



AI-Powered Scripting with GitHub Copilot

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Webex App

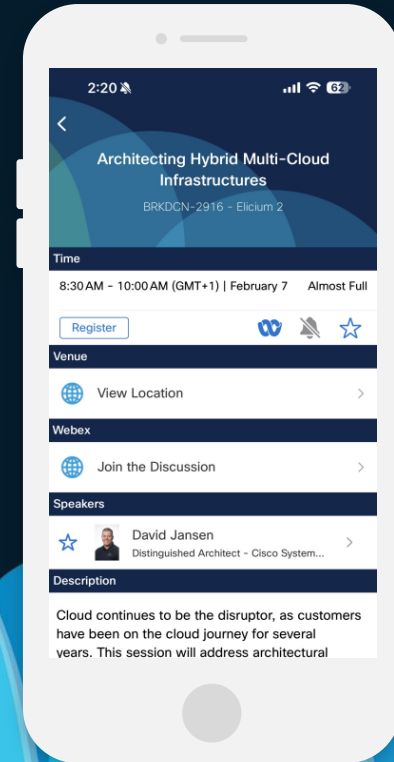
Questions?

Use the Webex app to chat with the speaker after the session

How

- 1 Find this session in the Cisco Events mobile app
- 2 Click “Join the Discussion”
- 3 Install the Webex app or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until February 28, 2025.





Agenda

- Intro to Coding Assistants
- Getting Started: GitHub Copilot
- Scripting Use Cases & Workflows
- Effectiveness of Copilot
- Caveats & Concerns
- Updates/Looking Forward
- Conclusion

Coding Assistants
**improve developer
productivity**
using GenAI.



There is GenAI, and there is GenAI tooling.

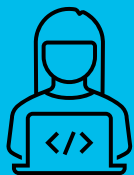
You don't need to "know AI" to use an AI tool!

You need to know **how to use the tool**, which includes knowing **how to create effective prompts**.

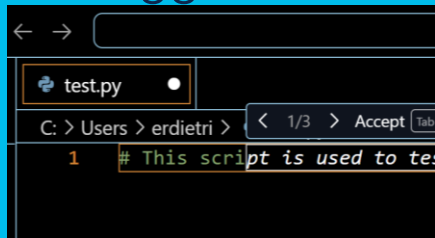
Getting Started: GitHub Copilot



The GitHub Copilot Suite

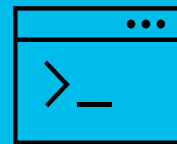
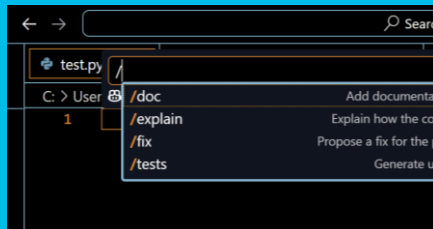


Copilot
Code
Suggestions



Companion to

Copilot Chat
Coding Help



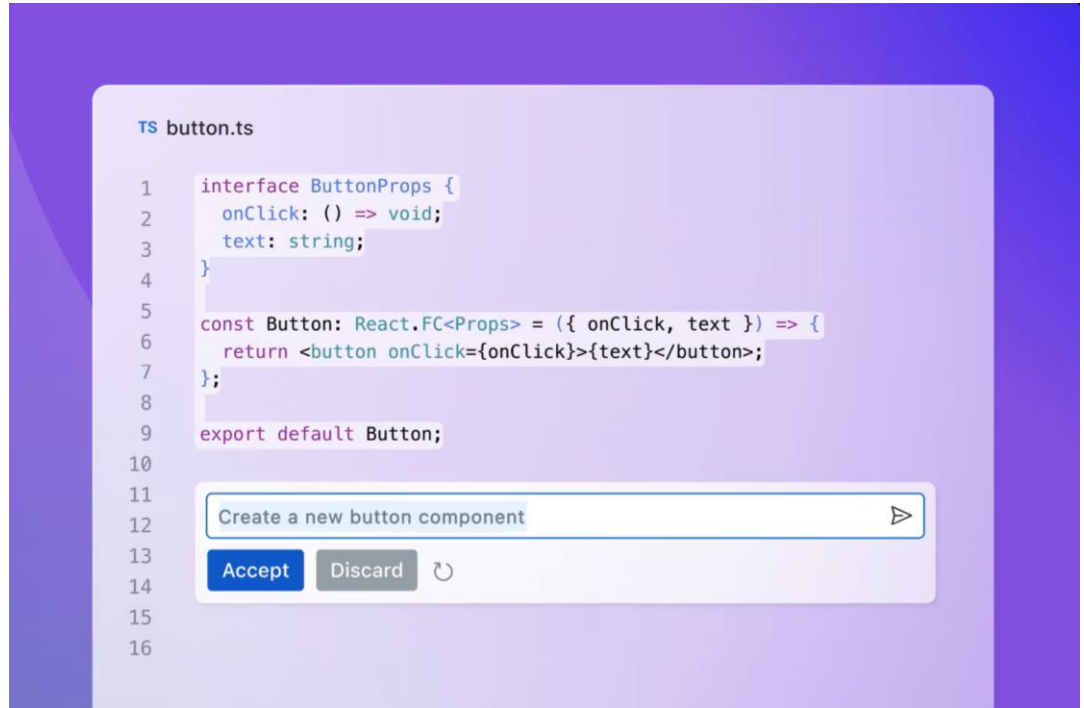
**Copilot in
the CLI**
Terminal Help

Core commands

- `gh auth`
- `gh browse`
- `gh codespace`

GitHub Copilot is the most widely used coding assistant in the world.

- Developed by GitHub and OpenAI in 2021
- Supports Python, JavaScript, TypeScript, Ruby, Go, C# and C++
- Developers are using it to **write code 55% faster**



"Why use Copilot when I can use ChatGPT?"

