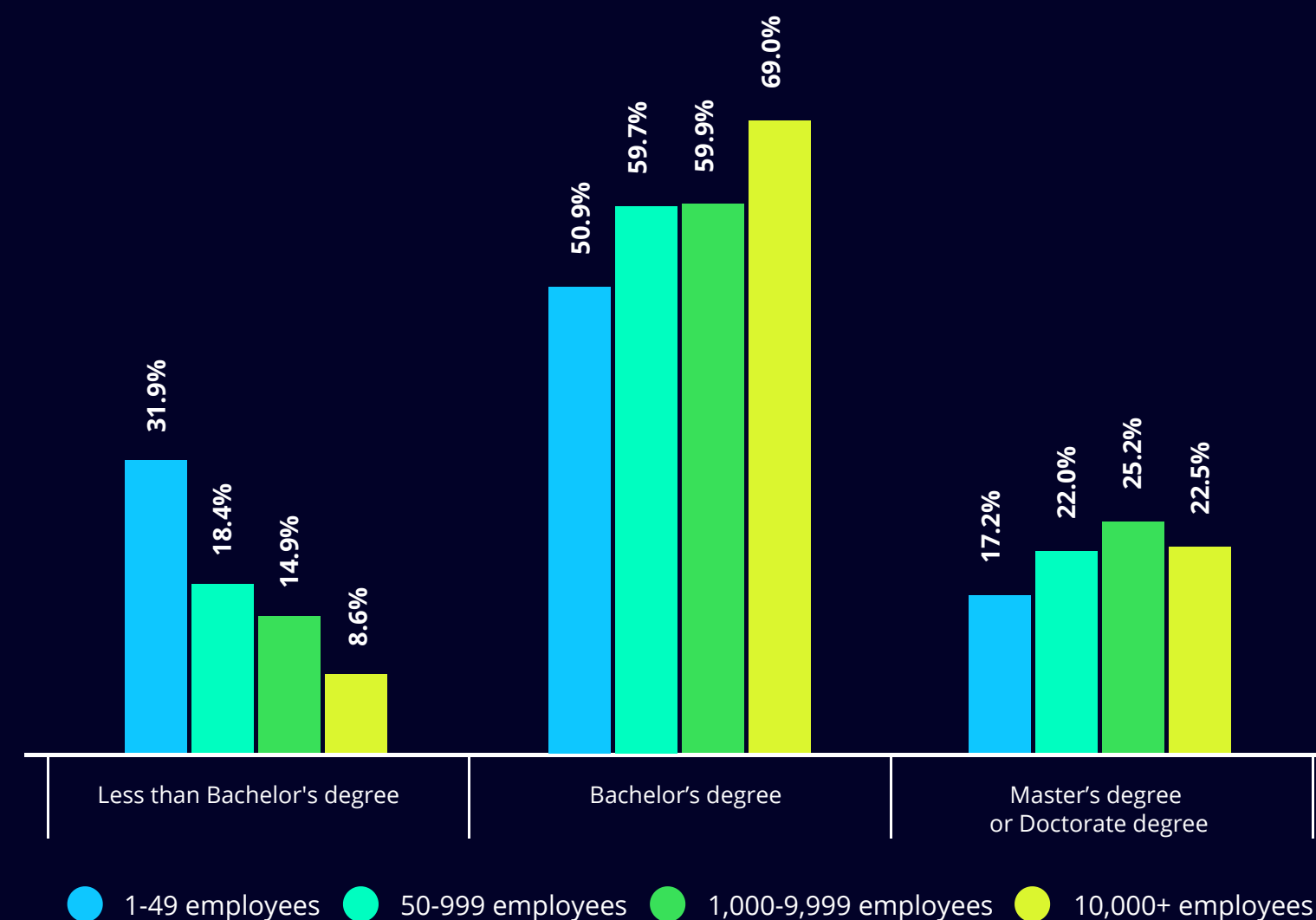
## Small companies are most likely to hire developers without a degree

Tech hiring giants like Google, Apple, and IBM have famously lifted their 4-year degree requirements. But for hiring developers without degrees, it's small companies that are leading the charge.

32% of developers at small companies (1-49 employees) haven't obtained a Bachelor's degree. It's a stark contrast to large companies (10,000+ employees); there, 91% of developers have obtained a Bachelor's degree or higher, while only 9% have not.

It's a win for small companies, and should be seen as an opportunity for larger companies to tap into a broader talent pool.

What is the highest level of education you've completed?





## IN-DEMAND SKILLS

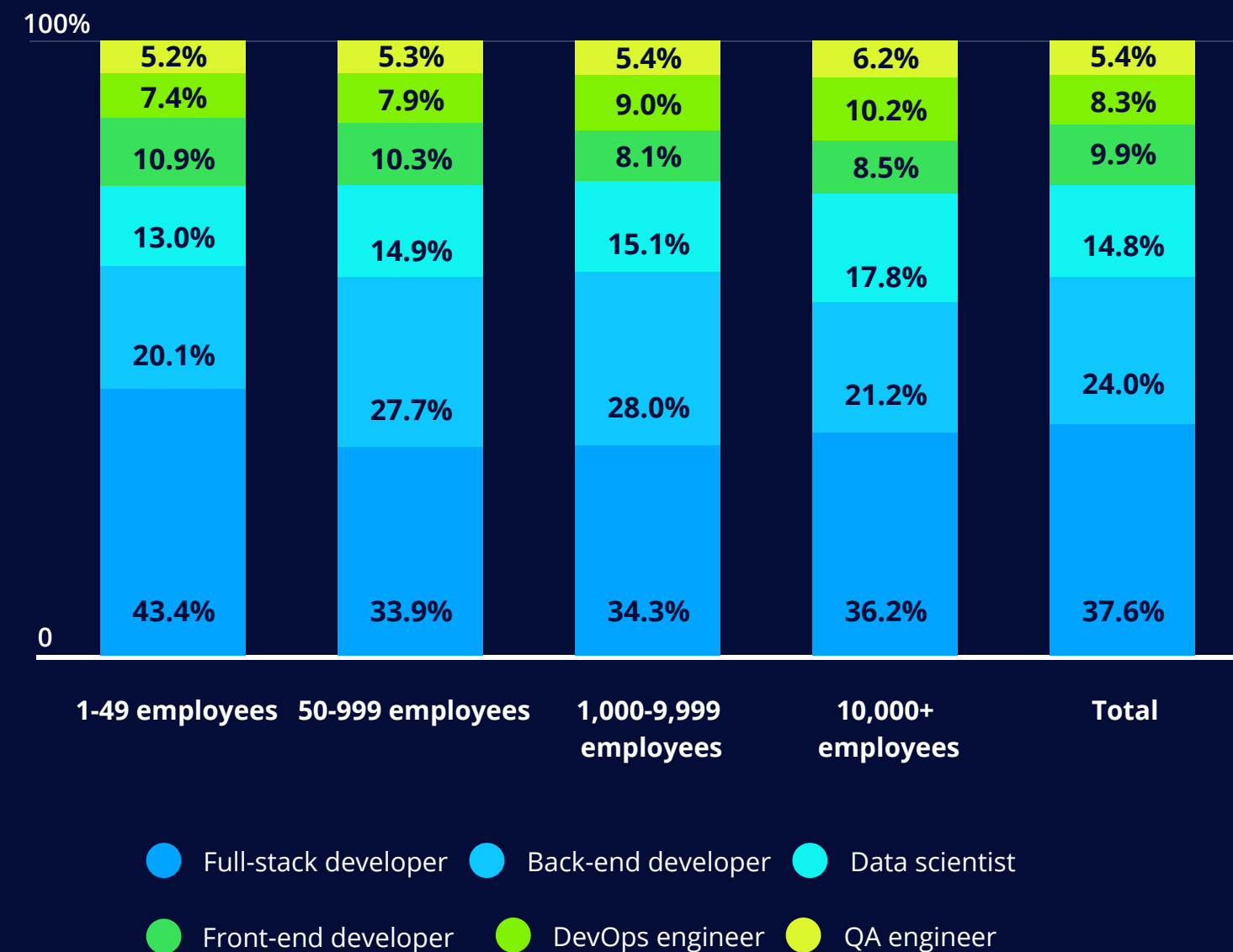
# 2020's most in-demand talent pool: full-stack developers

Across company sizes, hiring managers agree that full-stack developers are top priority: 38% of hiring managers say it's the #1 role to fill in 2020. Back-end developers and data scientists were ranked second and third priorities, respectively.

