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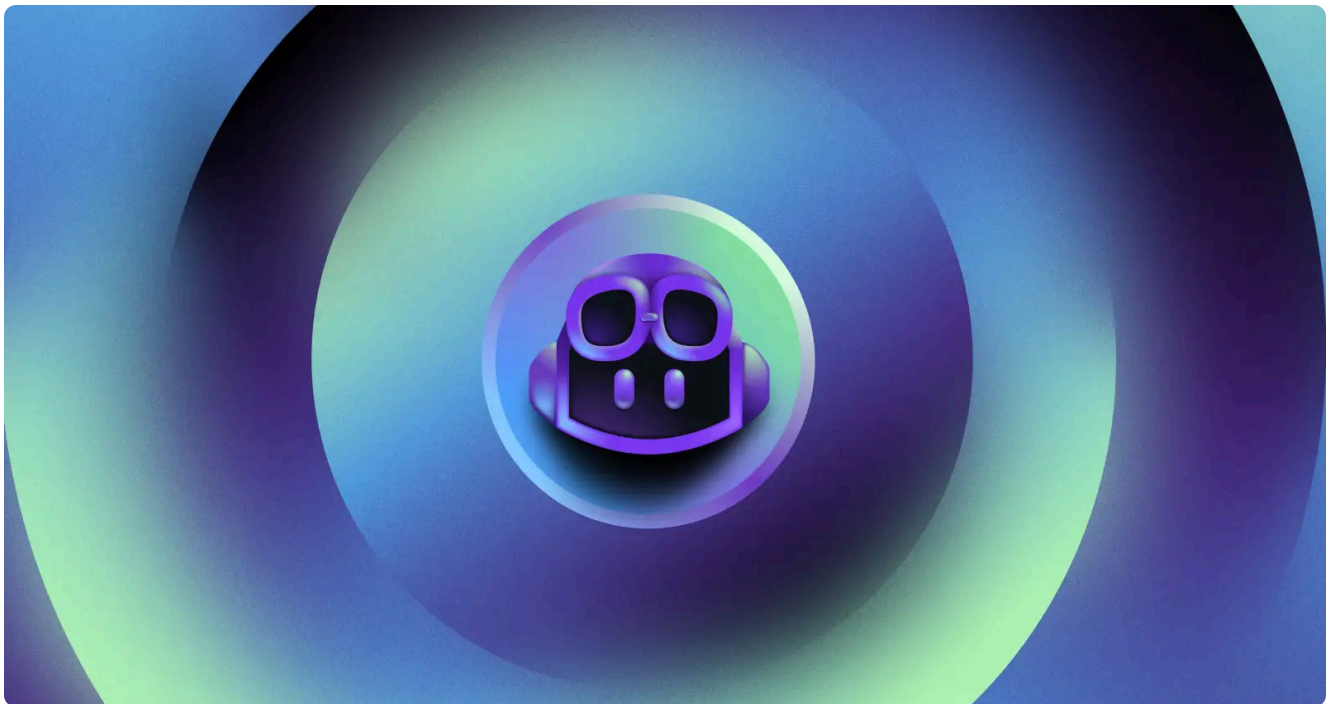
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# GitHub Copilot X: The AI-powered developer experience

GitHub Copilot is evolving to bring chat and voice interfaces, support pull requests, answer questions on docs, and adopt OpenAI's GPT-4 for a more personalized developer experience.



**Thomas Dohmke** · @ashtom

March 22, 2023

Updated May 21, 2024

🕒 7 minutes

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became clear that generative AI represents the future of software development. We partnered with OpenAI to create [GitHub Copilot](#), the world's first at-scale generative AI development tool made with OpenAI's Codex model, a descendent of GPT-3.

GitHub Copilot started a new age of software development as an AI pair programmer that keeps developers in the flow by auto-completing comments and code. And less than two years since its launch, GitHub Copilot is already [writing 46% of code](#) and helps [developers code up to 55% faster](#).



**But AI-powered auto-completion is just the starting point.** Our R&D team at [GitHub Next](#) has been working to move past the editor and evolve GitHub Copilot into a readily accessible AI assistant throughout the entire development lifecycle. This is [GitHub Copilot X](#)—our vision for the future of AI-powered software development. We are not only adopting OpenAI's new GPT-4 model, but are introducing chat and voice for Copilot, and bringing Copilot to pull requests, the command line, and docs to answer questions on your projects.

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**Want to see what's new? Discover GitHub Copilot X—our vision for the future of AI-powered software development. [Learn more >](#)**



Many developers and companies have already used GitHub Copilot, and it's helping improve productivity and happiness.