GitHub Copilot	ChatGPT
Specialized Purpose	General Purpose

"Why use Copilot when I can use ChatGPT?"

GitHub Copilot	ChatGPT
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More Accurate Code	Less Accurate Code

"Why use Copilot when I can use ChatGPT?"

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Specialized Purpose	General Purpose
More Accurate Code	Less Accurate Code
More Contextual Awareness	Less Contextual Awareness

"Why use Copilot when I can use ChatGPT?"

GitHub Copilot	ChatGPT
Specialized Purpose	General Purpose
More Accurate Code	Less Accurate Code
More Contextual Awareness	Less Contextual Awareness
Can Include Internal Knowledge Base	Publicly Available Information Only

"Why use Copilot when I can use ChatGPT?"

	GitHub Copilot	ChatGPT
✓	Specialized Purpose	General Purpose
✓	More Accurate Code	Less Accurate Code
✓	More Contextual Awareness	Less Contextual Awareness
✓	Can Include Internal Knowledge Base	Publicly Available Information Only
	Subscription-Based	Free for v3.5
	More Technical	Familiar/Friendly Interface

How useful or reliable
is Copilot really?

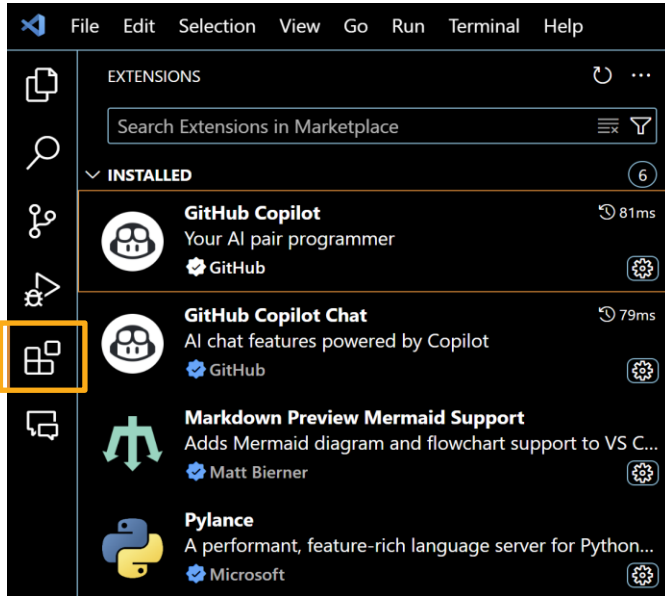
Prerequisites To Using GitHub Copilot

- Available as an IDE extension:
 - VS Code, Azure Data Studio, JetBrains IDEs, Xcode, Vim, Neovim, Visual Studio
- BIG NEWS: Free Tier now available! (It has limitations)

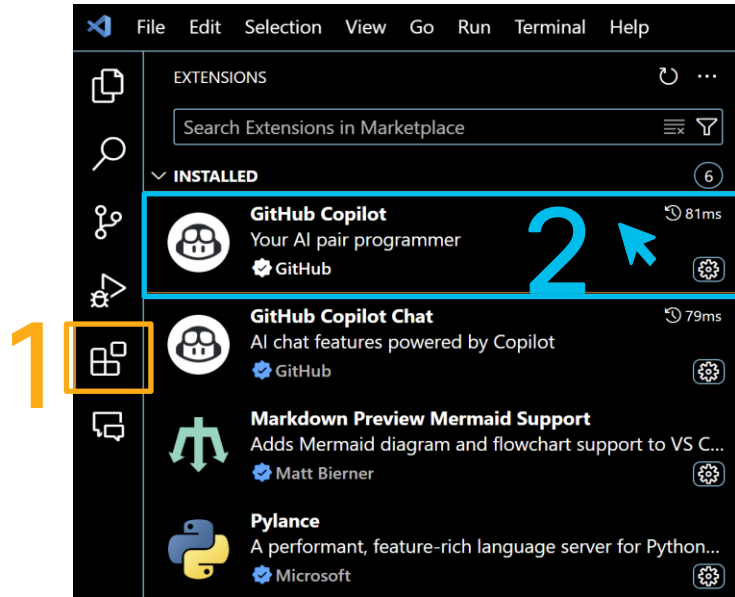
The screenshot displays the GitHub Copilot pricing page with four distinct tiers, each with a 'Get started' button. The 'Free' tier is highlighted with a 'New' badge, while the 'Pro' tier has a 'Most popular' badge. The 'Business' and 'Enterprise' tiers include a 'Contact sales' button. The 'Free' tier includes a link for existing VS Code users to 'Open now'.

Tier	Price	Frequency	Additional Info
Free	\$0	USD	For developers looking to get started with GitHub Copilot. Includes up to 2,000 completions and 50 chat requests per month.
Pro	\$10	USD per month	First 30 days free. Free for verified students, teachers, and maintainers of popular open source projects. Learn more
Business	\$19	USD per user / month	For teams ready to accelerate their workflows with GitHub Copilot.
Enterprise	\$39	USD per user / month	For organizations seeking a fully customized GitHub Copilot experience.