The emphasis on full-stack developers was most pronounced in small companies (1-49 employees), 43% of which ranked the role as their top priority.

Though the qualities that define a "full-stack developer" are a [subject of debate](#), most agree that they should have a basic understanding (or better) of all layers of a tech stack, and should be able to generate a minimum viable product on their own. It's why they're especially important in small organizations, where fewer employees often have to do the job of many.

What's the most important role you're looking to fill in 2020?



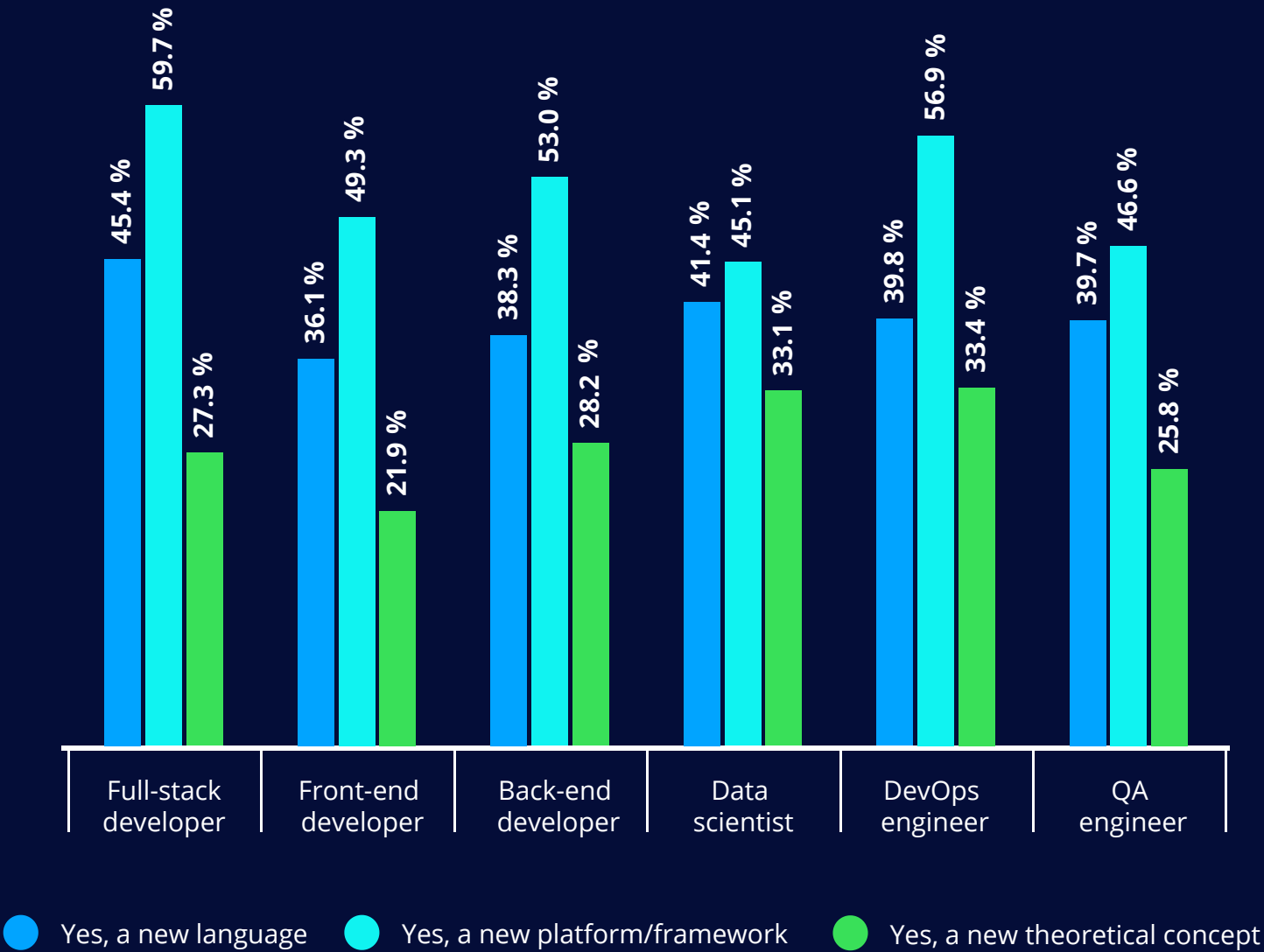
# Full-stack developers are required to learn new skills most often

Full-stack developers may be in highest demand, but their role is also one of the most professionally demanding. 60% of full-stack developers were required to learn a completely new framework or platform in the last year—more than any other role polled.

Full-stack developers also have to learn the most languages: 45% reported that they had to pick up a new one within the last year. Their peers have to learn more about theoretical concepts; data scientists and DevOps engineers were required to learn new concepts most often (33%).

With expertise that spans front-end, back-end, and more (depending on whom you ask), full-stack developers have one of the more nebulous job descriptions in the technical world. The relative flexibility of their role—and the breadth of technologies they have to keep up on as a result—means learning on the job never stops.

Did your job require you to learn a new technical skill in the last year?