## A new AI-powered developer experience 🤖

- **A ChatGPT-like experience in your editor with GitHub Copilot Chat:** We are bringing a chat interface to the editor that's focused on developer scenarios and natively integrates with VS Code and Visual Studio. This does far more than suggest code. GitHub Copilot Chat is not just a chat window. It recognizes what code a developer has typed, what error messages are shown, and it's deeply embedded into the IDE. A developer can get in-depth analysis and explanations of what code blocks are intended to do, generate unit tests, and even get proposed fixes to bugs.

GitHub Copilot Chat builds upon the work that OpenAI and Microsoft have done with ChatGPT and the new Bing. It will also join our voice-to-code AI [technology extension we](#)

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[Sign up for the technical preview >](#)

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- **Copilot for Pull Requests:** You can now sign up for a technical preview of [the first AI-generated descriptions for pull requests on GitHub](#). This new functionality is powered by OpenAI's new GPT-4 model and adds support for AI-powered tags in pull request descriptions through a GitHub app that organization admins and individual repository owners can install. These tags are automatically filled out by GitHub Copilot based on the changed code. Developers can then review or modify the suggested description.

[Enroll your repository in the technical preview >](#)

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**This is just the first step we're taking to rethink how pull requests work on GitHub.** We're testing new capabilities internally where [GitHub Copilot will automatically suggest sentences and paragraphs as developers create pull requests](#) by dynamically pulling in information about code changes.

We are also preparing a new feature where [GitHub Copilot will automatically warn developers if they're missing sufficient testing for a pull request and then suggest potential tests](#) that can be edited, accepted, or rejected based on a project's needs.

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This complements our efforts with GitHub Copilot Chat where developers can ask GitHub Copilot to generate tests right from their editor—so, in the event a developer may not have sufficient test coverage, GitHub Copilot will alert them once they submit a pull request. It will also help project owners to set policies around testing, while supporting developers to meet these policies.

- **Get AI-generated answers about documentation:** We are launching GitHub Copilot for Docs, an experimental tool that uses a chat interface to provide users with AI-generated responses to questions about documentation—including questions developers have about the languages, frameworks, and technologies they're using. We're starting with documentation for [React](#), [Azure Docs](#), and [MDN](#), so we can learn and iterate quickly with the developers and users of these projects.

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**We're also working to bring this functionality to any organization's repositories and internal documentation**—so any developer can ask questions via a ChatGPT-like interface about documentation, idiomatic code, or in-house software in their organization and get instant answers.

We know that the benefits of a conversational interface are immense, and we are working to enable semantic understanding of the entirety of GitHub across public and private knowledge bases to better personalize GitHub Copilot's answers for organizations, teams, companies, and individual developers alike based on their codebase and documentation.

Moving forward, we are exploring the best ways to index resources beyond documentation such as issues, pull requests, discussions, and wikis to give developers everything they need to answer technical questions.

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### Powered by OpenAI's new GPT-4 model

**Our work to rethink pull requests and documentation is powered by OpenAI's newly released GPT-4 AI model.**




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development task at every point in the developer experience.

Moreover, it's helping GitHub Copilot understand more of a developer's codebase to offer more tailored suggestions in PRs and better summations of documentation.

- **Copilot for the command line interface (CLI):** Next to the editor and pull request, the terminal is the place where developers spend the most time. But even the most proficient developers need to scroll through many pages to remember the precise syntax of many commands. This is why we are launching [GitHub Copilot CLI](#). It can compose commands and loops, and throw around obscure find flags to satisfy your query.

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```
Downloads %  
Downloads % ?? use ffmpeg to add a watermark to input.mp4  
  
----- Command -----  
ffmpeg -i input.mp4 -i watermark.png -filter_complex "overlay=10:10" output.mp4  
  
