# market is hot; here's how to learn the skills for it

While most techies who add blockchain to their skillset are versed in programming languages, it's by no means a prerequisite for learning the technology. Here's why the blockchain market is hot and how to take advantage of the current skills shortage.

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Blockchain developers are in short supply and hot demand.

The job of developing blockchain distributed ledgers for businesses was recently ranked second among the top 20 fastest-growing job skills, and postings for workers with those skills grew more than 200% last year.

Salaries for blockchain developer or "engineer" positions are accordingly high, with median salaries in the U.S. hovering around $130,000 a year; that compares to general software developers, whose annual median pay is $105,000, according to Matt Sigelman, CEO of job data analytics firm Burning Glass Technologies.

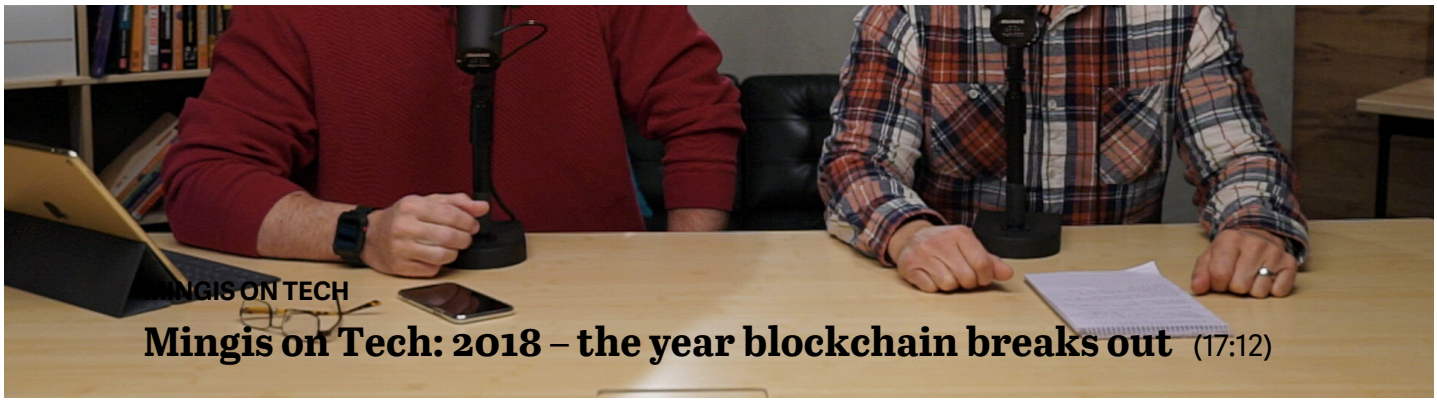
**[ Further reading: Blockchain in the real world: 3 enterprise use cases ]**

In high-tech regions of the U.S. such as Silicon Valley, New York City or Boston, a blockchain developer has a median annual salary of $158,000 – an $18,000 premium over salaries for general software developers.

People with experience with specific blockchain iterations, such as Solidity and Hyperledger Composer, are in even higher demand – and that demand is increasing steadily, said Eric Piscini, a principal in the technology and banking practices at Deloitte Consulting LLP.

"This is the number one thing I have in mind when I wake up in the morning: 'Where will I find more engineers to join the team,'" Piscini said via email.

Solidity is a blockchain programming language for creating smart contracts (self-executing scripts); Hyperledger Composer is an open-source version of blockchain based on JavaScript; it has REST API support that allows non-developers and developers to create business networks.




Along with Hyperledger, Ethereum is the world's leading blockchain platform and both are the basis for a myriad of decentralized applications (Dapps), from smart contracts to cryptocurrencies such as Ethereum's Ether.

Just below blockchain engineers on the list of the fastest-growing jobs is a related skill: bitcoin cryptocurrency developers. (Blockchain is the technology that underpins bitcoin.)

Taking second fiddle only to robotics specialists, blockchain and bitcoin developers are advertising their services for as much as $200 per hour, according to Upwork, an employment site that specializes in freelance workers.

