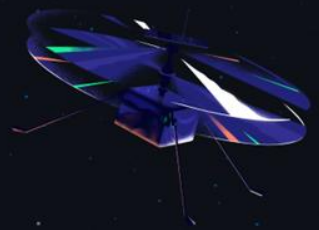
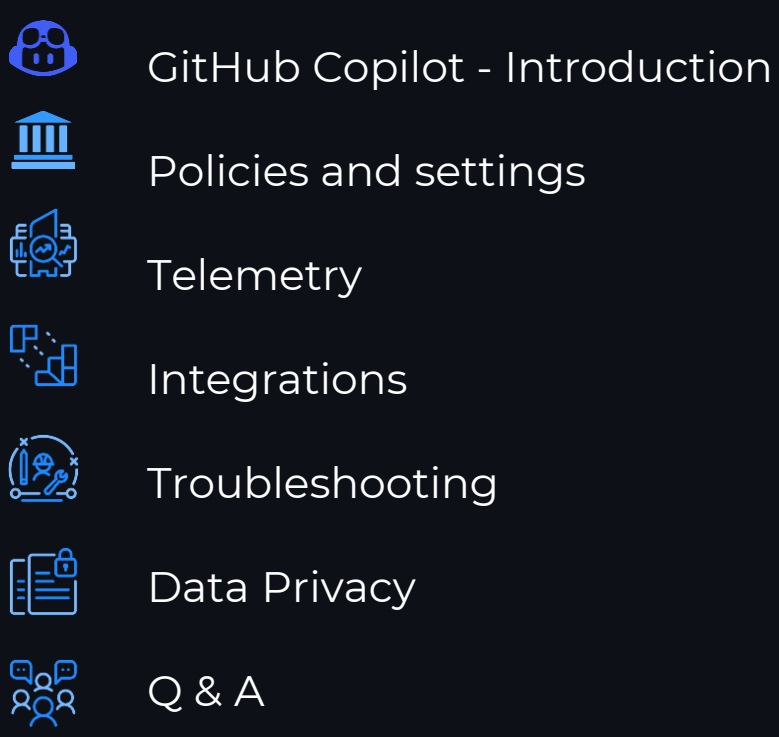
GitHub Copilot Administration & Security

