



IT'S GITHUB'S WORLD

**THE REST OF US
ARE JUST
COLLABORATING IN IT**

Two reasons to keep an eye on GitHub, maker of the world's most powerful software development tool. One, it's a brilliant business that is growing at a stunning rate. Two, your next business will be built on it

BY WILL BOURNE

Photographs by Robyn Twomey



Fork, Yeah
Chris Wanstrath (left)
and Tom Preston-Werner.
Their little side project is
now worth \$750 million.

It's "Beer:30,"

and Tom Preston-Werner is standing at a lectern in the vast San Francisco loft where GitHub makes its home. Before him, arrayed on a mashed-up assortment of chairs and couches or topping up a glass of whiskey at the overstocked house bar, are maybe 40 GitHub employees; another 44 around the world are watching a live feed. Preston-Werner has the tired eyes and untended facial hair of a new father, and the low-def biceps of a software engineer. Atop his head sits a mammoth banana-yellow foam-rubber cowboy hat.

The weekly gathering begins with Preston-Werner welcoming a few new employees. The co-founder and CEO then runs through a series of shout-outs to folks who have finished off pieces of code designed either to improve the GitHub site or to make it work better for clients. Then Preston-Werner takes a few minutes to wax philosophical. Taking a page from science writer Steven Johnson's *Where Good Ideas Come From*, he invokes the importance of "serendipitous interactions," the way powerful ideas can

emerge from the most random collisions of people, thoughts, and artifacts. He urges his people—many of them recent hires, most of them in their early 30s, tops—to go out and cultivate new experience, to

engage with the unknown. To underline his point, Preston-Werner reminds them that out of the investment the company received in July from Andreessen Horowitz, "about half of a percent" was picked up by Ron Conway, known in these parts as the godfather of Silicon Valley. Preston-Werner met Conway at a Y Combinator conference. Serendipity, indeed.

That venture round was worth \$100 million. It valued this little five-year-old company at \$750 million. As Preston-Werner speaks, between pulls on a beer, his giant foam chapeau jiggles gently.

As nerd endeavors go, GitHub is pretty much at the top of the food chain. What began as a private project with zero commercial intent has since emerged as one of the world's most—if not the most—powerful development tools for software. In just a few years, it has inserted itself at the center of the developer universe by making it easy for coders around the world to work together. If "software is eating the world," as Andreessen Horowitz co-founder Marc Andreessen put it not long ago, GitHub is where much of that software gets its teeth.

The Andreessen Horowitz bet was the "biggest investment we've ever made," says Peter Levine, the partner who now sits on GitHub's board. It's not hard to see why the VC firm went for it: GitHub's momentum is astonishing. The company says it took 38 months to host its millionth project on the site; the five millionth came in just two months and 21 days. "I don't know a start-up that's *not* on GitHub," says Jay Sullivan, VP of products at Mozilla, maker of the Firefox Web browser. In other words, your next company, or parts of it, will be built here.

GitHub started as an effort by Preston-Werner and co-founder Chris Wanstrath to solve what Preston-Werner calls a "pain-in-the-ass problem": using something called Git, a version control system developed by Linus Torvalds, the creator of Linux. A version control system is a tool that allows multiple coders to work on the same piece of software without losing track of the various changes made in each version or allowing the source code to be corrupted with lots of contradictory fixes. Torvalds built Git in reaction to the centralized structure of previous version control tools, which made it all but impossible for developers to work together independently. And though Torvalds's system "makes collaboration possible, it doesn't make it easy," says Preston-Werner. He sensed that Git could be "this superpowerful thing if only you could understand it."