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# Where to learn blockchain

Most who choose to add blockchain to their skillset or seek a career as blockchain developers are typically versed in programming languages such as Java or Python, Piscini said. But that's by no means a prerequisite.

"More universities are starting curricula and the natural cycle to graduate enough students will produce good volumes in the next few years," Piscini said. "We collaborate with universities around the world to develop content and hire the best talent."

Several accredited U.S. universities now offer courses on blockchain, such as MIT, which has offered two courses on cryptocurrency engineering and design, and Stanford University, which has a course called Bitcoin Engineering that teaches developers how to create bitcoin-enabled applications. There are also specialty schools, such as Mountain View, Calif.-based Blockchain University and London-based education startup B9lab, which launched an online Certified Ethereum Developer Training program in 2016.

Currently, the easiest and fastest way to become proficient is to learn on your own or attend programs organized by blockchain vendors and industry groups, such as Consensys, Blockapps, the Ethereum Foundation and Hyperledger.

Under the auspices of the Linux Foundation, Hyperledger is a collaborative cross-industry effort created to advance blockchain technology. Its Hyperledger Fabric and Sawtooth modular frameworks can be foundations for developing distributed ledgers for businesses.

While software developers tend to be the ones who sign up for blockchain courses, you don't have to be a coder to glean business-oriented knowledge of the distributed ledger technology or even learn to create blockchain networks for your company, according to Hyperledger Community Architect Tracy Kuhrt.

> For example, Hyperledger offers an introductory course for business people who simply want to learn about how the technology can be applied to their environment. The course


Hyperledger

*Hyperledger Community Architect Tracy Kuhrt*

includes a primer for techies hoping to learn how to start building blockchain applications with Hyperledger frameworks.

Hyperledger's courses are designed to be completed in 40 hours, but there's no time limit for completing the courses.

Developers who want to learn coding can take more specific courses on blockchain modular platforms, such as Hyperledger Fabric or Sawtooth. Those seeking a certificate in Hyperledger blockchain technology can turn to open online course provider edX; upon completion, they can pay $99 for a certificate in the technology.

"The courses could be taken by someone who is not developer," Kuhrt said. "It does provide a working example for the two projects we have – Hyperledger Fabric and Sawtooth. There are step-by-step instructions...to work through that. As far as whether or not it would be difficult for someone who doesn't have programming experience, I don't think that's where the challenge would be. I think somebody who doesn't spend a lot of time staring at command lines in a computer might have some challenges, but it really is intended to help anybody to get up and running and be able to see what's possible with blockchain technologies."