Let’s build from here



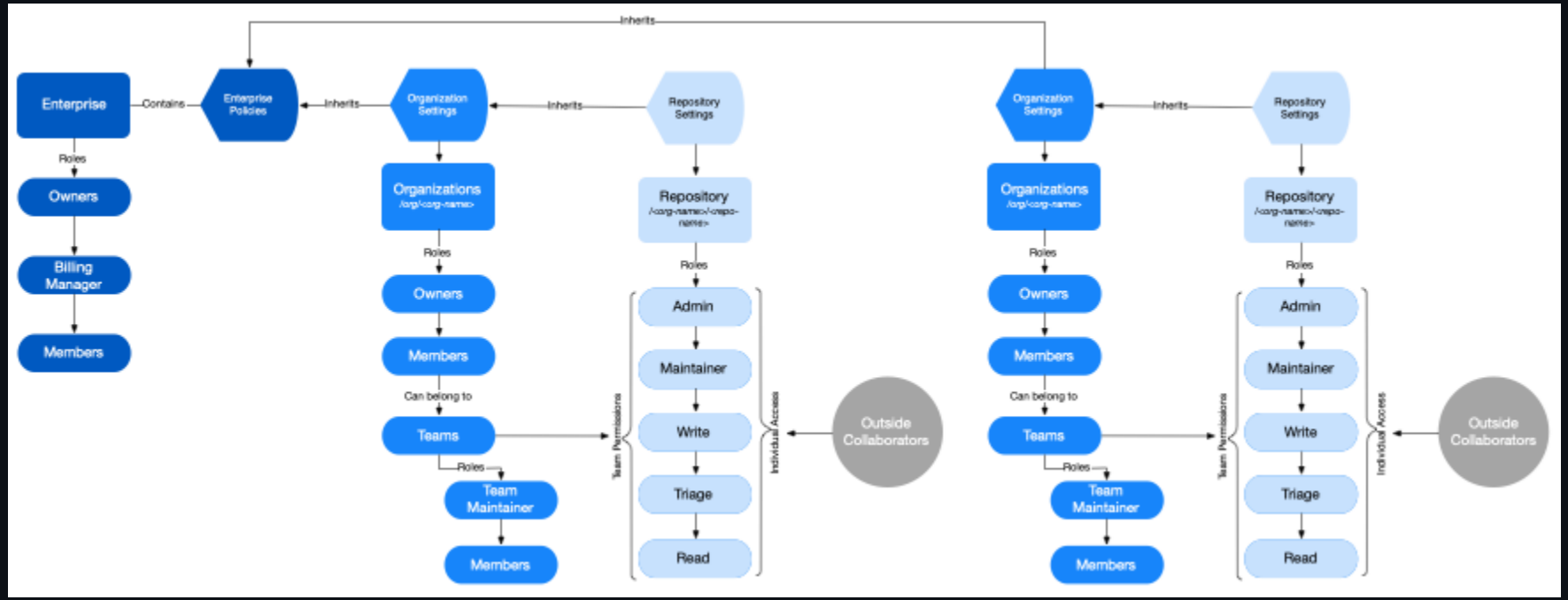
AGENDA



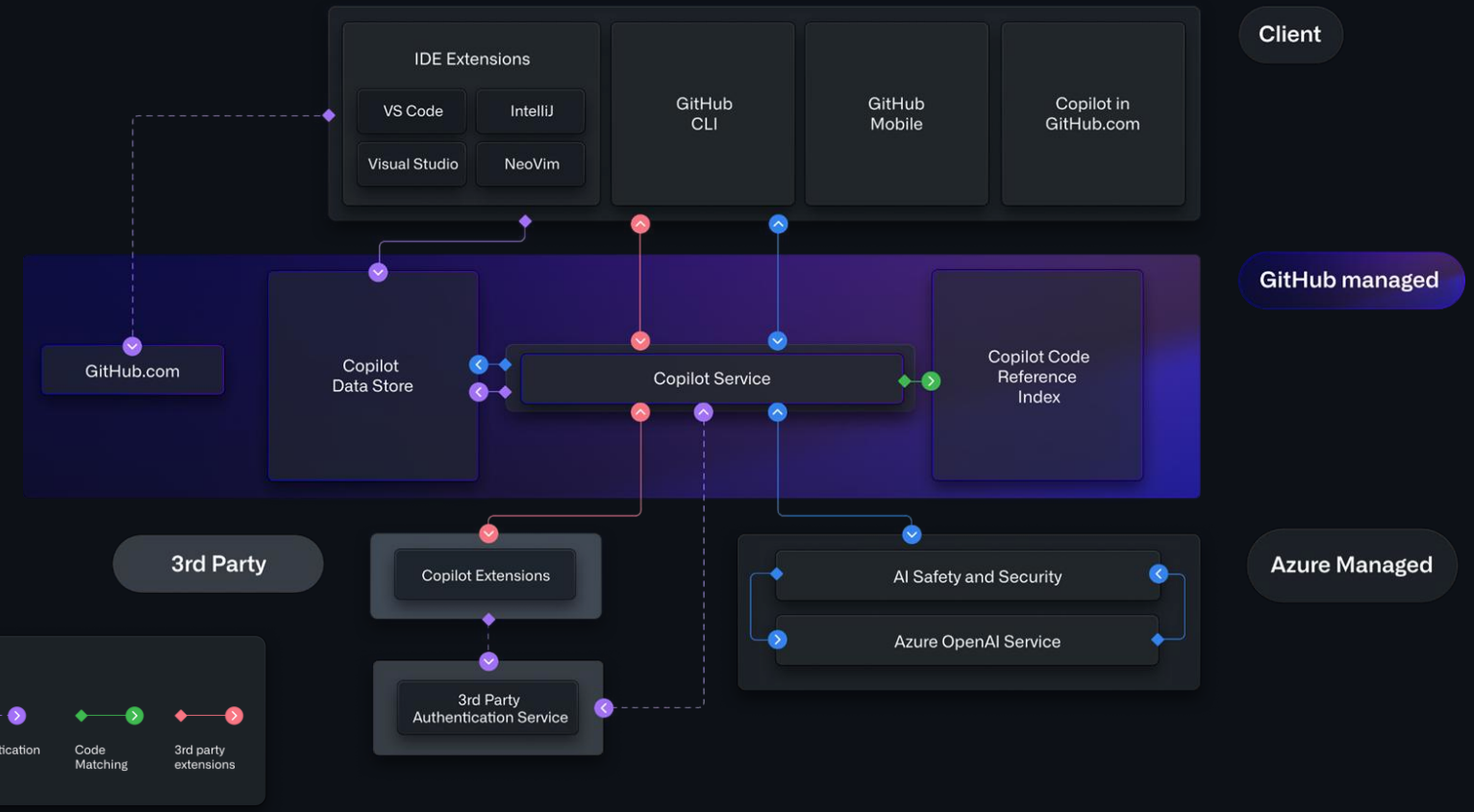
- GitHub Copilot - Introduction
- Policies and settings
- Telemetry
- Integrations
- Troubleshooting
- Data Privacy
- Q & A