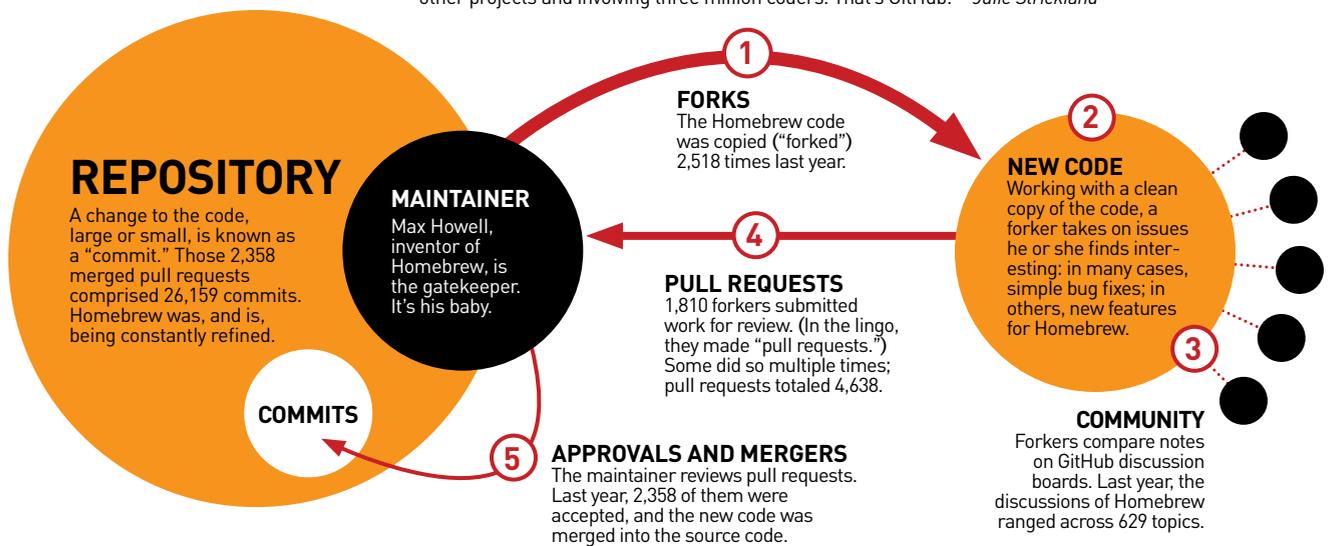
GitHub went live in February 2008, and soon a user demanded to pay for the service. Suddenly, a dork pastime was a business.

Preston-Werner grew up in Dubuque, Iowa; his mom was a special-education teacher and his stepdad an engineer. (His biological father passed away when Tom was a kid.) Preston-Werner was the classic engineer-in-training: ripping apart pieces of gear his stepdad had lying around, hacking the family TRS-80 PC, studying *How Things Work* books. Eventually, just as the dot-com boom was cresting, he set sail for Harvey Mudd College, east of Los Angeles. After two years, he dropped out to be part of a company run by two fellow Mudd students; then he struck out on his own, first running a digital design firm, which taught him "all of the crap it takes to run a business—taxes, all that," then creating Gravatar, the technology that allows your avatar to follow you around the Web from site to site.

He sold Gravatar to Matt Mullenweg, the founder of WordPress, then paid off his credit card debt and enjoyed the first bit of breathing room he had known in several years. That's when he met Wanstrath, who is still only 27, six years younger than Preston-Werner. ("I started GitHub when I was really young, so I don't have a bio or anything," says Wanstrath, who looks like Gregg Allman run through a reverse aging machine. "My life story's pretty short.") The two were part of the grow-

MULTIPLY BY FIVE MILLION

The most heavily trafficked project on GitHub in 2012 was Homebrew, a platform used by developers to make code integrate smoothly with the Mac OS. This graphic shows the flow of code and conversation that produced more than 2,000 changes to the Homebrew source code. Imagine the process repeated on five million other projects and involving three million coders. That's GitHub. —Julie Strickland



ing crew of developers working in Ruby on Rails, a Web development framework that has itself become a major force. "One of the things we talked about in the Ruby community was Git," Wanstrath recalls, "at the time a very esoteric version control system." In October 2007, they set about improving Git, partly for fun and partly to make it more useful in their professional lives. They stayed in their day jobs and noodled at GitHub primarily at bars and coffee shops around the SoMa neighborhood. During this period, they picked up two other co-founders, PJ Hyett and Scott Chacon.

