



THE WAY WE WORK IS CHANGING

Carnegie Mellon University's researchers continue to examine online workspaces like GitHub to discover how they function and how they are changing the way we do business.

Written by Therese Joseph

Everyday millions of Americans go to work. You, like many other Americans, work because you have bills to pay and family to care for. You depend on your work for the paycheck it provides. But if the way that you are used to working and earning a paycheck changed to a new process and way of earning money, could you adapt?

According to a Carnegie Mellon University researcher, you may need to adapt in the future because that change may already be underway in transparent work environments.

James Herbsleb, a researcher and professor at Carnegie Mellon University, is also the principal investigator of a research project that has been studying the way transparent work environments function.

A transparent work environment, as defined in the research of Herbsleb and colleagues, is an online setting where "individuals participate in large-scale, ill-defined communities that often have hundreds, if not thousands of members."

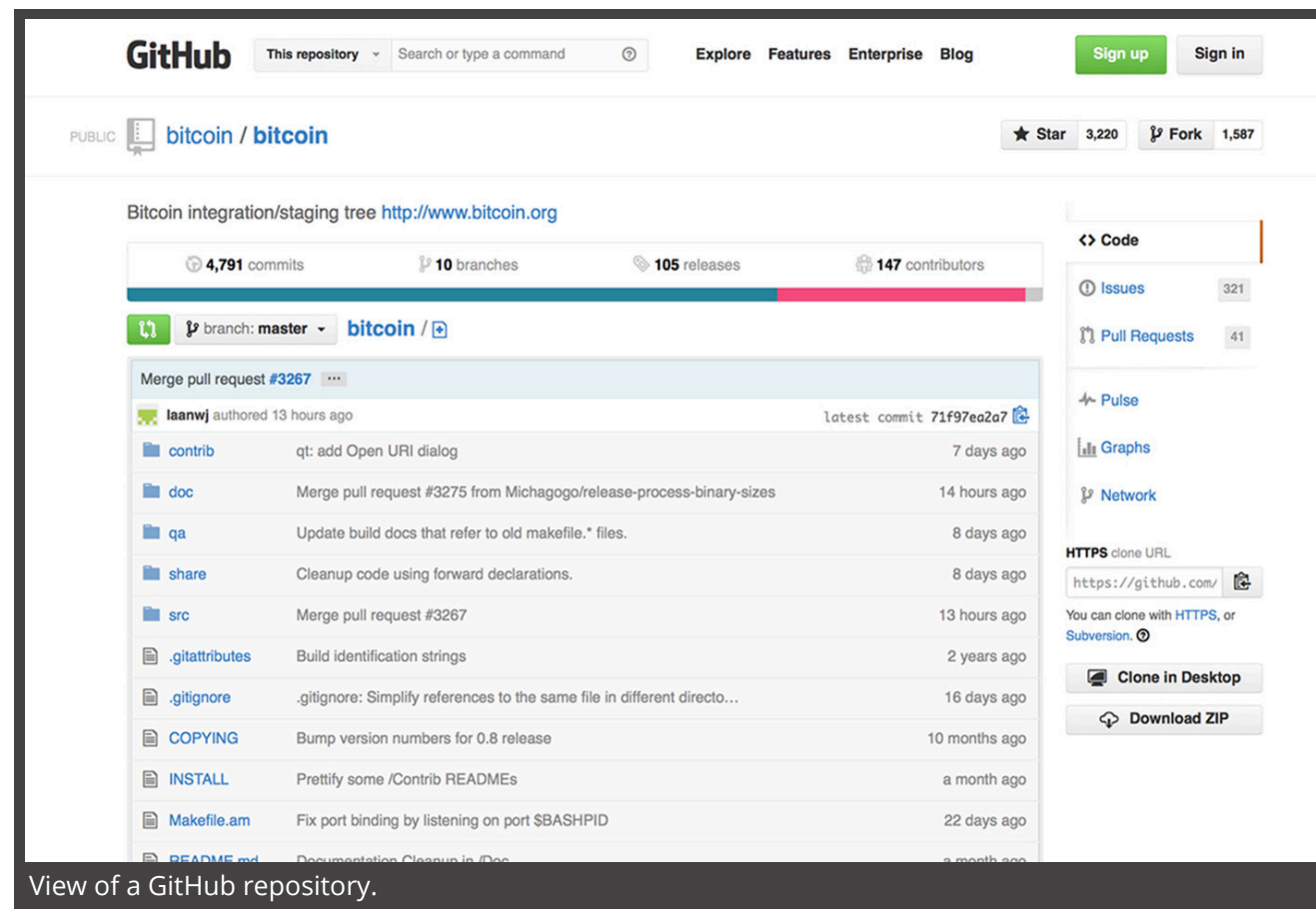
These online settings utilize social media-based features to facilitate communication and transparency, transparency being the ability to view work in progress in the same way we view our friends' latest statuses on Facebook.

Herbsleb and colleagues began their research by examining GitHub, a transparent work environment where software code is being composed.

