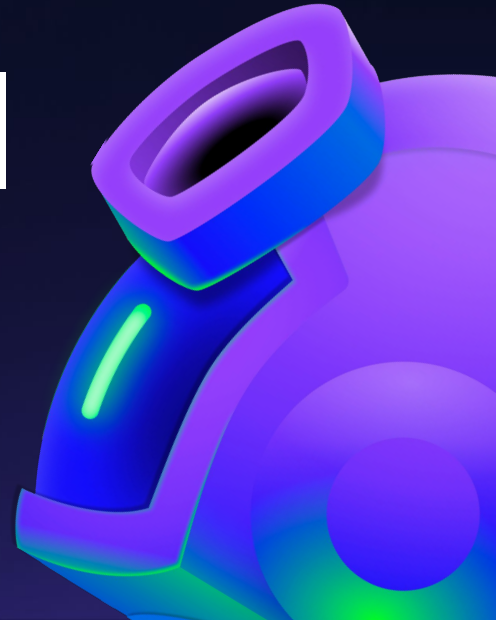




The World's Most Widely Adopted AI Developer Tool



Christopher Harrison
@geektrainer





GitHub + Company



Presenter's Name

Customer's Name

Month, Year



Why is DevX important?

Faster Time to Revenue

Grow revenue by improving DevEx.

- Shorter time to market
- Increased profitability

Source: Forrester, 2023

Improved Operational Efficiency

Drive business performance through increased:

- Productivity
- Efficiency
- Product quality

Source: Microsoft Research, DX,
University of Victoria, 2023

Higher Talent Retention

Attract and retain top engineering talent.

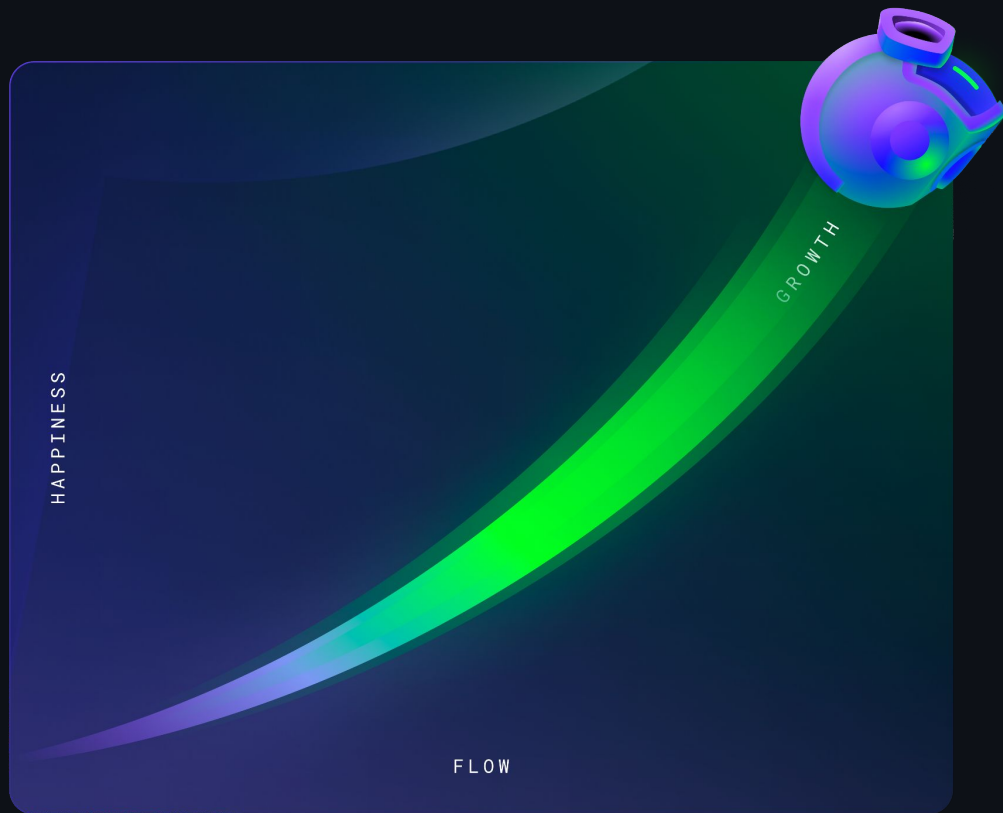
- High team morale
- Motivating and rewarding work

Source: Gartner, 2023



AI is the next frontier in DevEx.

A McKinsey study found that equipping developers to be their most productive also significantly improves the developer experience, and developers using generative AI-based tools were more than twice as likely to report overall happiness, fulfillment, and a state of flow.