Install GitHub Copilot with Chat in VS Code 2022

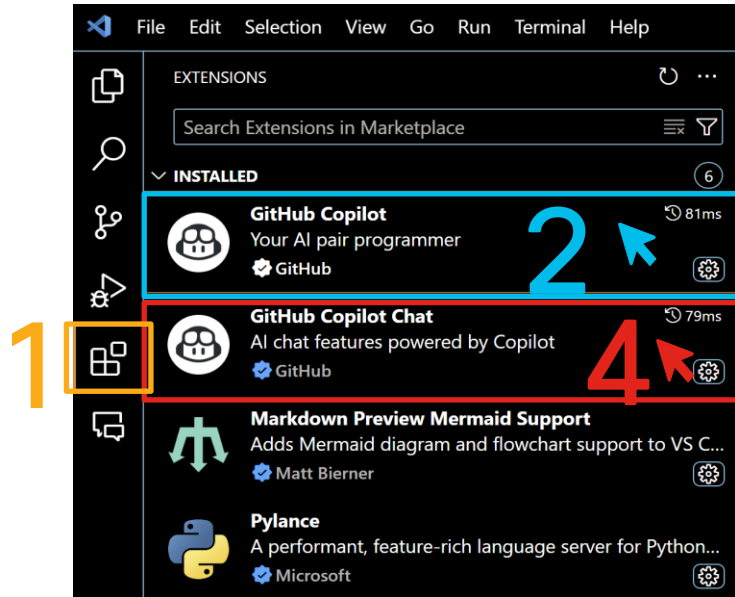


Install GitHub Copilot with Chat in VS Code 2022

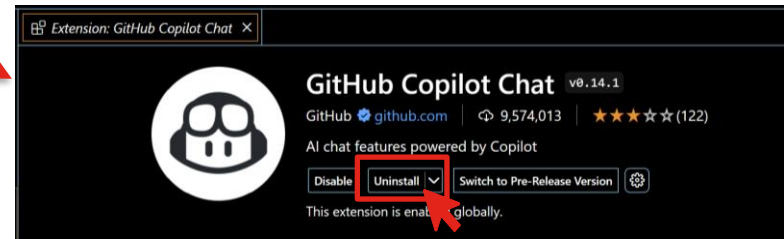


3 Click Install button for Copilot
(shows Uninstall when already installed)

Install GitHub Copilot with Chat in VS Code 2022



3 Click Install button for Copilot
(shows Uninstall when already installed)



5 Click Install button for Copilot Chat
(shows Uninstall when already installed)

Using Copilot Inside VS Code

The screenshot shows the VS Code interface with several annotations:

- Top Editor:** A blue box highlights a comment in `example.py`: `1 Press [Ctrl][I] to ask Code to do something. Start typing to dismiss.`. Below it, the text "Press Ctrl+I to pull up Copilot" is written in blue.
- Left Explorer:** An orange box highlights the file explorer where a file named `example.py` is selected. Below it, the text "After typing, can click the sparkle to pull up Copilot" is written in orange.
- View Menu:** A green box highlights the "View" menu, with "Chat" selected. Below it, the text "To view Copilot Chat window" is written in green.
- Right Panel:** The "Ask Copilot" sidebar is visible, showing instructions on how to use Copilot. At the bottom, a blue box highlights the input area where a chat can be started. Below it, the text "Start a chat" is written in blue with a blue arrow pointing to the input area.

Ask Copilot

Copilot is powered by AI, so mistakes are possible. Review output carefully before use.

📎 or type # to attach context
@ to chat with extensions
Type / to use commands

/fix the problems in my code
/tests add unit tests for my code
/explain how the selected code works

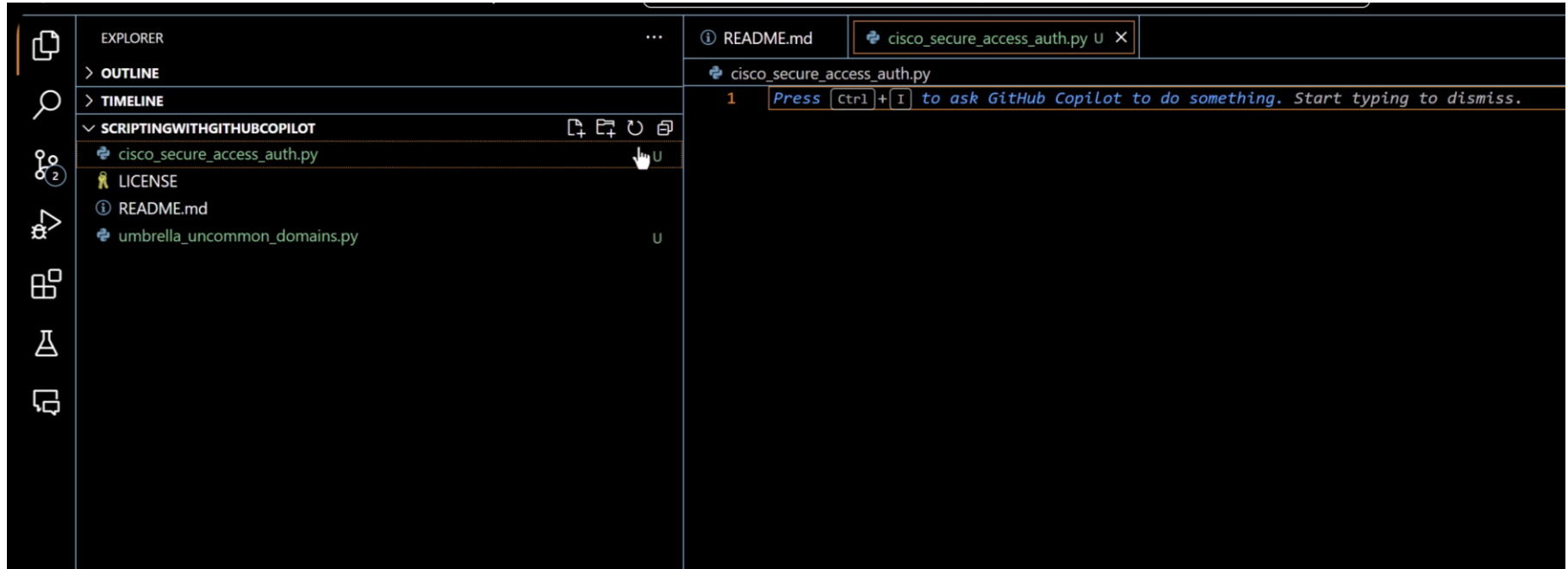
Ask Copilot

example.py Current file 🔗

@ 📎 🗣️ GPT 4o 🏠

Scripting Use Cases with Copilot

Accept predictive code suggestions as you type.