Architecture

Flow of policies and permissions



GitHub Copilot Architecture



Policies and Settings

Govern the usage of GitHub Copilot in your Enterprise

Copilot Policies Categories

Enterprise Policies

Manage the policies for all the organizations owned by your enterprise

You cannot select a more permissive policy at the organization level

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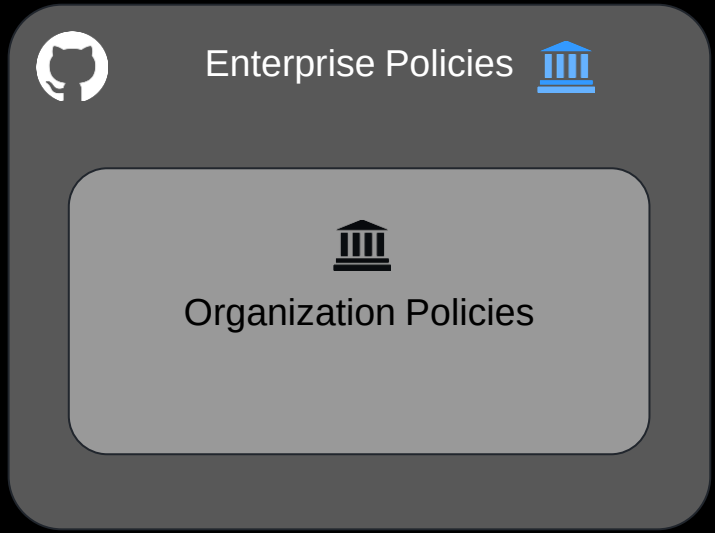
Organization Policies

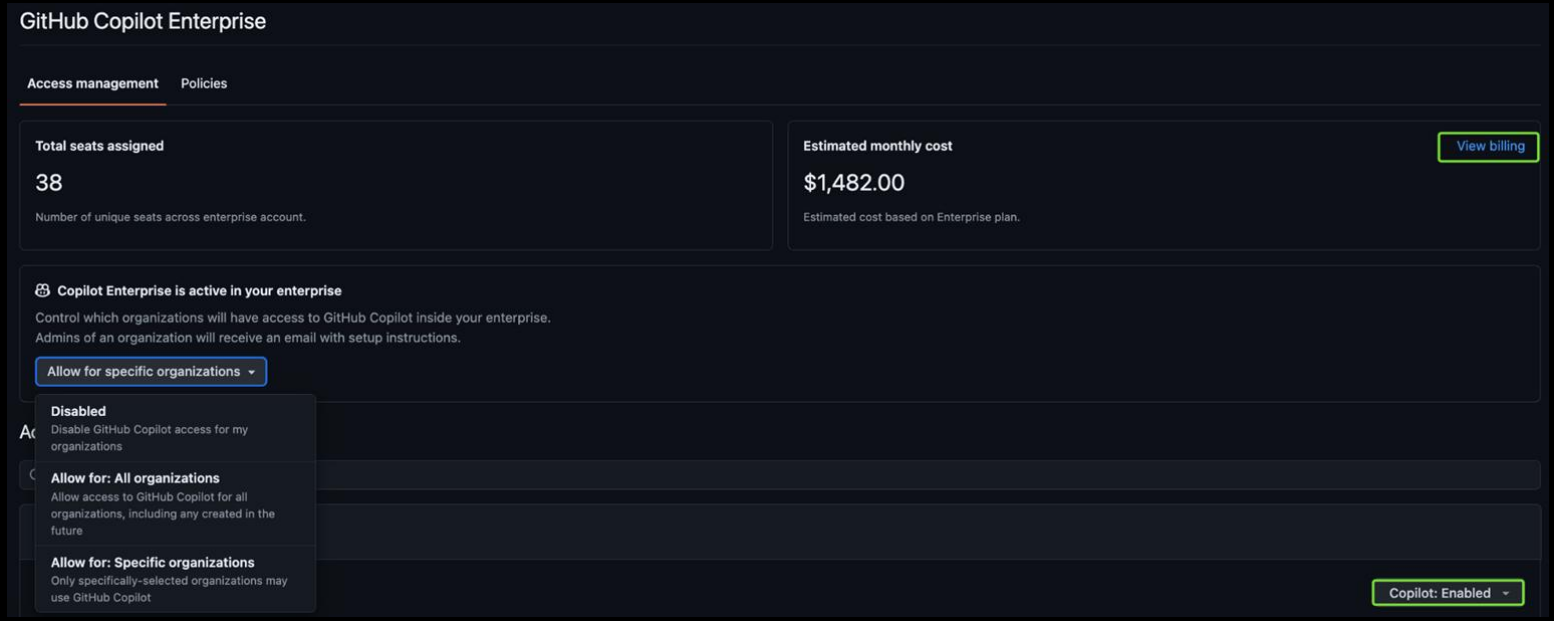
In the absence of a defined Enterprise Policy, individual organizations within the enterprise have the flexibility to choose their own.