The Copilot effect.

The world's most widely adopted AI developer tool.

Maximize developer happiness

Increase developer productivity

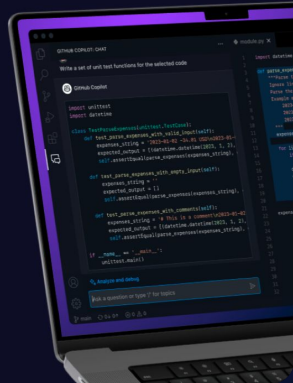
Accelerate software development



1st overall pick among developers.



55% of
developers
using AI coding
tools choose
GitHub Copilot



75% of
developers are
more fulfilled



75% of
developers
want to try it
next year

SUGGESTIONS

❖ Loading suggestions...

Ask a question or type '!' for topics.

Copilot enables
faster coding
by 55%

More than
1.5M developers

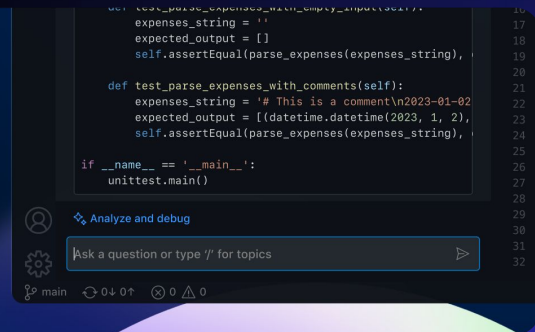


Pioneer in enterprise adoption of AI.

Over 1 in 5
Fortune 500
companies
use Copilot
(<1 yr since launch)



27,000+
businesses
building software
with Copilot



Coca-Cola

COYOTE
LOGISTICS

duolingo



mercado
libre

shopify

stripe



Developer productivity with Copilot means developers focus on what matters most.

✓ More time on

Designing

Brainstorming

Collaborating

Iterating

Planning

✗ Less time on

Writing boring and tedious code

Debugging

Searching documentation

Finding vulnerabilities

Deciphering existing code

Fixing syntax

Creating descriptions and summaries

Remembering Git commands



Developer
productivity
with Copilot
goes beyond
speed.

87%

less **mental effort**
on repetitive tasks

74%

focus on more
satisfying work

73%

say they are more
in the flow

Developer productivity with Copilot benefits enterprises.



Release
cycle agility

55%

Faster completion



Developer
onboarding

57%

More upskilling



Developer
retention

41%

Less burnout



Your copilot for an AI-powered software development lifecycle.