Copilot can generate comments for code and predict the next comment based on context.

```
cisco_secure_access_reporting.py > ...  
1 import requests  
2 import json  
3 import requests  
4  
5  
6  
7 # Authenticate to the Cisco Secure Access Reporting API  
8 def authenticate():  
9  
10 url = "https://api.sse.cisco.com/auth/v2/token"  
11  
12 payload = None  
13  
14 headers = {  
15     "Content-Type": "application/x-www-form-urlencoded",  
16     "Accept": "application/json"  
17 }  
18  
19 response = requests.request('POST', url, headers=headers, data = payload)  
20  
21 print(response.text.encode('utf8'))  
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```

A decently written comment can be enough for GitHub Copilot to suggest accurate code.

After using various files in a script, at the end of the script, I wanted to remove all unnecessary files.

Copilot correctly understood which files I would consider "unnecessary" based on context.

Original Comment

```
128  
129 # Clean up files used to determine uncommon domains.  
130
```

Accepted Code Suggestion

```
129 # Clean up files used to determine uncommon domains.  
130 def clean_up_files():  
131     os.remove('top-1m.csv.zip')  
132     os.remove('top-1m.csv')  
133     os.remove('top_destinations.csv')  
134     os.remove('top_1million_csv')
```

GitHub Copilot provides you with code options.

Option 1

Original Comment

```
128  
129 # Clean up files used to determine uncommon domains.  
130
```

Option 2

```
128  
129  
130 def clean_up_files():  
  
    os.remove('top-1m.csv.zip')  
    os.remove('top-1m.csv')  
    os.remove('top_1million_csv')  
    os.remove('top_destinations.csv')
```

Option 3

This alternative became unavailable to me while creating this example! Alternatives suggested often change.

```
128  
129  
130 def clean_up_files():  
  
    os.remove('top-1m.csv.zip')  
    os.remove('top-1m.csv')  
    os.remove('top_1million_csv')  
    os.remove('top_destinations.csv')  
  
    print("Files have been cleaned up.")  
131
```

Copilot can suggest better variable and function names.

Original Variable Name

```
7 # Authenticate to the Cisco Secure Access Reporting API and return the token
8 def authenticate():
9
10 url = "https://api.sse.cisco.com/auth/v2/token"
11
```

Suggested Variable Name

```
7 # Authenticate to the Cisco Secure Access Reporting API and return the token
8 def authenticate():
9
```

Can you improve this variable name?

GitHub Copilot

Made changes.

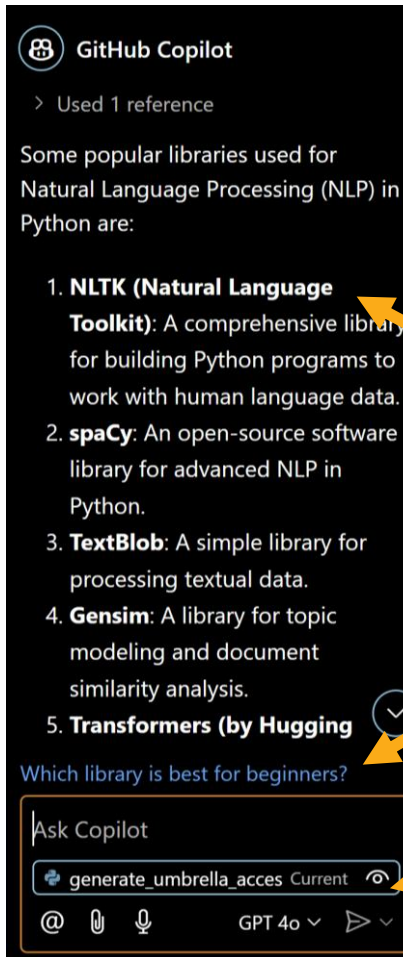
Accept Discard

Accept or Discard

```
10 token_url = "https://api.sse.cisco.com/auth/v2/token"
11
```

Copilot chat can be used for learning.

(i.e. understanding a new library)



“What libraries are used for NLP in Python?”

List of libraries with short descriptions

Suggests a follow-up question

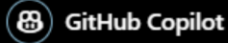
Indicates files referenced and LLM used

Get suggestions around code security.

U

```
2 import requests
3 import json
4 import os
5 import pandas as pd
6 from dotenv import load_dotenv
7
8 load_dotenv()
9
10 # Set the Cisco Umbrella Investigate API key
11 api_key = 'fjdsklewoiafewiaefije'
12
13 ✨
14
15
```

“How can I secure my API endpoints in Python?”



> Used 1 reference

Securing API endpoints in Python involves several steps, including authentication, authorization, input validation, and using HTTPS. Below is a step-by-step guide to secure your API endpoints using Flask, a popular web framework for Python.

Step 1: Install Required Packages

First, ensure you have Flask and Flask-JWT-Extended installed:

```
pip install Flask Flask-JWT-Extended
```


Step 2: Set Up Your Flask Application

Create a basic Flask application with JWT authentication.

```
from flask import Flask, jsonify, request
from flask_jwt_extended import JWTManager, create_access_token, jwt_required, get_jwt_identity

app = Flask(__name__)
app.config['JWT_SECRET_KEY'] = 'your_jwt_secret_key' # Change this to a secure key
jwt = JWTManager(app)
```

“How can I secure my API endpoints in Python?”

 **GitHub Copilot**

> Used 1 reference

Helpful!!

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jwt = JWTManager(app)
```

Less helpful

(Referencing the previous code)

“Can you tell me if this code is secure?”