## How one developer changed careers

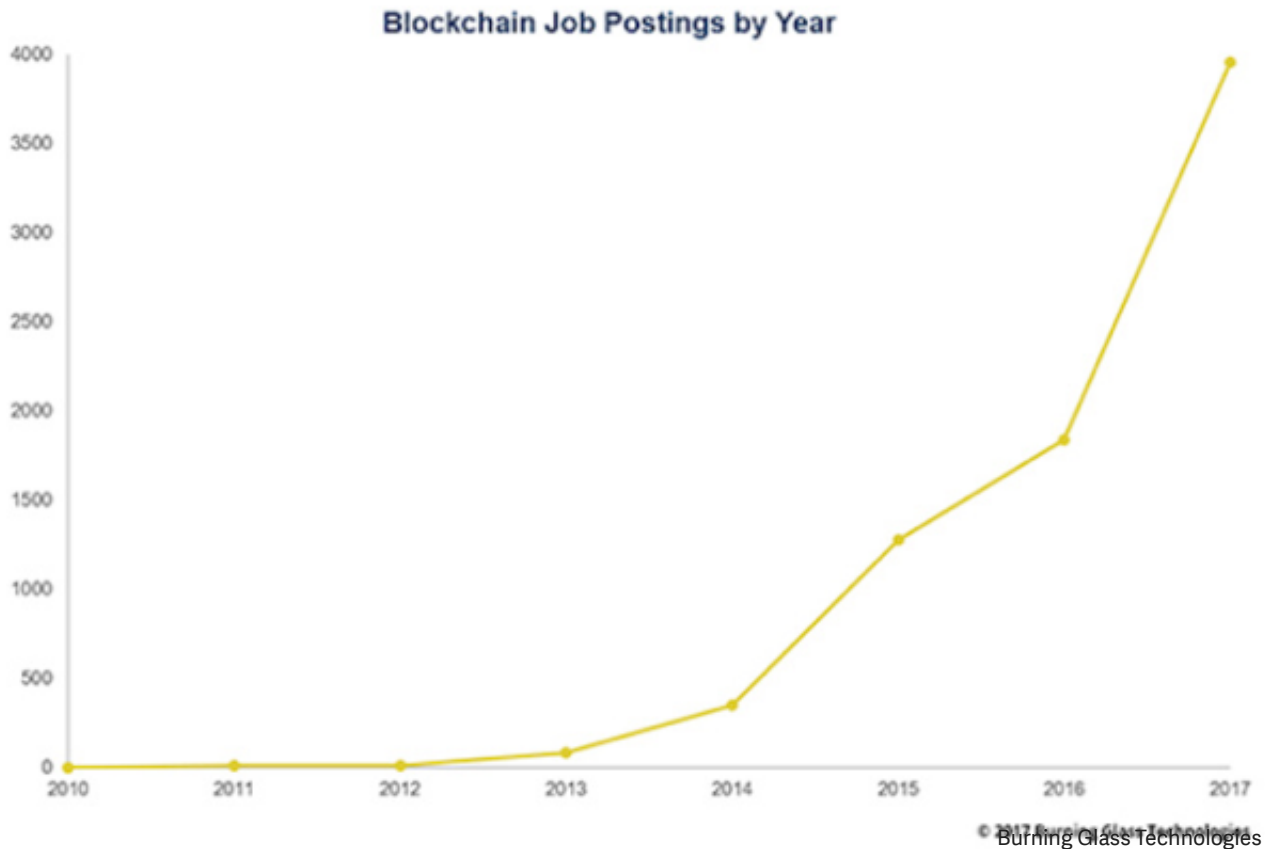
Until last year, Kuhrt had spent 10 years as a software engineer at PayPal, working her way up to its strategic architecture team where she was tasked to look at blockchain as a potential business platform. Kuhrt went on to design and implement a proof of concept for a PayPal rewards point program using Hyperledger Fabric, an open-source modular blockchain architecture.

"That's how I got interested in Hyperledger. It's a great place to get in on the ground floor," said Kuhrt, who last year took the job at Hyperledger, the Linux Foundation project started in 2015. "I think this technology is going to make some big changes in the way business is done."

Kuhrt is now in charge of connecting outside technologists to the Hyperledger's various blockchain initiatives, including its free training courses.

Since the courses went online last year, 72,925 people have enrolled and 2,252 have completed the course work, according to Kuhrt. Not surprisingly, enrollments continue to explode as the adoption of blockchain in a myriad of industries continues to grow

Blockchain applications are being applied to healthcare record management, renewable energy certificate trading and supply chain management, among others.



Toptal, a service that connects various software developers with employers, just launched a new blockchain specialization service for businesses hunting for blockchain engineers.

Since January 2017, Toptal said its client demand for blockchain expertise has shot up by more than 700%.

As enterprises and venture capitalists alike provide capital and credibility to blockchain initiatives, the industry's challenge has become the pace at which the technology itself grows. For blockchain to succeed, it will need a sustainable, accessible pool of elite talent, according to Luka Horvat, head of Talent Operations at Toptal.

While moving into a career as a blockchain engineer is no small feat, as it does require a significant time investment into becoming acquainted with the tools and related technologies, it's an excellent time to take the leap, said Horvat.

"Demand for blockchain developers is at an all-time high," he said.

## How to transition to a blockchain career

To transition into a career in blockchain, the first step anyone would need to take is to pick the initial technology they want to work on, Horvat said. That can range from contributing to a core of open-sourced blockchains (e.g., Bitcoin); creating business networks using the Hyperledger family of modular platforms; or creating public smart contracts using Solidity.

"Having experience with back-end and lower level development (cryptography) is beneficial for the transition as well, but is not required," Horvat said.