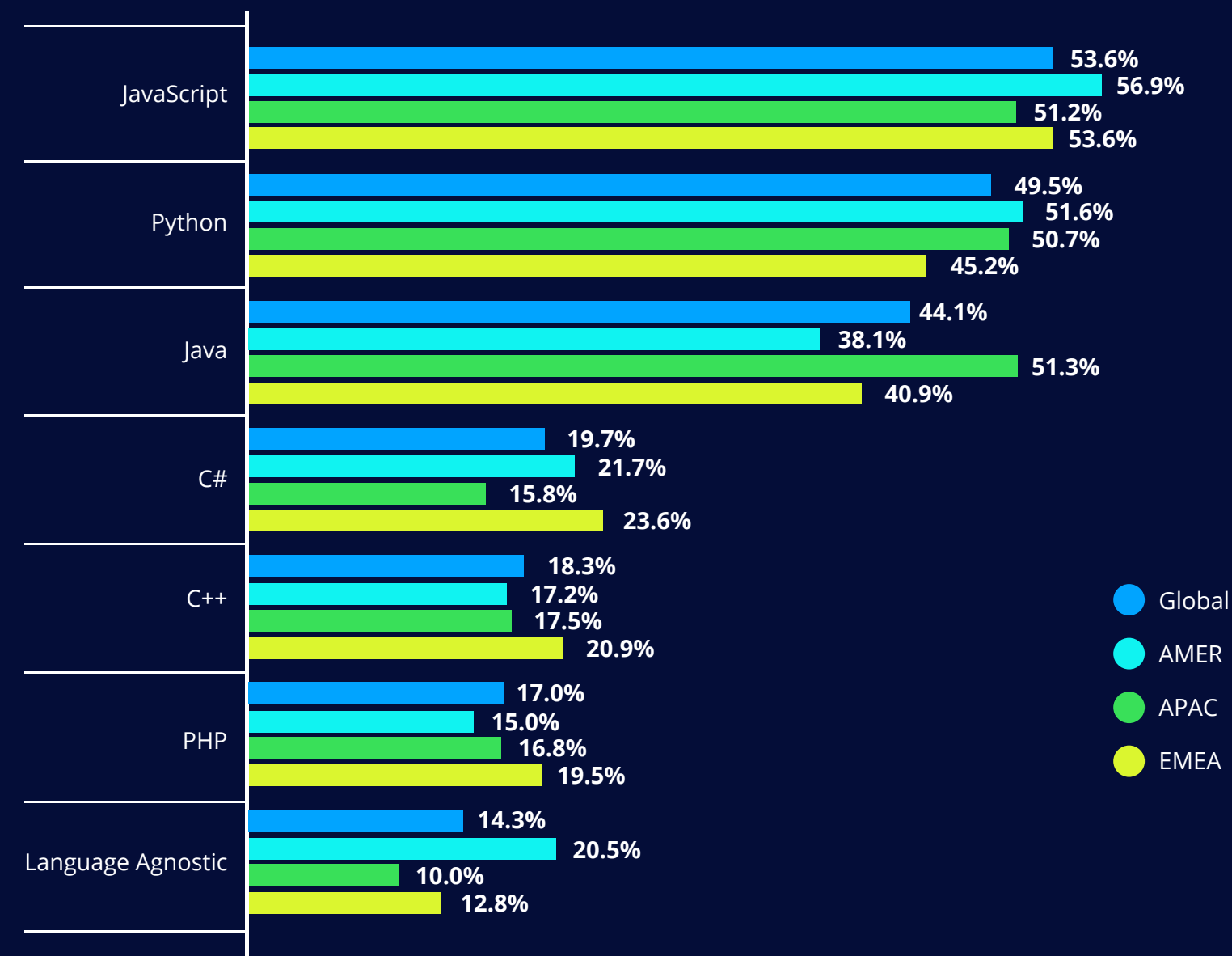
## IN-DEMAND SKILLS

# 1 in 5 hiring managers in the Americas are language agnostic when seeking new hires

Globally, JavaScript is the most popular language hiring managers look for in a candidate. But not all hiring managers see language skills as a top priority: globally, 14% say they're language agnostic when screening candidates.

This trend is most pronounced in the Americas region (AMER): 21% of hiring managers in the region are language agnostic when searching for new hires. Asia-Pacific region (APAC) hiring managers are half as likely to be language agnostic (10%).

What language skills do you look for when hiring developers?



## DEVELOPER TOOLS

# JavaScript is this year's most widely known language (again)

In terms of most known languages, little has changed over the last three years. In fact, the top 10 languages saw only two changes from last year: C# and PHP switched between sixth and seventh position.

It's worth noting that the best known language, JavaScript, isn't a language most developers learn to code in—only 5% of respondents reported it as their first programming language. Java follows a similar pattern: it's the second best known language overall, yet only 13% of developers say it was their first language learned.

## Best known languages: 2018-2020

		2020	2019	2018
JavaScript		1	1	2
Java		2	2	1
C		3	3	3
Python		4	4	5
C++		5	5	4
C#	▲	6	7	6
PHP	▼	7	6	7
TypeScript		8	8	8
Pascal		9	9	9
R		10	10	10

## DEVELOPER TOOLS

## Django and Vue.js are rising steadily

This year, the framework landscape was as dynamic as last year, with five total changes across the top 10.

Since our first Developer Skills Survey, Vue.js, has shown steady growth, rising one spot per year since 2018. But the most dramatic change was for Django, which moved up two spots between 2019 and 2020 (rising from sixth to fourth most popular).

Django's lift in usage is inextricably linked to the rise of Python. A popular choice for machine learning and artificial intelligence (AI), Python saw an uptick in usage in 2019, and has consistently been ranked as one of the top languages that developers want to learn year over year. And since Django is a Python-based framework, it's natural that Django would rise alongside it.

### Best known frameworks: 2018-2020

		2020	2019	2018
AngularJS		1	1	1
React		2	2	3
Spring		3	3	2
Django	▲	4	6	6
ExpressJS	▼	5	4	4
ASP	▼	6	5	5
.NETCore		7	7	7
Vue.js	▲	8	9	10
Ruby on Rails	▼	9	8	8
JSF		10	10	9

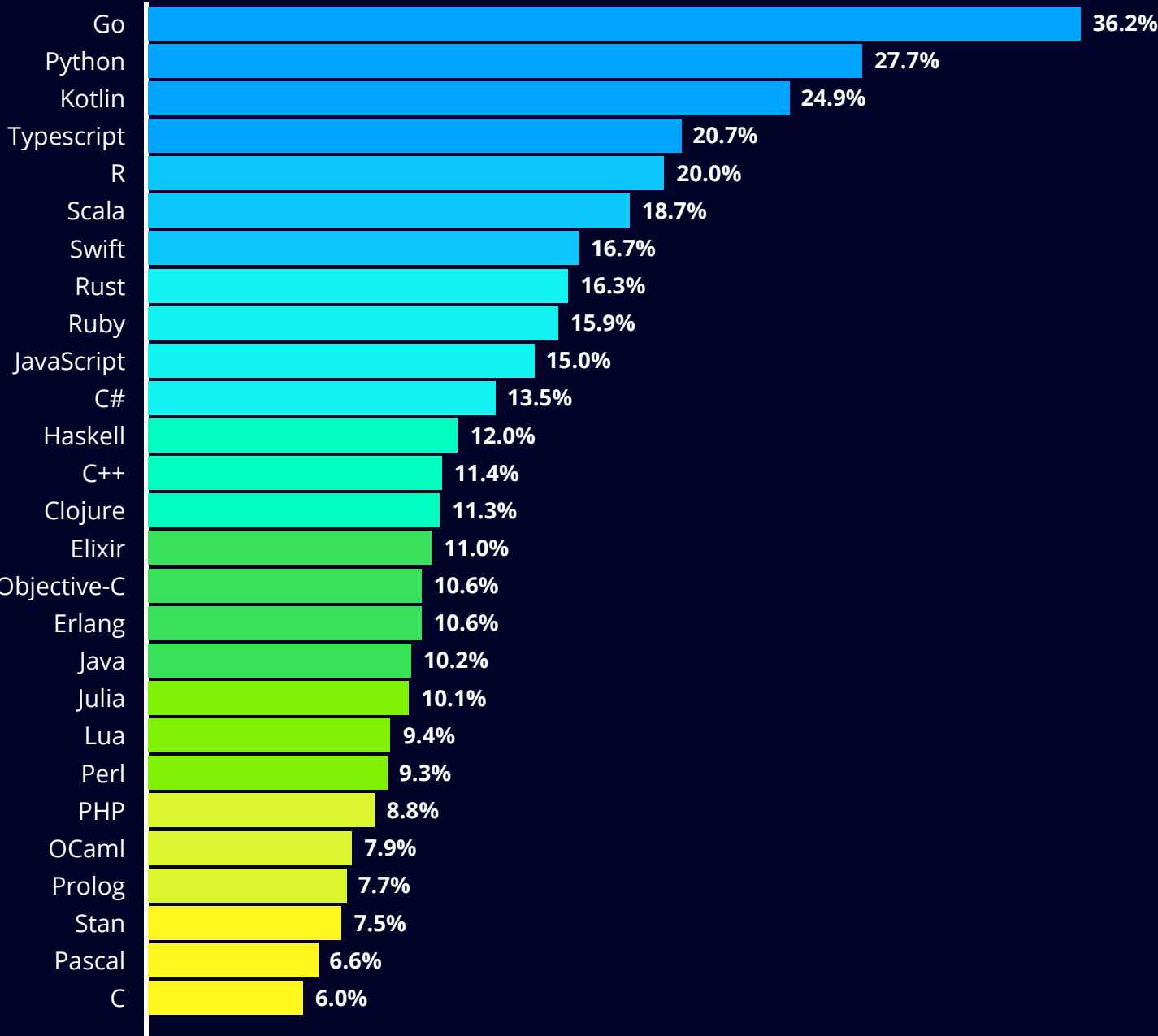
# Go is the #1 language developers want to learn

For the third year running, Go is the #1 language developers want to learn next.

Developed by Google, Go has seen increasing popularity since its invention in 2009, due in part to the visibility of its creators. As we noted [in our 2018 report](#), it's not the first time tech giants like Google have driven language adoption: Twitter similarly boosted Scala when it outgrew Ruby on Rails, as Apple did for Swift when it moved away from Objective-C.

And slowly but surely, developers are learning Go. It inched up to the 12th best known language for 2020, up from 13th in 2018.

What languages do you plan on learning next?