GitHub Copilot

> Used 1 reference

The code snippet you provided contains a potential security risk because the JWT secret key is hardcoded directly in the source code. Hardcoding sensitive information like secret keys can lead to security vulnerabilities, especially if the code is shared or stored in a version control system.

Recommendations for Securing the JWT Secret Key

1. **Environment Variables:** Store the secret key in an environment variable.
2. **Configuration Files:** Use a configuration file that is not included in version control.
3. **Secrets Management Services:** Use a secrets management service like AWS Secrets Manager, Azure Key Vault, or HashiCorp Vault.

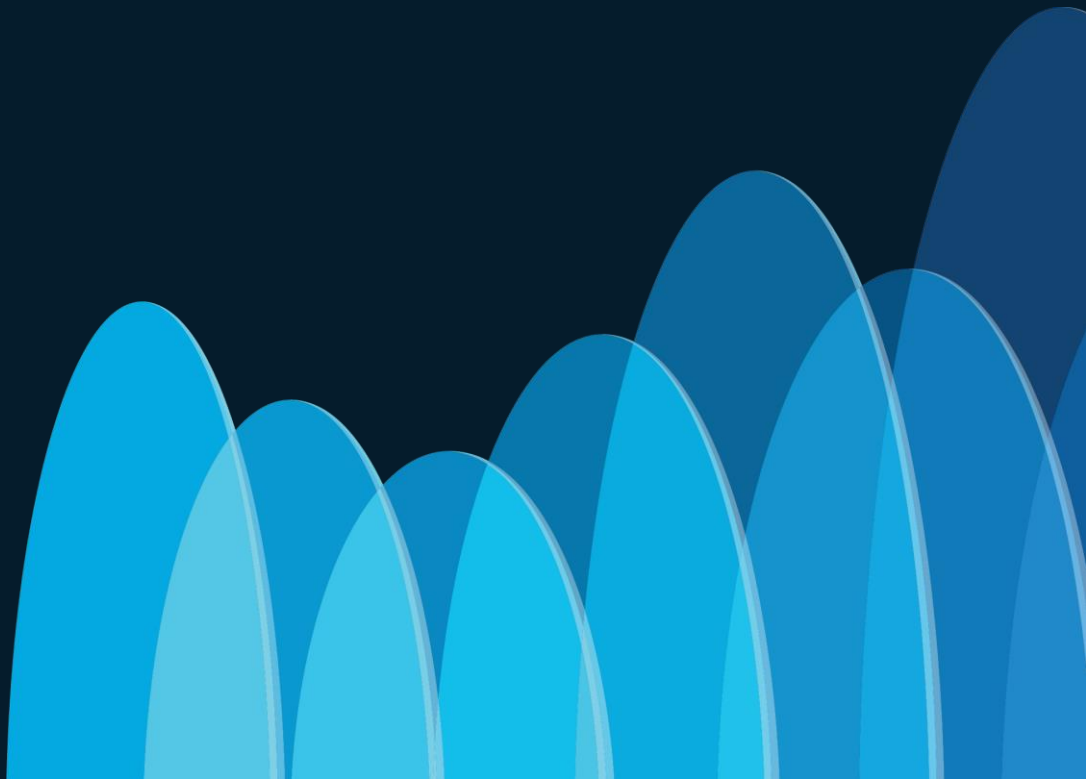
Example Using Environment Variables

1. Set the Environment Variable:

- On Windows:

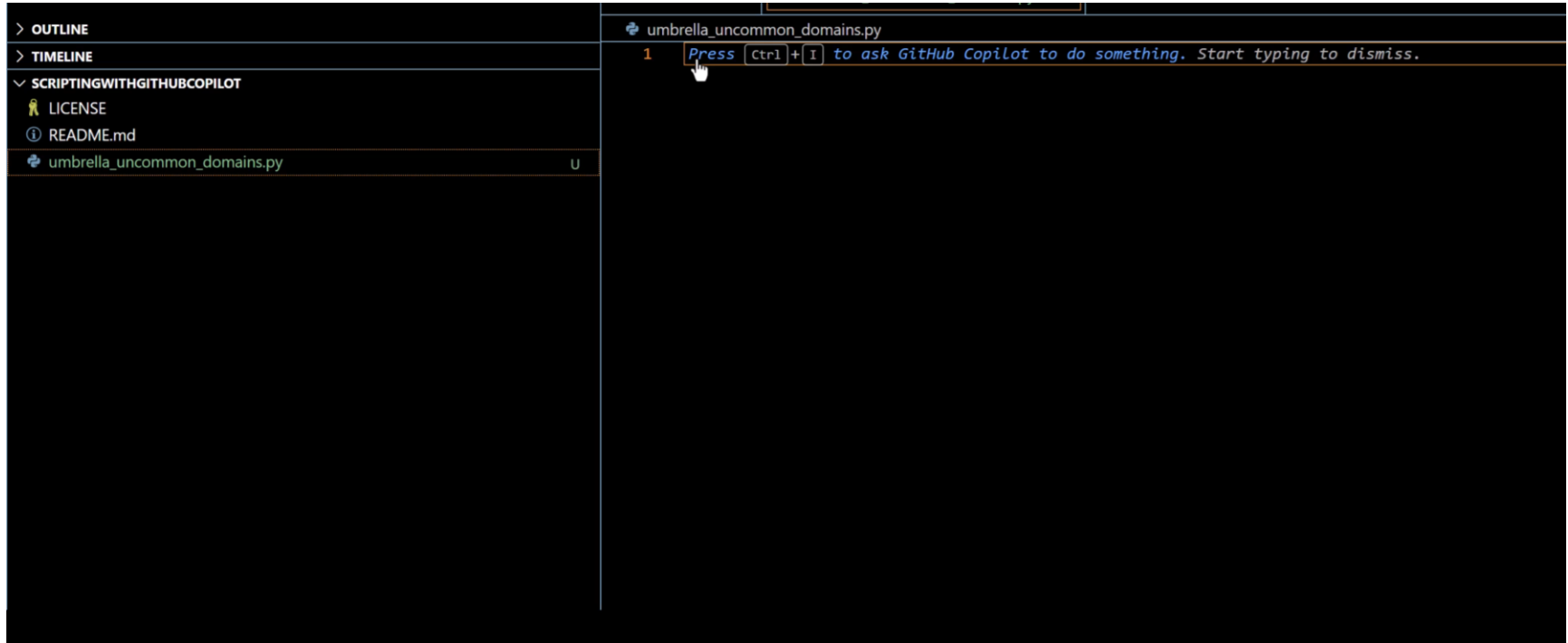
```
set JWT_SECRET_KEY=your_jwt_secret_key
```