----- Explanation -----  
o ffmpeg is used to process video and audio files.  
  ◆ -i input.mp4 specifies the input file.  
  ◆ -i watermark.png specifies the input file.  
  ◆ -filter_complex "overlay=10:10" specifies the filter to apply.  
    ◇ overlay=10:10 specifies that we want to overlay the second input file at position (10, 10).  
  ◆ output.mp4 specifies the output file.  
>  Run this command  
   Revise query  
   Cancel
```

A demo of GitHub Copilot for CLI.

Let's build from here 



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[model](#), we will harness the reservoir of data and insights that exist in every organization, to strengthen the connection between all workers and developers, so every idea can go from code to reality without friction. At the same time, we will continue to innovate and update the heart of GitHub Copilot—the AI pair programmer that started it all.

GitHub Copilot X is on the horizon, and with it a new generation of more productive, fulfilled, and happy developers who will ship better software for everyone. So—let's build from here.

Tags:

AI

GitHub Copilot

### Written by



**Thomas Dohmke**

[@ashtom](#)

Fascinated by software development since his childhood in Germany, Thomas Dohmke has built a career building tools developers love and accelerating innovations that are changing software development. Currently, Thomas is Chief Executive Officer of GitHub, where he has overseen the launch of the world's first at-scale AI developer tool, GitHub Copilot – and now, GitHub Copilot X. Before his time at GitHub, Thomas previously co-founded HockeyApp and led the company as CEO through its acquisition by Microsoft in 2014, and holds a PhD in mechanical engineering from University of Glasgow, UK.

### More on AI

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developer community by honoring individuals, projects, and organizations for creating an outsized positive impact on the community.

Laura Lindeman & Lee Reilly

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### **Bringing developer choice to Copilot with Anthropic's Claude 3.5 Sonnet, Google's Gemini 1.5 Pro, and OpenAI's o1-preview**

At GitHub Universe, we announced Anthropic's Claude 3.5 Sonnet, Google's Gemini 1.5 Pro, and OpenAI's o1-preview and o1-mini are coming to GitHub Copilot—bringing a new level of choice to every developer.

Thomas Dohmke

### **Related posts**

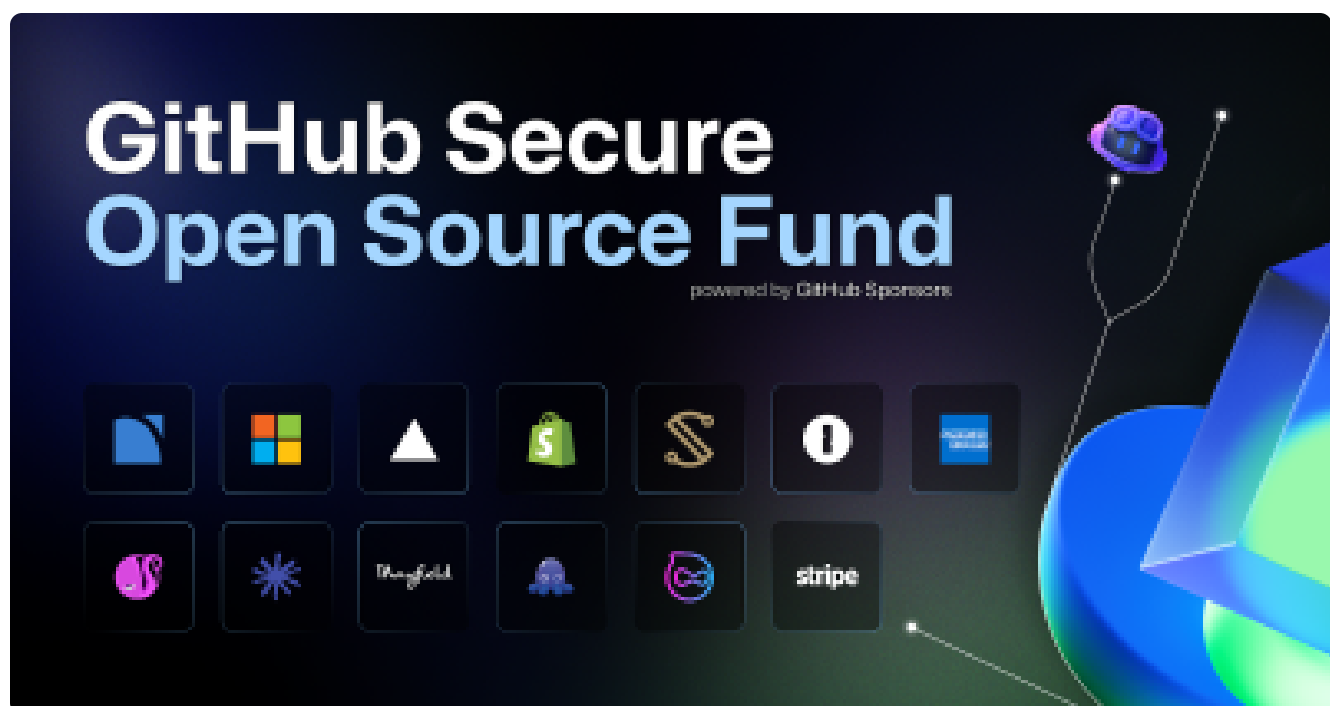
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## Students: Start building your skills with the GitHub Foundations certification

The GitHub Foundations Certification exam fee is now waived for all students verified through GitHub Education.

Morgan Erseroy



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Applications for the new GitHub Secure Open Source Fund are now open! Applications will be reviewed on a rolling basis until they close on January 7 at 11:59 pm PT. Programming and funding will begin in early 2025.

Martin Woodward



### **Software is a team sport: Building the future of software development together**

Microsoft and GitHub are committed to empowering developers around the world to innovate, collaborate, and create solutions that'll shape the next generation of technology.

Mario Rodriguez & Amanda Silver

### **Explore more from GitHub**

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