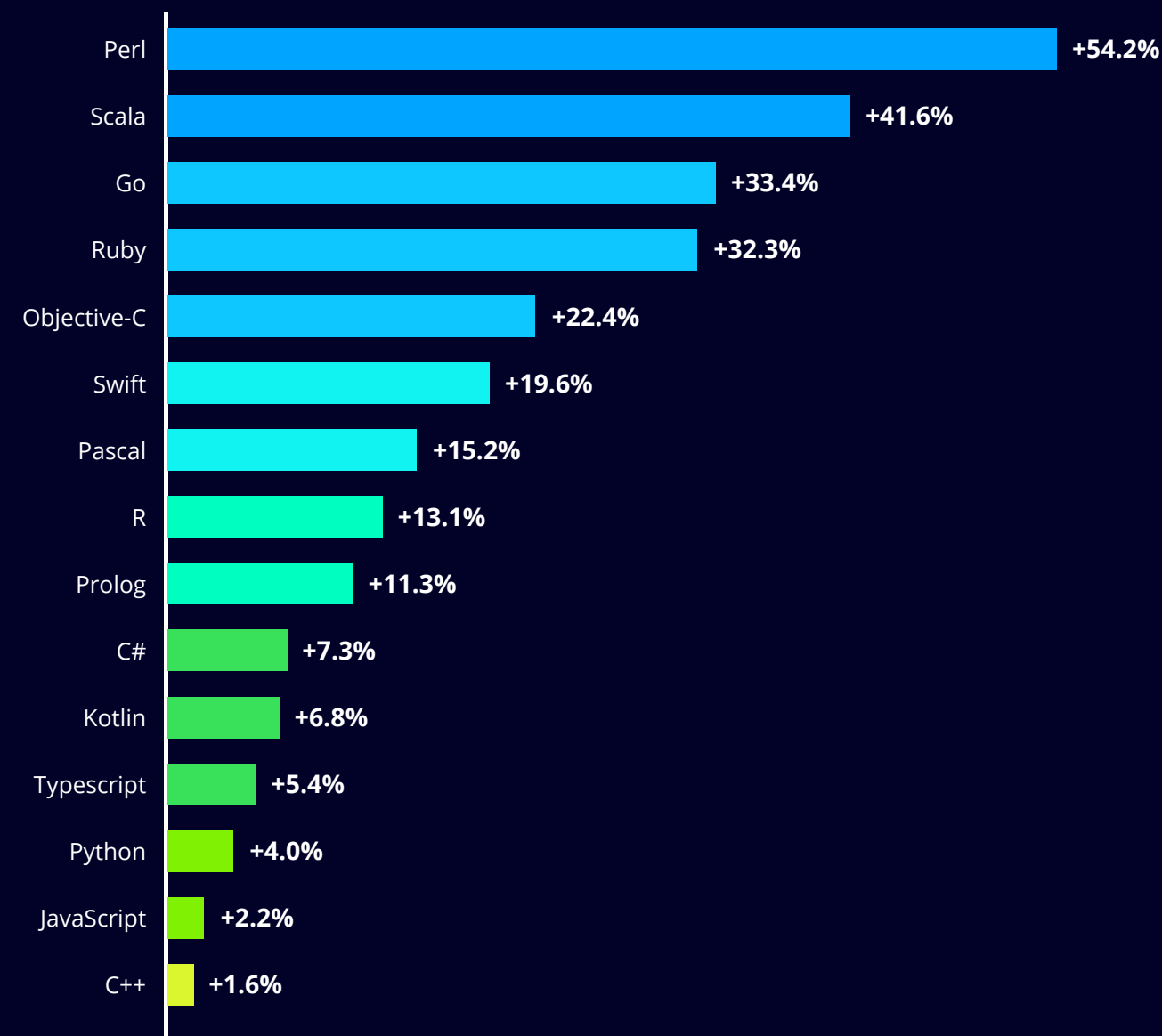
## DEVELOPER TOOLS

# Those that know Perl make 54% more than the average developer

Perl is the language most closely associated with above-average pay. Globally, developers that know Perl make 54% more than the average annual developer salary. It's followed by Scala (+42%), and Go (+33%).

The high pay association with languages like Perl, Scala, and Go is due in part to the demographic that knows them. For example, about 10% of senior developers polled knew Perl—but only 2% of junior developers did. Scala and Go showed similar patterns. And since senior developers tend to earn higher salaries, the average salary associated with each language is elevated.

Salary increase based on languages known  
Over global average salary (\$54,491 USD)



## DEVELOPER TOOLS

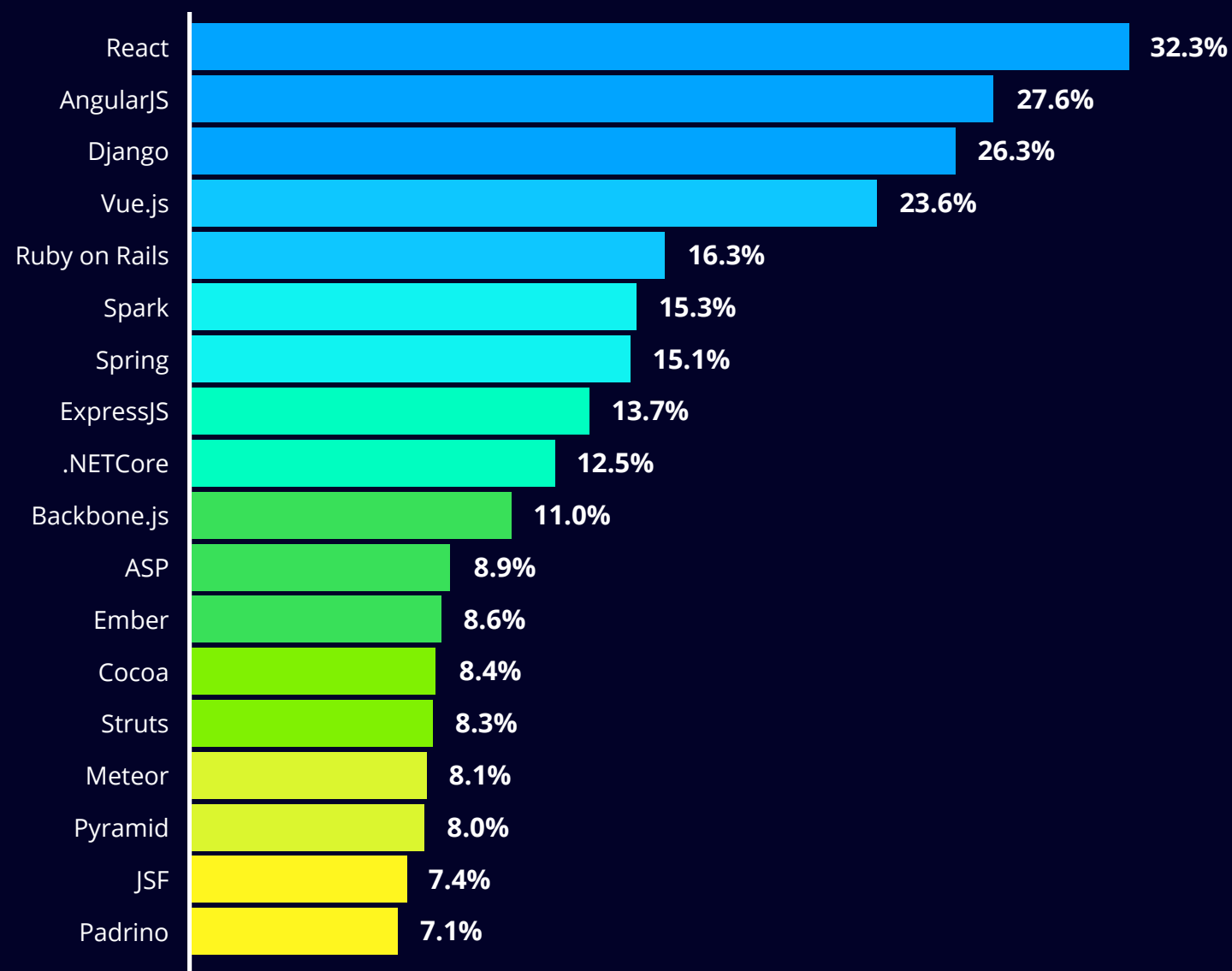
# Developers are learning React, AngularJS, and Django

React is the framework most developers want to learn—32% say it's the framework they're learning next.