Scripting Workflows with Copilot



Option 1: Copilot-Informed Scripting

Code as you normally would, but with Copilot enabled.

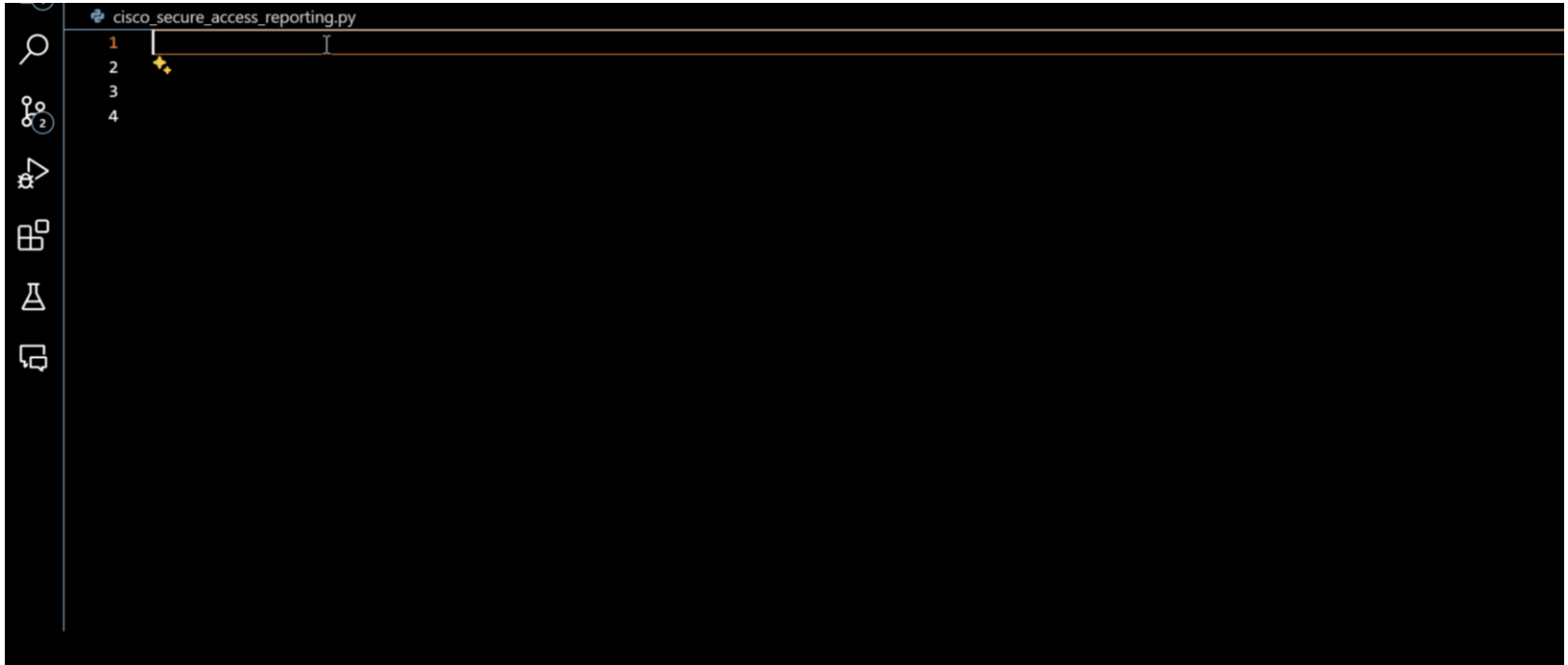


Ways To Be “Copilot-Informed”

- Accepting predictive text as convenient
- Asking Chat questions as needed
- Getting code security suggestions
- Getting refactoring suggestions
- Generating comments
- Generating code documentation