GitHub went live in February 2008, and soon Geoffrey Grosenbach, founder of PeepCode, essentially demanded to pay for the service. Suddenly, a dork pastime was a business, and by July, Preston-Werner was confident enough in it that he passed up the offer of a \$300,000 bonus and stock options from Microsoft, which had acquired Powerset, the company he worked for at the time.

Today, a programmer in Dubai can drop a chunk of code in a "repository" on GitHub's site, post a description of his project and what kind of help he's looking for, and then watch as coders around the world dig in and contribute. If the software is open source (that is, free for the taking by anyone who wants it, with minimal restrictions), the "repo" is visible to all three million developers who work on GitHub.com. Depending on how interesting the idea is—it might be a simple feature for a website or an entire operating system—hundreds or even thousands of people might "fork," or copy, the code and start working to improve it. When a developer thinks he has cracked whatever problem or portion of the problem he was working on, he can make a "pull request" to the "maintainer" of the repository to review his suggested fixes. The maintainer

integrates some or all of the new code as he sees fit.

GitHub is in some ways like Wikipedia—highly social, tapping into the human desire to contribute to a common goal. When so many brains are engaged at once, the process of development, refinement, and deployment is radically accelerated. Each revision should, in theory, make the code more powerful, get it closer to the point where it can be shipped as an element in a larger software product, whether open source or commercial. "If the barrier to collaboration is too high, then you're not gonna do it," Preston-Werner says. "But once you get that barrier low enough, once you pass a certain threshold, everybody's contributing." GitHub is adding users at the rate of 10,000 per weekday.

Unlike Wikipedia, however, GitHub has a business model. Essentially, GitHub offers programmers and companies a choice: They can use the collaborative platform for free as a place to build open-source software, or they can pay to use it behind a wall, where they can develop proprietary software that forms part of a commercial product or service. In the first case, your willingness to make your code available to everyone earns you the right to exploit the web of open-source coders working on the GitHub site. In the second, your company's developers work in private, using the collaborative features GitHub has built but not its distributed global network of talent.

"If you have code on GitHub but the whole world can't see it, then you're paying for it," says Preston-Werner. There are three payment tracks. One is a personal plan that costs as little as \$7 a month. (The price is based on the number of repositories you have.) Then there is an organization plan, which has features for more sophisticated team management and starts at \$25. The big-money option is the enterprise

“CREATING ART, CREATING

plan, which involves clients downloading a version of GitHub to live locally on their servers. It can cost millions of dollars a year. Enterprise clients include Lockheed Martin, Microsoft, LivingSocial, VMware, and Walmart. GitHub doesn't talk about how much these companies, specifically, are paying, but it has hundreds of thousands of paying customers between the website and the enterprise client base.

Levine, the Andreessen Horowitz partner, says his firm was first drawn to GitHub because it was “a growing enterprise with 300 percent year-over-year annualized growth—in a market that has been unchanged for a very long time.” Sounding amazed even several months on, he marvels that the co-founders had gotten to “really interesting levels of profitability and revenue without a dime of outside funding and without even building out a sales organization—they're all engineers!”

A grown-up sales operation, Levine says, is just a first “tactical” step. He and the lads have big plans.

For survivors of Web 1.0, GitHub's offices bring the memories—or night sweats—flooding back. The 14,000-square-foot loft is rigged out with air hockey, Ping-Pong, a pool table, and an Xbox 360 (hooked up to side-by-side flat screens). There's a catered Thursday lunch (families are invited), a fridge full of microbrew, and a handmade wooden kegerator with an inlaid Octocat, GitHub's fantastical mutant mascot. Numerous side rooms house the many other toys designed to “optimize for happiness” for GitHub's 145 employees, who work whenever and wherever they like: electric guitars, an amp, and a full matched set of harmonicas in the jam room; a Skype chamber; a womb room with low lighting, a shag rug, and four egg chairs. There's a ladies' lounge with a pink, plasticized fainting couch, and the executive lounge, complete with faux-antique globe (which conceals a 16-year-old bottle of Lagavulin) and lots of manly leather. Actually, the whole office smells of leather—and revenue, which is what makes it so *not* like 1999.