“Wait,” you’re thinking. “What does software code have to do with me?” More than you think. In fact, you probably encounter software code multiple times throughout the day without realizing it.

“More and more, the functionality of anything you buy is in software these days,” Herbsleb explains. “If you buy a car, Ford executives are saying that one car will have somewhere between 50 and 70 computers in it, 15 million lines of software, and more than half the features that distinguish a car—make it more attractive than its competitors—more than half those features are software.”

Whether you realize it or not, software is shaping the world around you, and if you don’t pay attention to how software is changing, you might just miss how the world is changing.



View of a GitHub repository.

One popular trend in the software industry is the use of GitHub.com. GitHub is a repository site where software developers can digitally store and edit software code. The site utilizes social features to make information about users and their activities visible within and across separate software projects.

This means that anyone can see which projects a person is working on or what changes are taking place to a specific project. It also means that if you are a user on GitHub, you can subscribe to receive updates on the new activities of specific people or projects.

For example, pretend you are using a system similar to GitHub to work on a project at work. In order to stay up to date on that project you could repeatedly view your project’s page to catch every change someone might make.

In a physical work environment, this would be similar to emailing or calling your teammates multiple times throughout the day and asking, “So, anything new I should be aware of?”

Or you could simply subscribe to that project and receive automatic updates when others are making changes. By subscribing, anytime you’re curious about what is happening with the project, a quick scan of your feed informs you of all the changes on the project.

As Herbsleb states, “You can kind of look around and see. You don’t have to wait for somebody to tell you or wait for communication. You just kind of see everything.”

The concept of how transparent work environments function is still being researched by Herbsleb and CMU colleagues, Laura Dabbish and Jason Tsay. Their team is currently 2 years into a 3 year grant, and they are currently working on securing their next round of funding.

Previous publications from the team on transparent work environments include “Social Coding in GitHub: Transparency and Collaboration in an Open Software Repository”, “Impression Formation in Online Peer Production: Activity Traces and Personal Profiles in GitHub”, and “Social Media in Transparent Work Environments”.

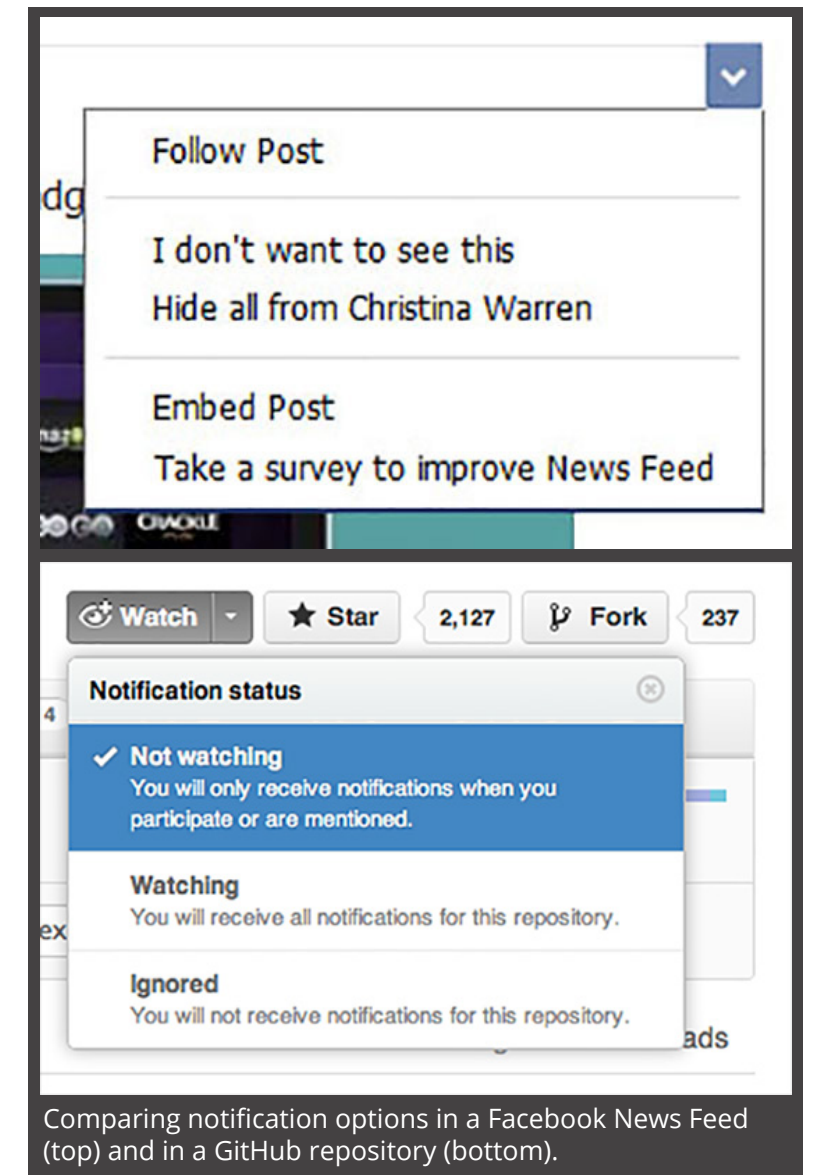
In future research, Herbsleb stated that their grand ambition is to go beyond collaboration of software and to understand the process of how we create digital things.