Option 2: Comment-Driven Scripting

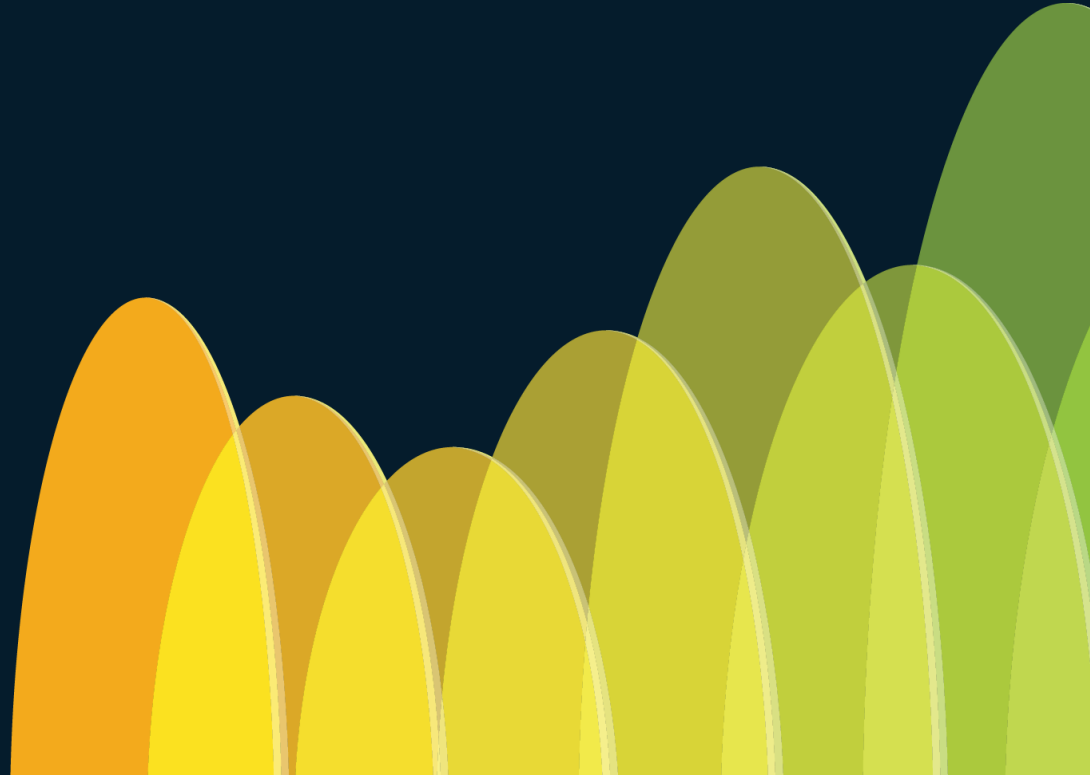
Generate code from descriptive comments ("effective prompts")



How To Be “Comment-Driven”

- Generate code from descriptive comments ("effective prompts")
- Being "Comment-driven" also requires...
 - Knowing how to implement suggested logic
 - Evaluation of all code generated
 - Willingness to make code changes where needed

Effectiveness of Copilot



How useful or reliable is Copilot really?

Highly reliable

- Variable naming
- Function naming
- Answering questions about libraries
- Teaching concepts

Moderately reliable

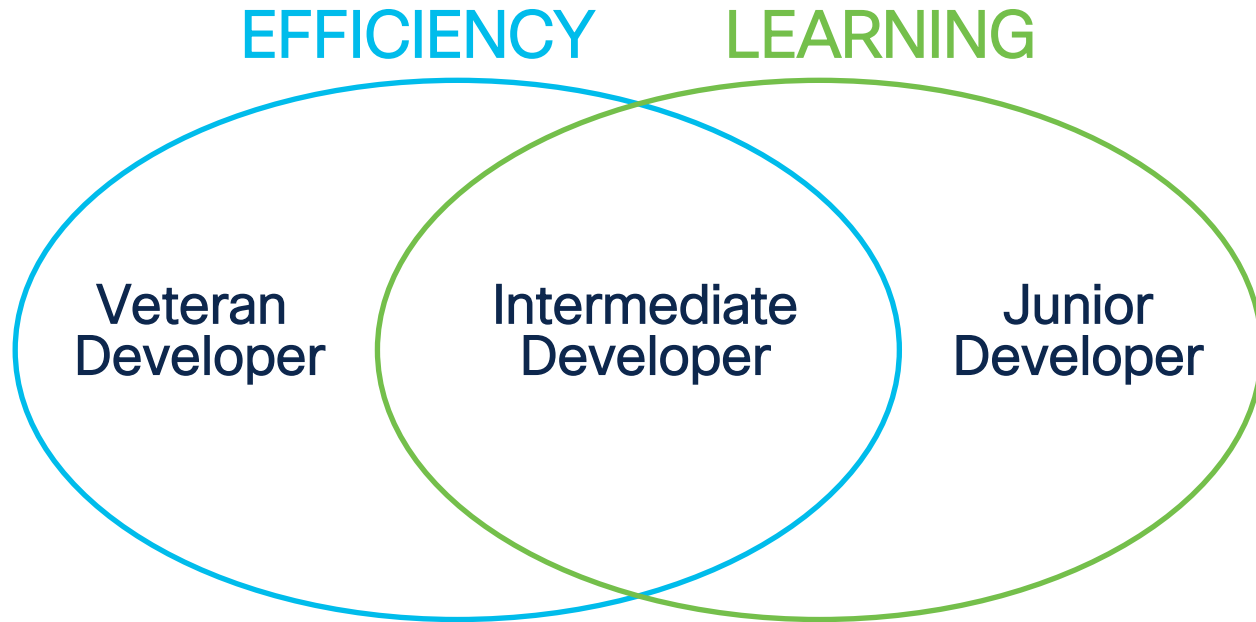
- Comment generation
- Code generation from comments
- Specific code generation
- Secure code suggestions

Not so reliable

- Code scaffolding
- API requests
- Complex code generation

The smaller and
more specific the task,
the more reliable Copilot is.

Where can Copilot **provide the most value** when scripting?



Caveats



Coding assistants
aren't always correct.

Faster code
doesn't equal
better code.

Coding assistants
are not a replacement
for knowing how to code.

“What is Copilot doing with my data?”