AngularJS and Django round out the top 3: 28% say they plan to learn AngularJS, and 26% say they're learning Django. All three frameworks are in the top five that hiring managers need.

Last year, we noted that [an increasing number of developers](#) were planning to learn React—and that as a result, it had a chance to become the best known framework in 2020. But in this year's survey, React's position remained static as the second best-known framework.

Which frameworks do you plan on learning next?





## But globally, Backbone.js is associated with the highest pay

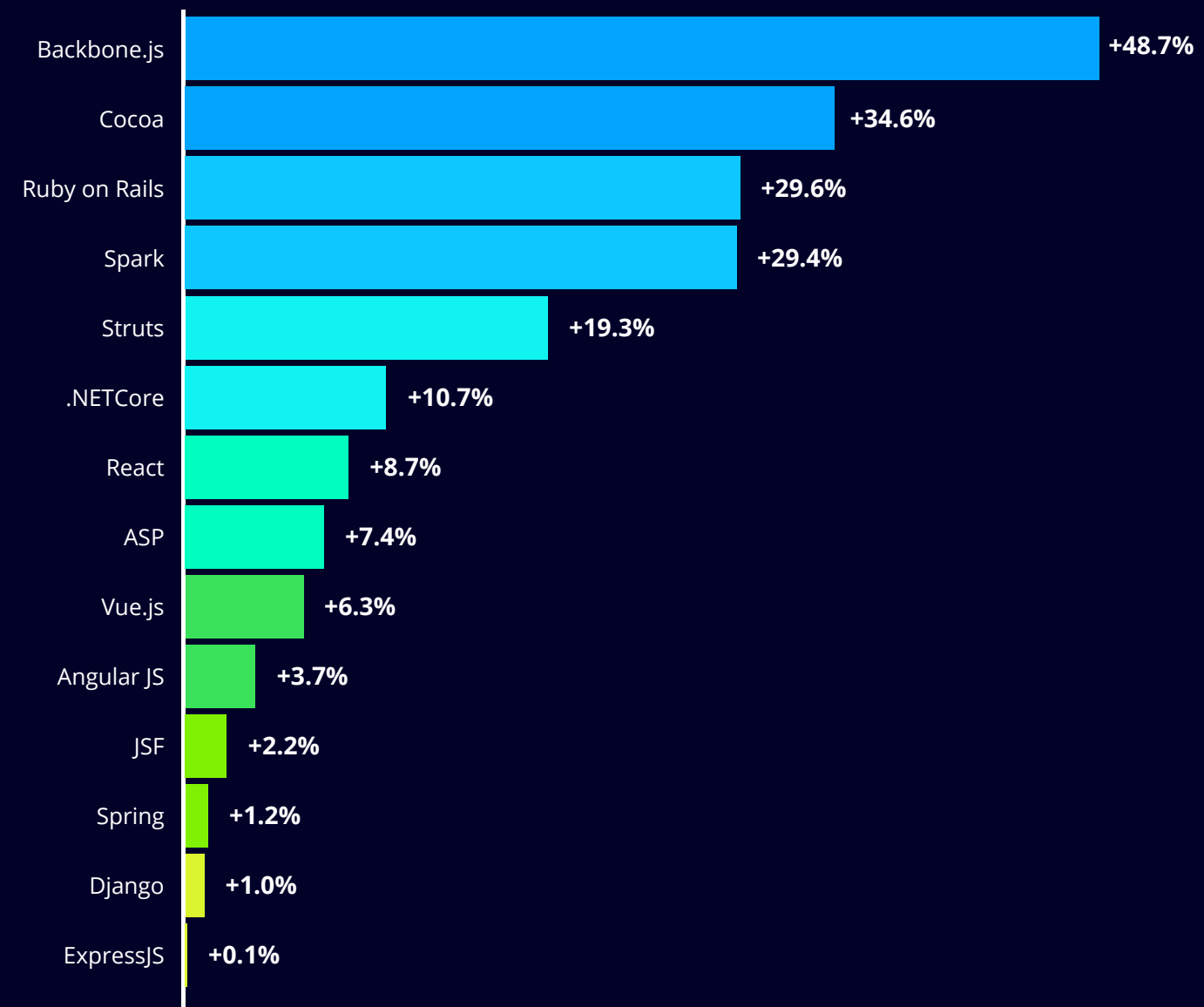
Backbone.js is the framework associated with the highest pay: developers that know it earn 49% more than the global average.

Cocoa and Ruby on Rails were linked to the second and third highest average salaries. Those that know Cocoa earn 35% more than the global average, whereas those that know Ruby on Rails earn 30% more than the global average.

Again, the association with higher pay is tied in part to seniority. Take, for example, Backbone.js. 7% of senior developers know it, compared to only 2% of junior developers. And since senior developers earn higher pay, it could elevate the average pay linked to the framework.

It's worth noting that Backbone.js is also an uncommon skill—globally, only 4% of developers know it. So the low knowledge supply may allow those that know it to demand higher pay.

Salary increase based on frameworks known  
Over global average salary (\$54,491 USD)

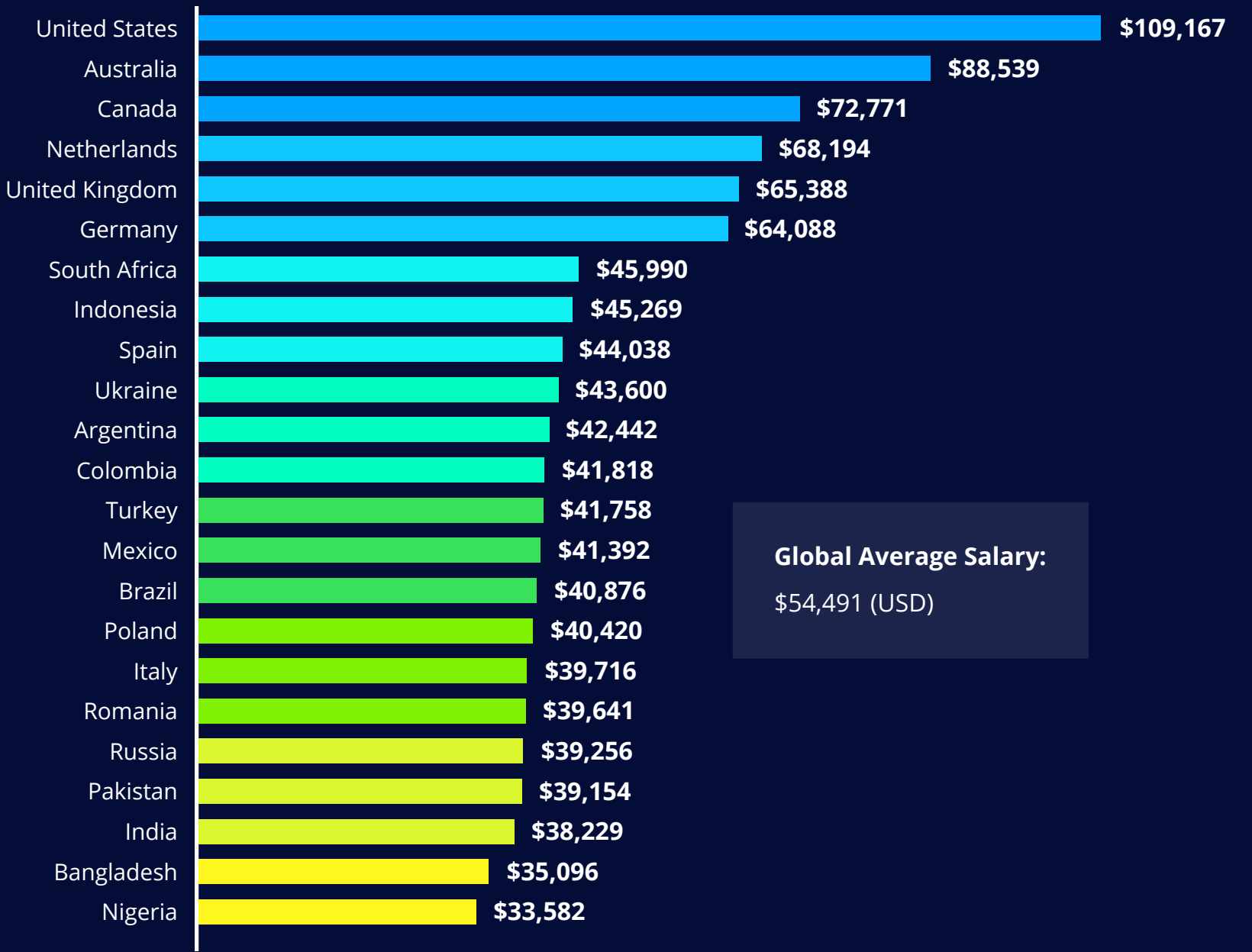


# US developers make more than those in any other country

Averaged across all job roles and levels, US developers are paid the most: developers there make \$109,167 annually on average.