From the
IDE and
Terminal



To the
Platform



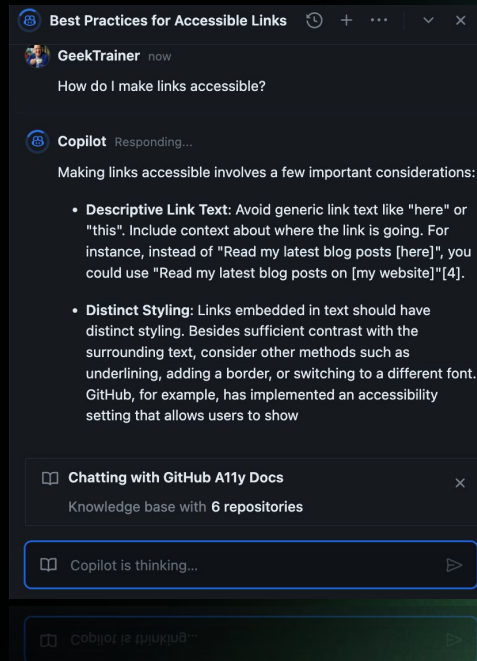


Search effortlessly with Copilot Knowledge Bases

✓ Conversational documentation search

✓ Customized to your documentation

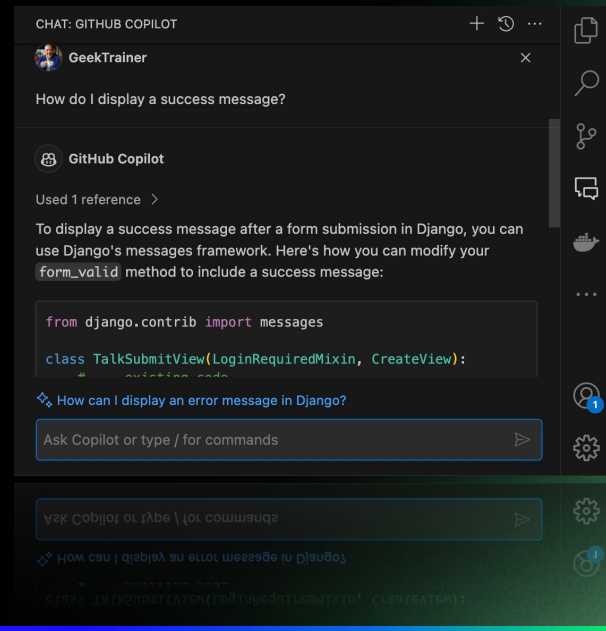
✓ Summaries and references to sources





Improve code quality with contextual conversations with Copilot Chat

- ✓ Context specific coding support
- ✓ Explains concepts and specific code blocks
- ✓ Debugging and vulnerability remediation assistance





Save time and energy on writing code with Code Completion

✓ Convert comments to code

✓ Autosuggest tests

✓ Show alternatives

```
class TalkListView(ListView):
    model = Talk
    template_name = 'list.html'
    context_object_name = 'talks'

    # Allow user to filter by status
    def get_queryset(self):
        status = self.request.GET.get('status', 'pending')
        return Talk.objects.filter(status=status)

        status = self.request.GET.get('status', 'pending')
```




Enable developers to take command of the CLI with Copilot CLI

✓ Git command assistance in the terminal

✓ Command and script explanations

```
Last login: Tue Feb 13 09:00:20 on console
$ gh copilot suggest "How do I create a new Django project in a folder named dog-shelter"
```

```
Welcome to GitHub Copilot in the CLI!
version 0.5.3-beta (2023-11-09)
```

I'm powered by AI, so surprises and mistakes are possible. Make sure to verify any generated code or suggestions, and share feedback so that we can learn and improve.

? What kind of command can I help you with?

> generic shell command

Suggestion:

```
django-admin startproject dog-shelter
```

? Select an option [Use arrows to move, type to filter]

> Copy command to clipboard

Explain command

Revise command

Rate response

Exit

EXIT

kgfz l62bou26

kgA726 coumwuq

Exbf9tu coumwuq

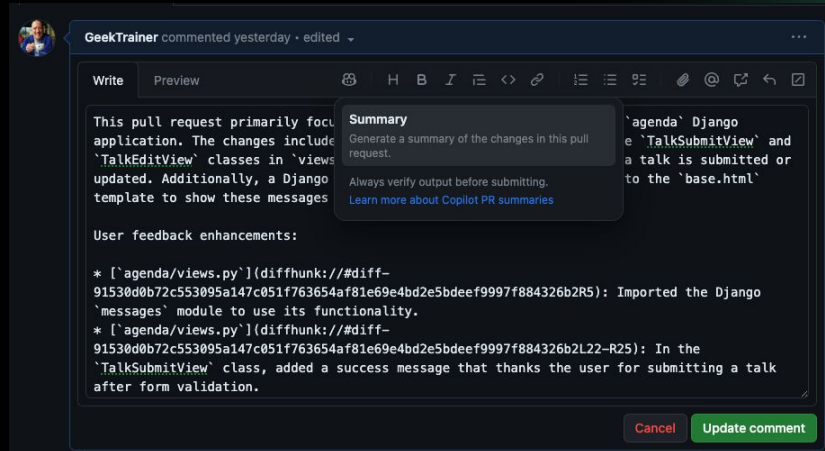
> c0b4 coumwuq g0 c77browz4

! perfect nu obf70u [Use arrows to move, type to filter]



Simplify collaboration by adding clarity with Copilot Pull Requests

- ✓ Pull request summaries
- ✓ Assisted code reviews
- ✓ Explanations on changes and comments





Implement custom models for fine tuning Copilot

✓ Draws context from your code and knowledge

✓ Fine tuning and custom private models



GitHub Copilot / Safe, Trustworthy, and Reliable

Safe, Trustworthy, and Reliable

Committed to creating responsible AI by design so you can trust in not only the technology and product but also GitHub as a partner.

Learn more: <https://gh.io/trustcenter>

- ✓ Privacy: Handling your data responsibly
- ✓ Security: Azure infrastructure and encryption
- ✓ Copyright: Respecting intellectual property rights



A six-month study of 450 developers



ACTIVITY

35%

Acceptance rate

88%

Characters retained



PRODUCTIVITY

50%

More pull requests

15%

Higher merge rate



EFFICIENCY

50%

More builds

45%

Higher success rate



SATISFACTION

96%

Successful on day one

90%

More fulfilled

Flight Reports



“ Trying to code in an unfamiliar language by googling everything is like navigating a foreign country with just a phrasebook. Using GitHub Copilot is like hiring an interpreter.