Toptal sets a high bar for talent, requiring engineers to have a strong fundamental knowledge of blockchain and the underlying technologies – including cryptography and distributed systems – as well as some knowledge of how most public blockchains work, "which we test for using theoretical tests and coding tasks which are geared towards the technologies powering blockchains."

Blockchain developer positions come in all types, from hourly to full-time. The type of role depends on the size of the client and the kind of project or product it is working on, according to Horvat. Regardless, the demand for blockchain roles (whether hourly or full-time) is skyrocketing.

Toptal's client list ranges from startups raising funds via ICOs (initial coin offerings) to Fortune 100 companies that are transferring major business segments to blockchain, Horvat said. The work developers are tackling varies from distributed programming to cryptography, private blockchains, decentralized applications and smart contracts, among others.

> ***"Even assuming 20,000 developers have worked with blockchain in some form or another, this is less than 1 in 1,000 developers worldwide. ...Those developers that do have experience in the field are in great demand."*** *– Windsor Holden, Juniper Research*

"Some clients start with only a few developers part time to get a project started, and then ramp up with a larger full-time team as the project gets underway," Horvat said. "As the underlying technologies related to blockchain continue to evolve over time, organizations that are investing in the technology will have needs that evolve as well, which Toptal is suited to addressing."

The supply of blockchain experts, however, still lags well behind the demand for their services.

**[ Further reading: IBM sees blockchain as ready for government use ]**

In a survey of 200 Fortune 500 executives by Synechron Inc., a New York-based IT consultancy, 55% said they had plans to implement blockchain technology over the next decade.

"For blockchain technology to gain traction, it will require more developers to acquire the skills to be able to work with the technology," said Windsor Holden, a blockchain analyst with Juniper Research. "Even assuming 20,000 developers have worked with blockchain in some form or another, this is less than 1 in 1,000 developers worldwide. For the moment, those developers that do have experience in the field are in great demand."

While the small number of developers will stand to benefit enormously in the short term, it will be essential to develop training programs, both by academia and in-house via the leading technology providers, according to Holden.

In the meantime, a number of blockchain 'boot camps' have offered developers an introduction to the technology, including an eight-week course provided by New York's Byte Academy that costs $10,000.

The Academy - School of Blockchain claims to be one of the only accredited schools for blockchain code training. The school is accredited by the Southern Association of Colleges and Schools (SACS-CASI).

On Jan. 29, the Academy launched its first onsite "immersion class" to retrain 120 software developers for blockchain in Sofia, Bulgaria; it plans to offer a six-week online course in July. The immersion blockchain course is six weeks long and costs from $18,000 to $24,000, depending on the location of the classes, the Academy said in its marketing material.

The Academy is launching four more international classes in the April-May timeframe, the locations of which have yet to be announced. It expects about 1,600 students will complete its six-week blockchain training program this year.

The school also works with students to place them in jobs once they complete the program.

While the first class has yet to graduate, an Academy spokesperson said its regular software development program boasts a graduate placement rate of 92%, "and we fully expect our blockchain student placement rate to equal, if not surpass that rate."

## Blockchain is tech you can build a career around

The U.S. is expected to lead the world in blockchain investments, accounting for 40% of spending, followed by Western Europe, China and the Asia Pacific region (not including Japan), according to a recent report from IDC.

By 2021, spending on blockchain is expected to reach $9.2 billion, with the technology likely to rival that of Linux and the open-source software industry in general.

While 2017 was considered a time of experimentations for the still-evolving technology, as businesses came to see both its benefits and challenges, this year is considered a crucial year as enterprises move from proof-of-concept projects to full blockchain deployments.

"Blockchain is a technology that will continue to be around for a long time and it's a place people can build a career around," Kuhrt said. "I think I could spend the rest of my career thinking about blockchain technologies."

*This story, "The blockchain market is hot; here's how to learn the skills for it" was originally published by Computerworld.*

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*Senior Reporter Lucas Mearian covers financial services IT (including blockchain), healthcare IT and enterprise mobile issues (including mobility management, security, hardware and apps).*

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