Australia and Canada were the next highest paying countries, with average developer salaries of \$88,539 and \$72,771, respectively. The Netherlands and the United Kingdom rounded out the top five highest paying countries.

## What is your current salary?



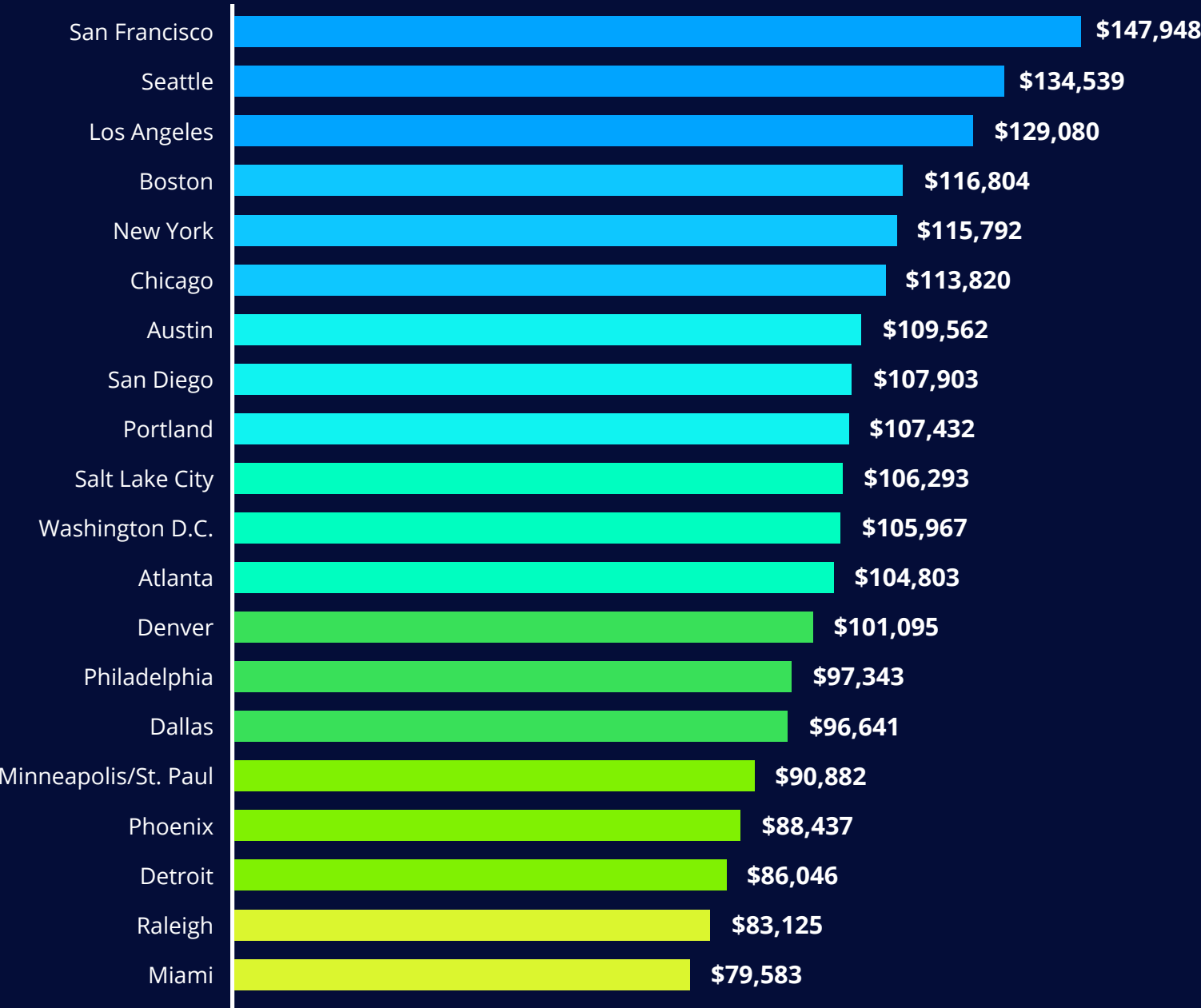
# The west is the highest paying region in the US

Taking a closer look at the US, western cities take the cake for highest developer salaries. Cities in the west have the highest pay (with an average salary of \$128,198), while the northeast comes in second (with an average salary of about \$112,871).

High salaries in the west region are led by coastal tech talent magnets like **San Francisco (\$147,948)**, **Seattle (\$134,539)**, and **Los Angeles (\$129,080)**, which make up the three highest paying cities in the region. And in the northeast, **Boston (\$116,804)** and **New York (\$115,792)** pay the highest salaries.

- **West Average:** \$128,198
- **Northeast Average:** \$112,871
- **Midwest Average:** \$100,711
- **South Average:** \$98,986

Average developer salary by US metro area



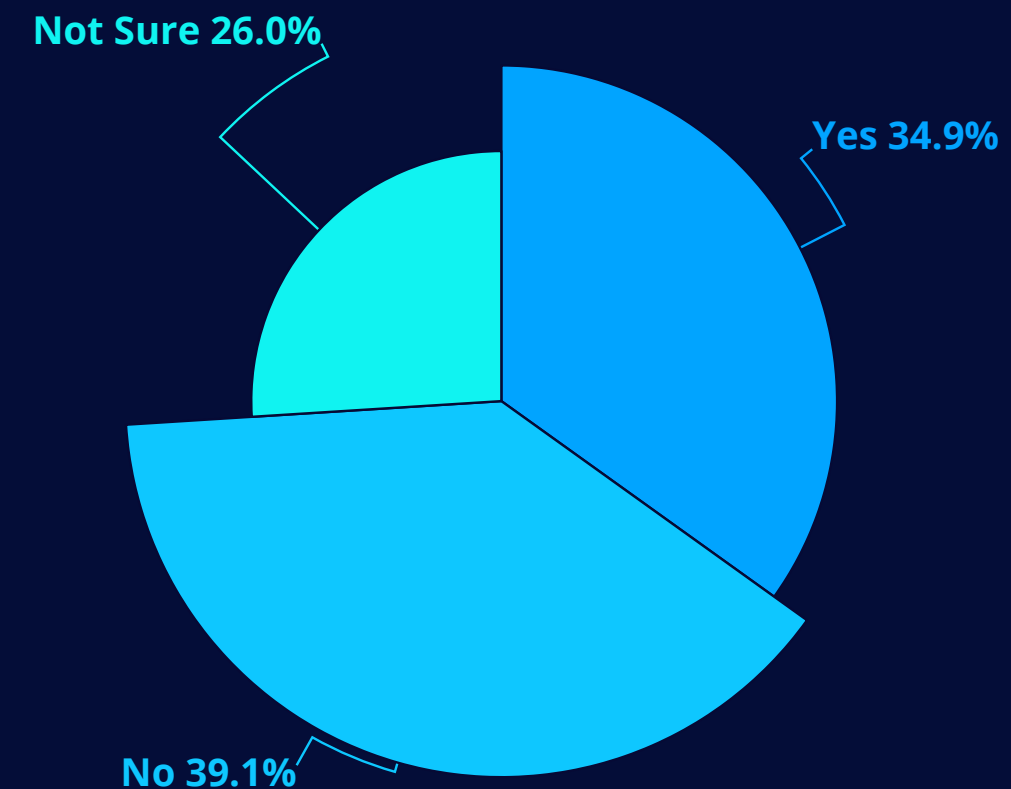
## DEVELOPERS AT WORK

## Globally, 39% of developers feel they're paid unfairly

Only 35% of developers believe they're being paid fairly. On the flip side, 39% believe they're being paid unfairly compared to peers, and 26% just aren't sure.