Enterprise Access Management

Copilot Enterprise is active in your enterprise

- Disabled
- Allow for all organizations
- Allow for specific organizations



Enterprise Policies

Control whether suggestions matching public code is allowed or blocked

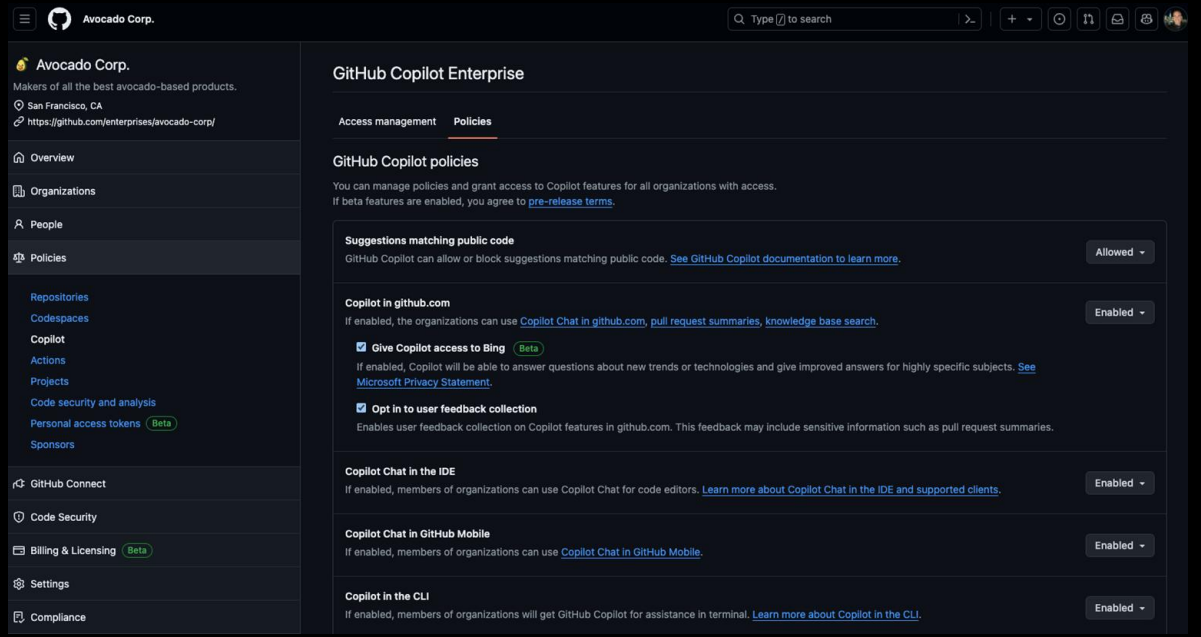
- No policy
- Blocked
- Allow

Copilot in github.com

- No policy
- Enabled
- Disabled

Copilot Chat in the IDE

- No Policy
- Enabled
- Disabled



Copilot Chat in GitHub Mobile

- No Policy
- Enabled
- Disabled

Copilot in the CLI

- No Policy
- Enabled
- Disabled

Organization Settings

Categorization of Copilot Organization settings

Access

Manage, control and audit the users Copilot interaction

Policies

Regulate Copilot functionality and feature enablement

Knowledge bases

Groups of repositories that are used by Copilot to ground responses in your organization's data