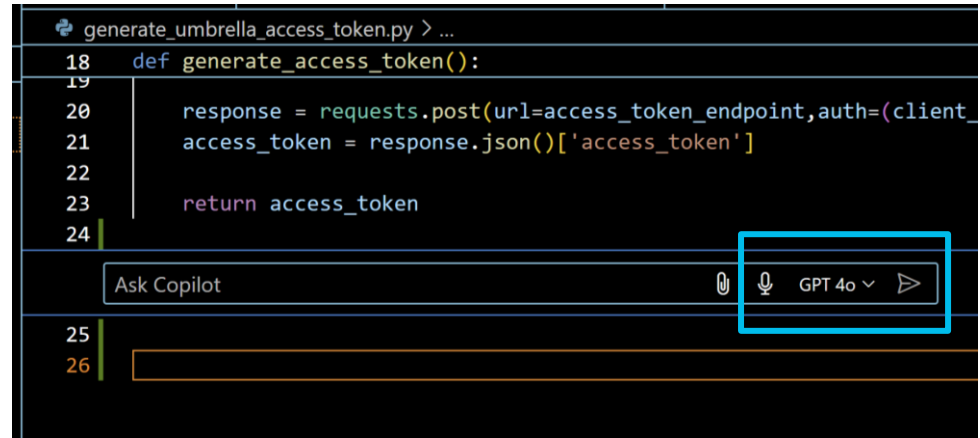
- Prompts are encrypted (in-transit and at rest) and transmitted to Azure, where Copilot’s model is hosted
- If using the Copilot extension, Copilot will discard your prompt, suggestion, and supporting context.
- GitHub doesn’t train on code from Business/Enterprise customers, but Individuals must opt-out

Updates/ Looking Forward



Copilot is **now offering developer choice** in large language model.

- Anthropic's Claude 3.5 Sonnet
- Google's Gemini 1.5 Pro
- OpenAI's GPT-4o
- OpenAI's o1-preview
- OpenAI's o1-mini



The screenshot shows a code editor with a dark theme. At the top, a file named 'generate_umbrella_access_token.py' is open. The code defines a function 'generate_access_token()' that uses 'requests.post()' to fetch an 'access_token' from a JSON response. Below the code, there is a Copilot interface bar. It includes a text input field with the placeholder 'Ask Copilot', a paperclip icon for attachments, a microphone icon for voice input, a dropdown menu currently showing 'GPT 4o', and a right-pointing arrow icon to submit the query. The code lines are numbered 18 through 26.

```
generate_umbrella_access_token.py > ...
18 def generate_access_token():
19
20     response = requests.post(url=access_token_endpoint, auth=(client_id, client_secret))
21     access_token = response.json()['access_token']
22
23     return access_token
24
25
26
```

The next big thing: Workspaces

Guidelines for teaching junior engineers to code in the age of AI.

Conclusion



AI coding assistants
are helpful assistants only;
you are the brain.

How will **you** start using an AI coding assistant in your workflow?

CISCO *Live!*

GO BEYOND

The background of the slide features a series of overlapping, teardrop-shaped elements in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are arranged in a way that creates a sense of depth and movement, resembling a stylized mountain range or a series of waves. The overall aesthetic is clean and modern.

“What is Copilot doing with my data?”

- Prompts are encrypted (in-transit and at rest) and transmitted to Azure, where Copilot’s model is hosted
- If using the Copilot extension, Copilot will discard your prompt, suggestion, and supporting context.
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Webex App

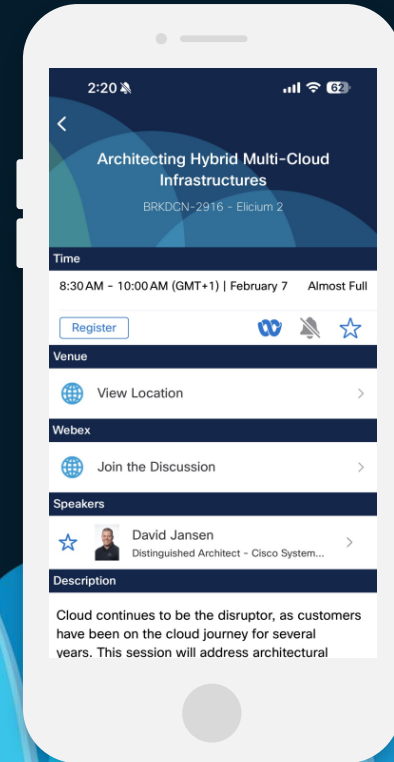
Questions?

Use the Webex app to chat with the speaker after the session

How

- 1 Find this session in the Cisco Events mobile app
- 2 Click “Join the Discussion”
- 3 Install the Webex app or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until February 28, 2025.



Fill Out Your Session Surveys



Participants who fill out a minimum of 4 session surveys and the overall event survey will get a unique Cisco Live t-shirt.

(from 11:30 on Thursday, while supplies last)



All surveys can be taken in the Cisco Events mobile app or by logging in to the Session Catalog and clicking the 'Participant Dashboard'



Content Catalog

Continue your education



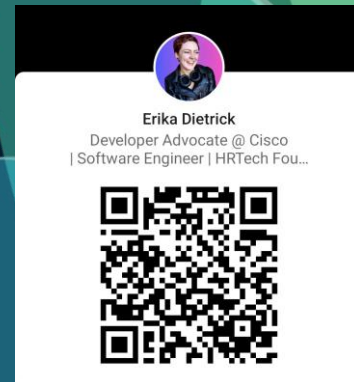
- Visit the Cisco Showcase for related demos
- Book your one-on-one Meet the Engineer meeting
- Attend the interactive education with DevNet, Capture the Flag, and Walk-in Labs
- Visit the On-Demand Library for more sessions at ciscolive.com/on-demand. Sessions from this event will be available from March 3.



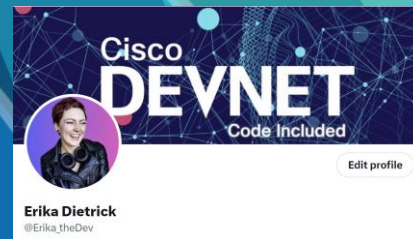
Thank you

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GO BEYOND

The background of the slide features a series of overlapping, teardrop-shaped elements in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are arranged in a way that creates a sense of depth and movement, resembling a stylized mountain range or a series of waves. The overall aesthetic is clean and modern.