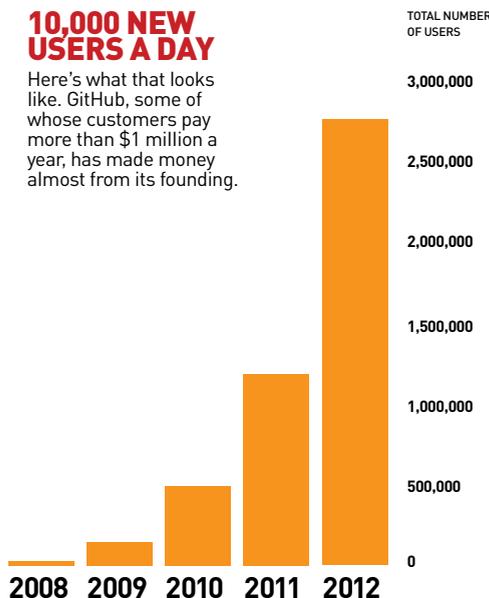
If the term *open-source software* triggers some sort of narcolepsy neurotransmitter in you, you are not alone. It certainly did in me, to the extent that I thought about it at all. But the further I wandered in this world, the more wondrous I found it to be. Those of us who don't write code tend to be oblivious to the sheer labor involved in creating thousands or even millions of lines of the stuff, all of which have to function perfectly if a piece of software is to run bug free. A single project on GitHub can entail months or years of work and

countless strings of dialogue among maintainers and coders hoping to contribute.

It's hypergranular work and has to be, not least because open-source software has become the bedrock of almost every company on earth. From Apple to Microsoft to the tiniest start-up, open source is part of the software stack—and many companies are built *mostly* from open source. And that, of course, is the point: Open source means a new business doesn't have to start from zero; it can pull down prefab pieces of software infrastructure for free, building only the bits it needs to bring its product to life. John Pettitt is founder and CEO of Repost.us, a service that allows news articles to be embedded as easily as video, and to carry their advertising and analytics along with them; earlier, he was the founder of Software.net, which became Beyond.com, and CyberSource, a credit card fraud detection company bought by Visa for \$2 billion in 2010. Back in 1994, when Pettitt was starting Software.net, he says, “there was no e-commerce software, there was no e-commerce platform; I had to write my own credit card processing, I had to write my own storefront. Everything we had to do, we had to do from scratch, because there were none of the building blocks there.” Pettitt built much of his new company on GitHub. “Today, you can sort of Lego things together in a way you never could before,” he says. “And the corpus of information and tools is growing at a huge rate.”

Those Legos form the skeletal system of almost every new company; the profitmaking intellectual-property layer is skin thin, sitting on top. “It's no different than having two-by-fours and electricity,” Preston-Werner says. “If you have a ready-made Web server and Web framework, for example, that represents hundreds of thousands or millions of man-hours of work that you don't have to put into creating a product.”

That is exactly why GitHub is formidable: It is at once a lumberyard and a workspace. Entrepreneurs on the site can find, or help develop, almost all of the open-source raw materials they need *and* set up their own closed place to integrate those materials with their IP. What's more, by simplifying Git, GitHub has turned a tool even serious coders found arcane into something useful to the “casual forker,” in Wanstrath's term. “We want to enable people who don't know each other to collaborate on the same thing, toward the same goal,” says Wanstrath. “This is all I want to do—forever.”



TOOLS, CREATING DOCUMENTS, DOING HOMEWORK, ANYTHING—IT'S NOT LIMITED TO PROGRAMMING."