Flight Reports



“ A tool like GitHub Copilot is so impactful at large companies because suddenly engineers can make impactful changes to other developers' code with little previous exposure.



Severin Hacker // CTO, Duolingo

Flight Reports



John Skoubourdis
@scoubourdis

GitHub Copilot is like giving a programmer a super power 🦹

11:41 PM · Jun 2, 2022

1,579 Retweets 137 Quote Tweets 22.6K Likes



Alex MacCaw ✓
@maccaw

One of the best uses of GitHub CoPilot is autocompleting your tests.

At this point it's writing the majority of my tests.

5:55 PM · Oct 29, 2022

20 Retweets 3 Quote Tweets 307 Likes



swyx
@swyx

By far the greatest benefit of using @Github Copilot so far is I now don't have to be forced to document my code.

I actively "want" to write great comments, because when I do, I get the dopamine hit of a good Copilot suggestion.

7:51 PM · Oct 12, 2022 from Puerto Vallarta, Jalisco

21 Retweets 3 Quote Tweets 338 Likes



@willman@xoxo.zone
@willmanduffy

You win this round Copilot

```
updateMyselfMutationVari  
Name: 'Bob',  
ame: 'Builder',
```

5:01 PM · Jun 14, 2022

50 Retweets 3 Quote Tweets 780 Likes



Danny Postma
@dannypostmaa

AI is doing 80% of my coding – the future looks brighter than ever! 😁

```
90 methods: {  
91   async fetch () {  
92     // |  
93  
94     this.test = await this.$axios.$get('/admin/analytics', {  
95       params: {  
96         startDate: this.date.start,  
97         endDate: this.date.end  
98       }  
99     })  
100   }  
101   this.isLoading = false  
102 }  
103  
104
```

4:37 PM · Dec 1, 2022

1,161 Retweets 187 Quote Tweets 9,969 Likes



JD Ross ✓
@justindross

Some of our engineers just told me they'd estimate 40% of the lines of code they produce are now written by the Github CoPilot AI

6:13 PM · Oct 19, 2022

386 Retweets 159 Quote Tweets 5,220 Likes



Trusted and Proven AI / Customer Stories

Mercado Libre frees developers' minds to focus on their mission with GitHub.

GitHub-powered solutions

GitHub Enterprise — Turbo-charging the speed to market, including merging and deploying about 100,000 pull requests per day, keeping the company's apps ahead of the competition.

GitHub Copilot — Improve satisfaction and productivity among teams, empowering them to focus more on valuable work while automating away repetitive or less engaging tasks.

GitHub Advanced Security — Give developers security feedback early, so they can fix potential issues before they find their way into production.

Impact

Automated deployment, security tests, and repetitive tasks to free developers to spend more time on high-value, rewarding work.





“

With GitHub Copilot, I think
the possibilities for unlocking
innovation are dramatic.

Sebastian Barrios

SVP of Technology @ Mercado Libre



mercado
libre

SPACE: A framework for understanding developer productivity

The SPACE framework offers a new way of thinking about developer productivity.

S

Satisfaction and well-being

P

Performance

A

Activity

C

Communication and collaboration

E

Efficiency and flow



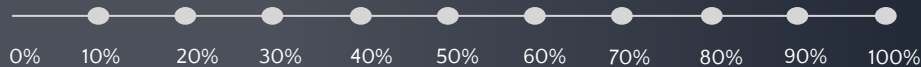
Satisfaction & well-being

Performance

"Less frustrated when coding"

"More fulfilled with my job"

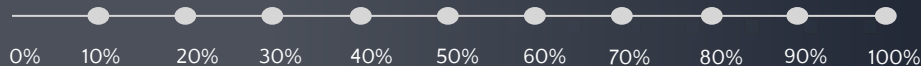
"Focus on more satisfying work"



S

"Faster completion"

"Faster with repetitive tasks"



P

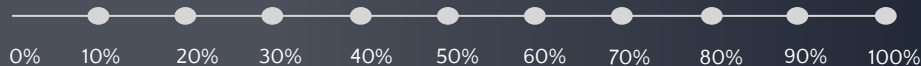


Communication & Collaboration

Efficiency & Flow



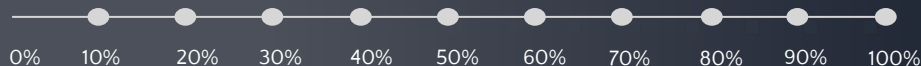
"Learn from suggestions"



"More in the flow"

"Less time searching"

"Less mental effort on repetitive tasks"

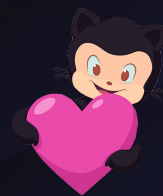




+



=





GitHub Advanced Security

Code Scanning

Analysis of created code, integrated into the developer workflow and powered by CodeQL

Secret Scanning

Automatic notifications of any API tokens or other secrets exposed anywhere in your git history

Dependabot

Secure the open source dependencies your applications rely on



Upskill developers

Provide in-context, actionable information

Copilot chat is a conversational UI experience with deep understanding of your code.