As Herbsleb explains, digital things could be 3D printer files, MP3 files, software, or even just text documents.

Take GoogleDocs for example. In Google’s application, the Google Drive, you can store files remotely like you would on DropBox or other cloud storage systems. This means you can access those files from any computer with an internet connection.

What makes the Google Drive different from other cloud storage options? The application’s foundation on another application known as Google Docs.

Google Docs was an application where you could create text files, similar to Microsoft’s Word , Excel, or PowerPoint. These files were stored remotely so



Comparing notification options in a Facebook News Feed (top) and in a GitHub repository (bottom).

that you, or anyone you gave access to, could view and edit those files from any computer with an internet access. Since the file never left the remote storage and automatically saved every change, it meant that multiple people could access and edit one document at the same time.

When Google Docs became Google Drive, it retained this ability to create documents that groups could work on simultaneously with one added advantage. You could now store other file types like a Microsoft Word file and you are given the option to convert those files into Google Docs for seamless collaboration.

“I see this move towards the digital and this move towards openness going together and being the trends in all sorts of work going forward.”

In future research, Herbsleb and colleagues hope to examine other transparent environments like GitHub and GoogleDocs to understand how people are making the most of relaxed constraints on copying, distribution, and sequential work processes.

To do this, Herbsleb stated that his research group is trying to partner with companies like IBM, Google, and GitHub to understand the larger space of transparent work environments and their production processes.

Their hope is that by examining multiple production processes, they can begin to understand the relationship between the product and the structure of transparent work environments, the nature of the tools that will let you work on a specific product, and the way people organize the process to accomplish production.

In their future research, Herbsleb is looking forward to exploring how transparent work environments are already starting to change the way that things are being produced.

“The physical world,” explains Herbsleb about the current production process, “it’s all about bringing everything together at the same place at the same time. Physical limitations limit what you can do to something. Everything has to be sequential. You bolt this on and you cut this hole.”

He continues to explain how the production process is changing, stating, “In the digital world, it doesn’t have to be sequential. A thousand people can edit the same things at the same time—if you can figure out how to not get them to step on each other while doing it. But there’s nothing in principle that prevents that.”

For living proof of this change in process, consider the growing popularity of GitHub. According to Tom Preston-Werner, one of the co-founders of GitHub, during its private beta launch the site had 6,000 users and 2,500 repositories.

Most recently in April 2013, Preston-Werner stated in a blog post that GitHub has reached 3.5 million users working on 6 million repositories on their site, a significant rise in usage in a period of less than 5 years.

But GitHub’s repositories are not limited to software code only. According to Herbsleb, you can find groups collaborating on many projects, ranging from 3D printer files to Gregorian chants.

3D printer files, specifically, are an example of how transparent work environments are causing the entire production process to become digital. As Herbsleb states, “That’s the thing about 3D printing is that for the entire life cycle of an artifact, it’s digital up to the time it lands on your printer and you go boom, print. That’s the only physical part of the life cycle. The rest is all digital.”

In addition, Herbsleb is looking forward to exploring how transparent work environments are affecting the business models companies use to make money.

As Herbsleb states, “One of the things that’s interesting about this whole space is there’s all sorts of business models that people really hadn’t thought about before.”

For a specific example of a new business model, Herbsleb referred to the company Red Hat. Red Hat is a company that supports the Linux operating system—a free, open sourced system.

Since Linux is a free system, much of the support that Red Hat provides, they cannot charge for. According to Herbsleb, this includes promoting Linux, adding to the source code, and fixing the bugs within the source code.

“A lot of people thought they were crazy. Why are you doing this?” explains Herbsleb about Red Hat’s work with Linux. “It turns out that there are a lot of other things about/around Linux that people are quite willing to pay for.”

For example, Herbsleb states, “So, if you want someone to come in and install Linux for you and train your people how to use Linux and give you a really super robust enterprise-version of Linux, [Red Hat] can manage that for you.”



“Just about all the major Web companies—Google, Facebook, Netflix—have a presence on GitHub, where they share their open-source code with the public and give their internal engineers a place to work together.”

—Ashlee Vance, Bloomberg Businessweek Technology Reporter

According to Herbsleb, the transition to transparent work environments, like the software industry’s transition to GitHub, is not going away.

“I see this move towards the digital and this move towards openness going together and being the trends in all sorts of work going forward. And I think it will provide a whole lot more flexibility,” states Herbsleb.

How much is the way we work and do business going to change? Only time and further research will tell.

As Herbsleb explains what he foresees in the future, he states, “We’re going to see many more different kinds of arrangements for how people get paid, how they work, and so on than just a single company. I think their models are going to open up. It’ll be interesting to see how much.”