As sharing salaries has become the norm through websites like Glassdoor and LinkedIn, developers have gained unprecedented access to peer salary estimates. In many ways, that shift is a positive one; it gives developers the ammo they need to negotiate pay aligned with their fair market value. But it also means developers are more aware when their pay differs from that of their peer group.

Do you believe you're being paid fairly compared to your peers?



## DEVELOPERS AT WORK

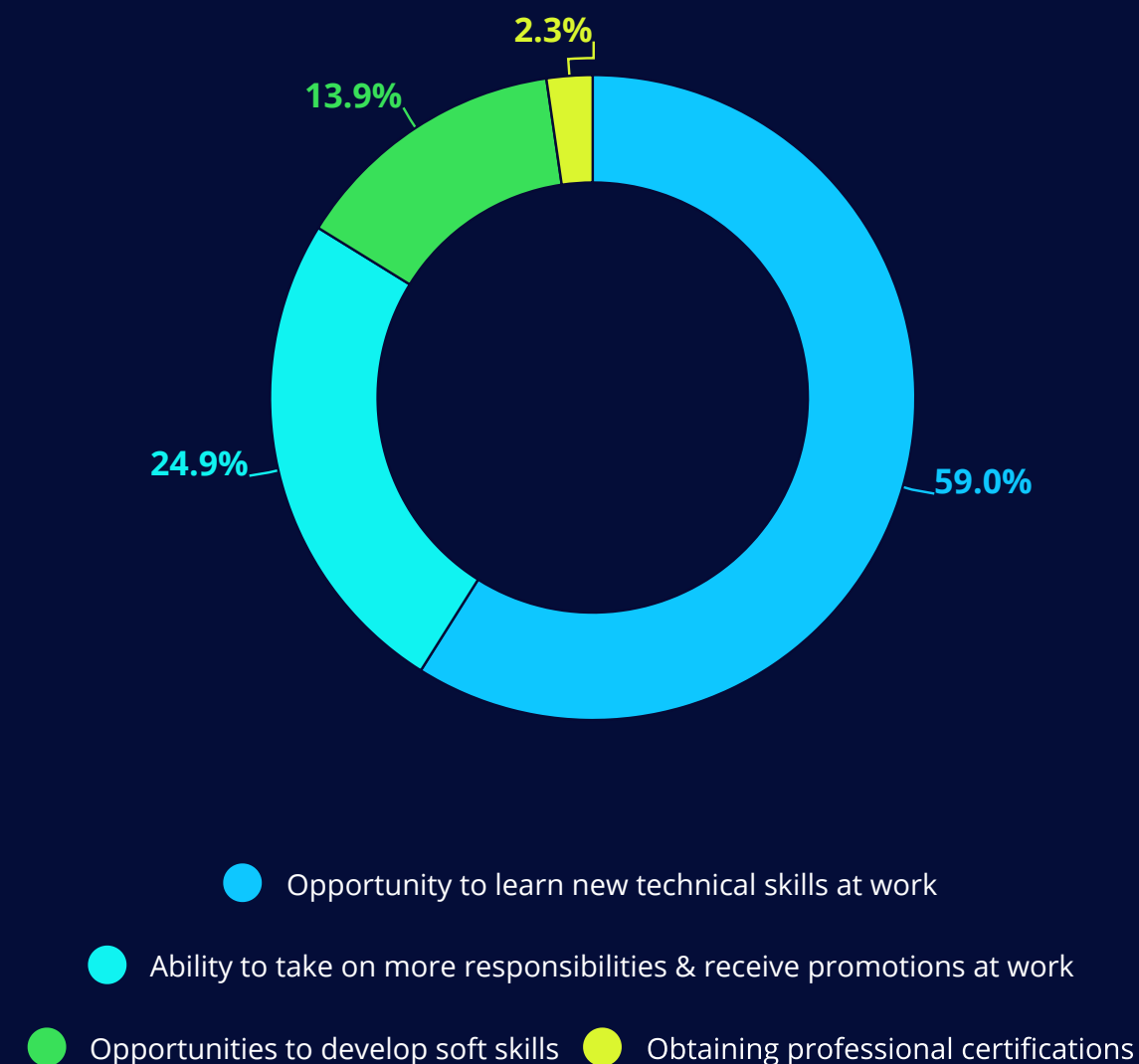
## The most important form of professional growth: new tech skills

Last year, we learned that competitive compensation is the #3 criteria developers look for in a job—but professional growth and learning is #1. This year, we asked developers to define the form of professional growth that's most important to them.

Most developers agree: they want opportunities to learn new technical skills on the job. A whopping 59% of developers ranked it as the most important form of professional growth.

It was twice as important as the ability to take on new responsibilities, and more than 4x more important than chances to develop soft skills.

What form of professional growth is most important to you?



## DEVELOPERS AT WORK

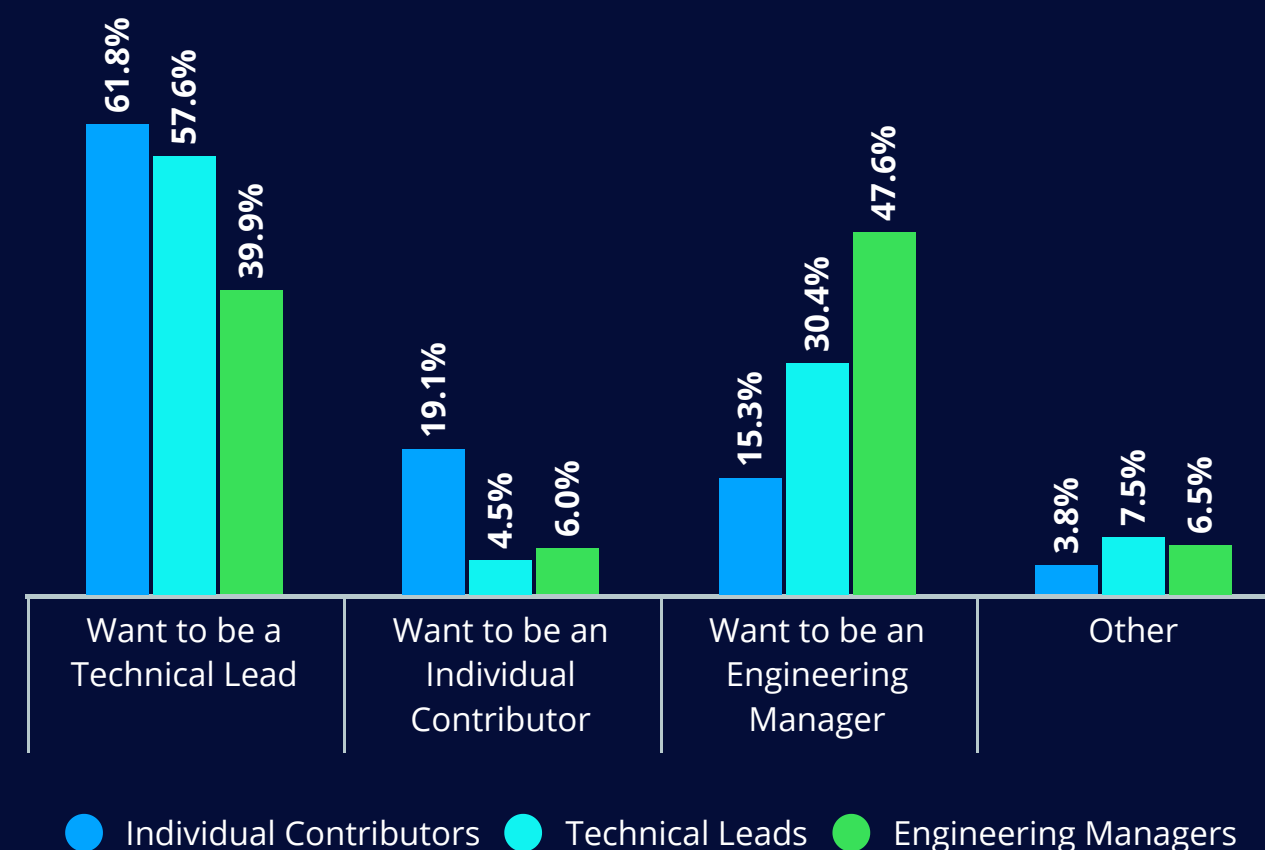
# Individual contributors want to be tech leads, not managers

62% of developers in individual contributor roles want to become a technical lead in the next three years. That's a stark contrast to the number that want to become managers (15%).