The De-Nerding Wanstrath and Preston-Werner want GitHub to be used for collaborations that have nothing to do with software.

There has been considerable rumbling lately that the Web is turning into a Monopoly board or mall, with a few big anchor stores and a bunch of rabble scrambling either to build on top of them or to find a survivable place in their shadows. “The openness that drove the Web and its richness are definitely under attack,” says Tim O’Reilly, founder and CEO of O’Reilly Media, the producer of industry-leading programming manuals, tech magazines, and conferences. “This happens again and again when something new comes on the scene. There’s usually a huge sharing economy, with lots of innovation and lots of openness, and then some animals become ‘more equal than others,’ in Orwell’s wonderful phrase, and then it tends to start to stagnate. But that impulse to create goes and bursts out somewhere else.”

That somewhere, at least right now, would seem to be GitHub. In fact, it’s possible to see GitHub as a new killer app for the Internet—a “mini Web,” as Preston-Werner describes it, a place where networked minds actually build things together.

“The network effect is awesome,” Preston-Werner says, sitting in the situation room, another ironically themed chamber (this one has a red Batphone to nowhere, a massive table in burlled veneer, Big Boy Executive Chairs, and LED signs with the time zones of various GitHub outposts). “There are standards now based on GitHub, so everybody can come in to a new project and immediately know how to get the code, how to contribute code, how to review the code, how to submit issues to the code base.... The more people do that, the stronger the effects and the gains from having a uniform, well-known, standardized system. And that’s happening really, really rapidly.”

That network effect gets reinforced in numerous ways. For example, a developer on GitHub acquires a social reputation, and that reputation becomes a way to find new, paying work; the network’s role as a placement service helps it to grow still

larger. The truly badass potential of GitHub, though, is that it isn’t only a force multiplier for producing code but also for the generation of ideas—and for the products created from those ideas. As Preston-Werner says, projects hosted on GitHub will increasingly be “not just code, but anything that involves working on files on a computer: books, hardware projects, schematics for circuit boards, legal documents—anything that ends up in a digital format.” This is already happening on the site, including projects for books (several coding manuals, for example, are being written on GitHub—including one *about* GitHub), hardware (OpenRov has the hardware design, software, and circuit schematics for its underwater robots on GitHub), and government (the U.S. and U.K. governments both work on the site).

Wanstrath, who handed the CEO title over to Preston-Werner in June and is an absolute geyser of GitHub zeal, agrees that as more people pile into the service, a shift is taking place: “Now we are finding that it’s not just about the code; it’s about, ‘Hey, I want to work on this with you.’ That’s really eye-opening to us and gets everyone here superexcited. Working with someone else is just an awesome part of being alive. Creating art, creating tools, creating documents, doing homework, anything—it’s not limited to programming. I don’t see why musicians wouldn’t want to work this way, for example.”

In other words, as GitHub gets bigger, its power becomes less about the platform itself than about the people on it. One day in the GitHub offices, I ran into David ten Have, a New Zealander (and an *Inc.* cover subject in 2009). Ten Have is founder and CEO of Ponoko, a company focused on developing “the tools to enable digital fabrication.” That means a system that could, one day, given a disassembled MP3 player, spec out each component, relay those specs to a 3-D printer, and have the printer produce all the pieces required for assembly by a nearby robot. Ten Have says, “GitHub makes this easier and faster, because it has a platform that enables the collaboration and, most important, the social norms to encourage people to look at the world collaboratively. That is fundamentally why GitHub is important beyond software: Ethos and attitude are transferable—into lawmaking, product design, manufacturing, biology, chemistry, dance, music, moviemaking, books, cooking... The list goes on.”

And on. Which suggests that GitHub has only begun to grow—as a business, as a tool for business, and as a cultural force. “It’s this huge ricochet effect,” Wanstrath says, nearly manic with optimism. “We are this thing that people can step on, like an elevator, and then go shooting into space.”

Will Bourne, formerly the executive editor at Fast Company, is now the editor in chief of The Village Voice.