Ask. Learn. Understand.

The screenshot displays the GitHub Copilot chat interface within an IDE. The chat window shows a conversation with a user named 'leftrightright' asking about cross-site scripting (XSS). GitHub Copilot responds with a detailed explanation of XSS and provides a link to a security alert. The background shows a code editor with Java code for a web application.

GITHUB COPILOT

Hi @leftrightright, how can I help you?

I'm powered by AI, so surprises and mistakes are possible. Make sure to verify any generated code or suggestions, and [share feedback](#) so that we can learn and improve.

leftrightright

Can you explain what cross-site scripting is?

Github Copilot

Cross-site scripting (XSS) is a type of security vulnerability that allows an attacker to inject malicious code into a web page viewed by other users. This can allow the attacker to steal sensitive information, such as login credentials or personal data, from the users who view the page. In the context of the warning you provided, it means that the value of `queueNamePrefix` is not being properly sanitized, and could potentially contain malicious code that could be executed by a user's browser.

🔗 [How can I prevent cross-site scripting attacks in my web application?](#)

Ask Copilot a question or type '/' for topics

GitHub Security Alert

Cross-site scripting vulnerability due to a user-p

Cross-site scripting

Directly writing user input (for example, an HTTP request) allows for a cross-site scripting vulnerability.

Recommendation

To guard against cross-site scripting, consider using one of the other solutions that are mentioned in the

Example

The following example shows the `page` parameter in a cross-site scripting.

```
public class XSS extends HttpServlet {
    protected void doGet(HttpServletRequest request) throws ServletException, IOException {
        // BAD: a request parameter is written to the response
        response.getWriter().print("The page '" + request.getParameter("page") + "'")
    }
}
```

References

- OWASP: XSS (Cross Site Scripting) Prevention

AI and detection

Lessons from GitHub Copilot provide a foundation for scaling our detection capabilities to a point where we can **broaden** our scope whilst surfacing **high confidence** in the results.



Generic Secrets ✓

Leverage LLM's to give a better context of "strings", and turn that into a way to give you high accuracy "generic secrets"



Improve SAST coverage detection ✓

Use AI to scale our team from running models as data manually, to dynamically understanding context of code.



Non-structured third party software ⌚

Open source software doesn't just come in structured manifest files. How could we leverage LLMs to be able to get more context into a repository, and understand a broader range of open source software consumed.

Automated remediation



Faster Remediation 🍔

Quickly re-write vulnerable code with suggested fixes



Context Aware Suggestions 🍔

Developers gain a deeper understanding of findings from security tools



Automated PR Generation ✅

Turn on CodeQL, we will automatically raise PRs to fix your vulnerabilities.

github-code-scanning [bot] found potential problems 10 minutes ago [View reviewed changes](#)

```
main.js
... @@ -1,2 +1 @@
1 - document.write("Hello");
2 - document.write(window.location.search);
1 + document.write(window.location.search + "2");
```

Code scanning / CodeQL
Client-side cross-site scripting (Medium)
Cross-site scripting vulnerability due to user provider value
[View details](#)

Show paths Dismiss alert

github-code-scanning [bot] 10 minutes ago

To guard against cross-site scripting, consider using contextual output encoding/escaping before writing user input to the page. The following fix requires an external dependency, [dompurify 3.0.3](#)

AI suggested fix

```
1 - document.write(window.location.search + "2");
1 + const searchParams = new URLSearchParams(window.location.search);
2 + // This fix requires an external dependency: dompurify >= 3.0.3
3 + const sanitizedSearch = DOMPurify.sanitize(searchParams.toString());
4 + document.write(sanitizedSearch + "2");
```

Edit Commit fix Add fix to batch

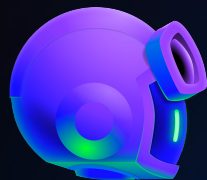
Reply...

Resolve conversation

Resolve conversation

GitHub Copilot

Built for tomorrow,
ready for today.





Thank You!