It may be part of why most developers prioritize learning new tech skills when it comes to professional growth (versus taking on more responsibility or soft skills advancement, for example). Most are less interested in managing people, and more interested in filling a technical lead role, like a principal architect—so picking up new technical skills is paramount.

On the flip side, developers currently acting as managers and technical leads were pleased with their current roles. Most wanted to stay in the same role down the line.

What role do you want to have in three years?

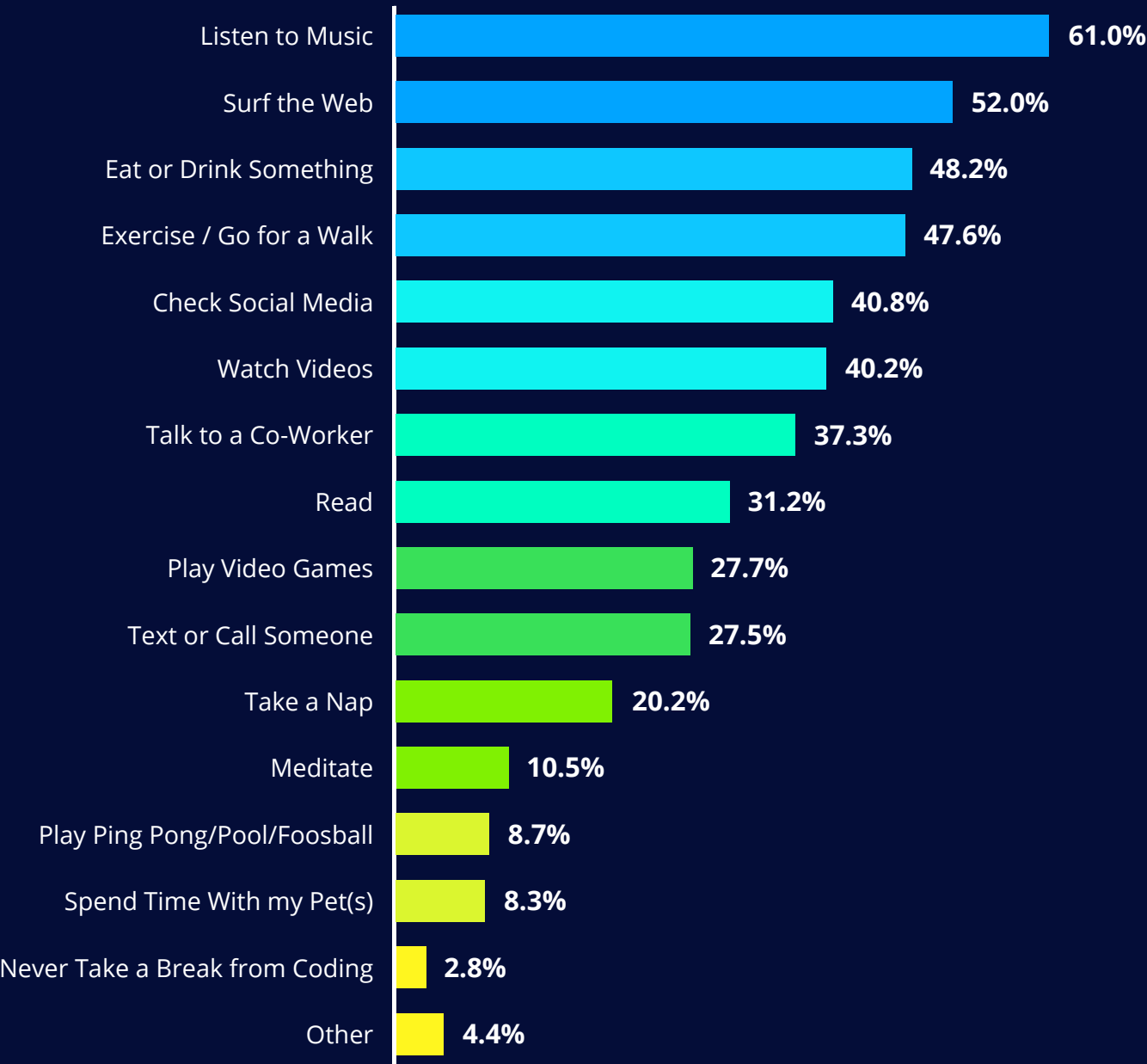


# Developers spend downtime listening to music and surfing the web

When they're not coding, most developers spend their time listening to music (61%).

Surfing the web (52%), getting something to eat or drink (48%), and exercising (48%) were also popular options for a quick time out. But 3% of developers say they never take a break!

What do you do to take a break from coding?



# Methodology

HackerRank conducted its third annual developer skills survey to identify trends in the developer community. A total of 116,648 developers and students responded to the 15-minute online survey from November 12 to December 11, 2019. The survey was programmed in SurveyMonkey and HackerRank recruited respondents via email (community members, customers, and prospects) and through social media sites. Respondents came from 162 countries. Results were analyzed using Q Research. Tests of significant differences were conducted at the .05 level (95% probability that the difference is real, not by chance). Percentages may not always add to 100% due to rounding.

## US region definitions (based on [US Census Bureau method](#)):

- **Midwest:** Chicago, Minneapolis/St. Paul, Detroit
- **Northeast:** Boston, New York, Philadelphia
- **South:** Austin, Atlanta, Miami, Dallas, Raleigh, Miami, Washington D.C.
- **West:** San Francisco, Seattle, Los Angeles, San Diego, Portland, Salt Lake City, Denver, Phoenix

## Generation definitions (based on [Pew Research ranges](#)):

- **Gen Z:** Born 1997-2012
- **Millennial:** Born 1981-1996
- **Gen X:** Born 1965-1980
- **Baby Boomer:** Born 1946-1964

## Global region definitions:

- **Americas (AMER):** Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, United States, Uruguay, Venezuela
- **Asia-Pacific (APAC):** Afghanistan, Australia, Azerbaijan, Bangladesh, Bhutan, Brunei, Cambodia, China, Fiji, Georgia, India, Indonesia, Japan, Kazakhstan, Kiribati, Kyrgyzstan, Maldives, Malaysia, Mauritania, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, Turkmenistan, Uzbekistan, Vietnam, Tajikistan
- **Europe, Middle East, & Africa (EMEA):** Albania, Algeria, Andorra, Angola, Armenia, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cameroon, Congo, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, Gabon, Gambia, Germany, Ghana, Greece, Holy See, Hungary, Iceland, Iran, Iraq, Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Latvia, Lebanon, Lesotho, Libya, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malta, Mauritius, Moldova, Montenegro, Morocco, Mozambique, Namibia, Netherlands, Niger, Nigeria, Norway, Oman, Palestine, Poland, Portugal, Qatar, Romania, Russia, Rwanda, San Marino, Saudi Arabia, Serbia, Seychelles, Sierra Leone, Slovakia, Slovenia, Somalia, South Africa, Spain, Sudan, Swaziland, Sweden, Switzerland, Syria, Tanzania, Togo, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, Yemen, Zambia, Zimbabwe, Mali



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