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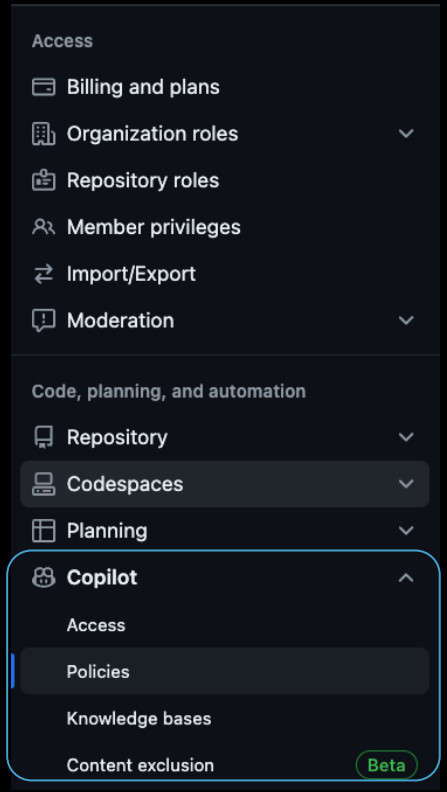
Content exclusion

Repositories and paths that need to be excluded from Copilot within the organization

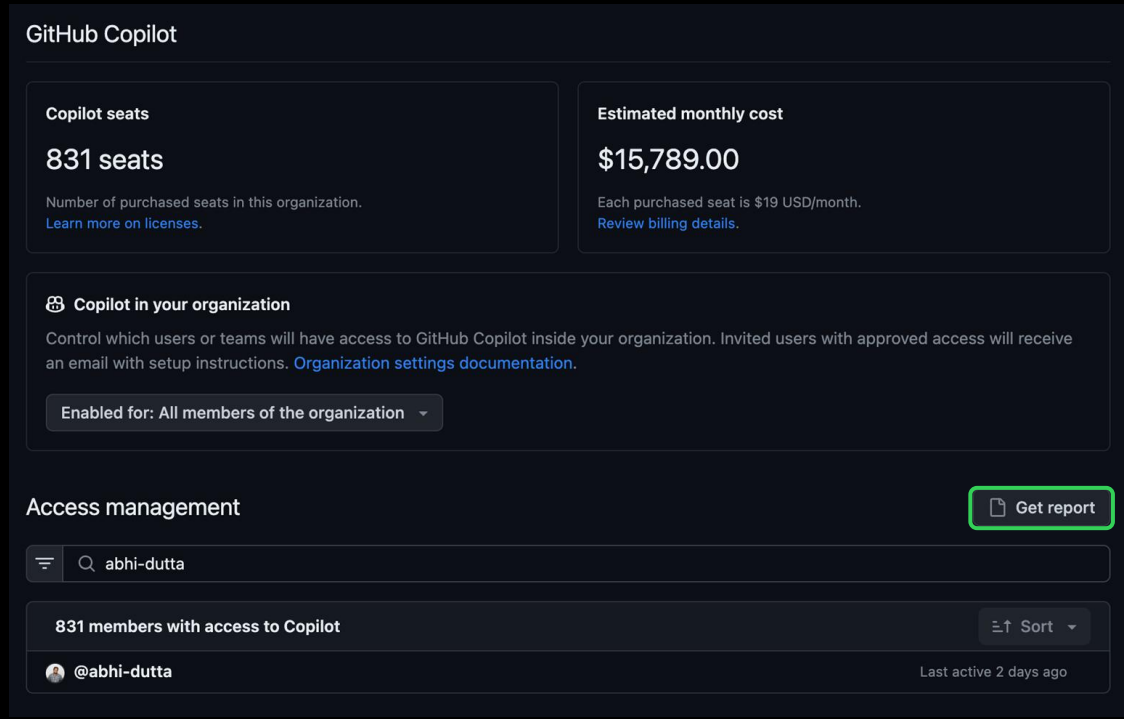


Organization Settings

Access Settings

- View Number of Copilot license utilized
- Estimated cost of Copilot Usage within the Organization
- Policy to enable Copilot for all members in the Organization or selective members
- Extract report of Copilot activity per user

Manage & Control Access



Organization Settings

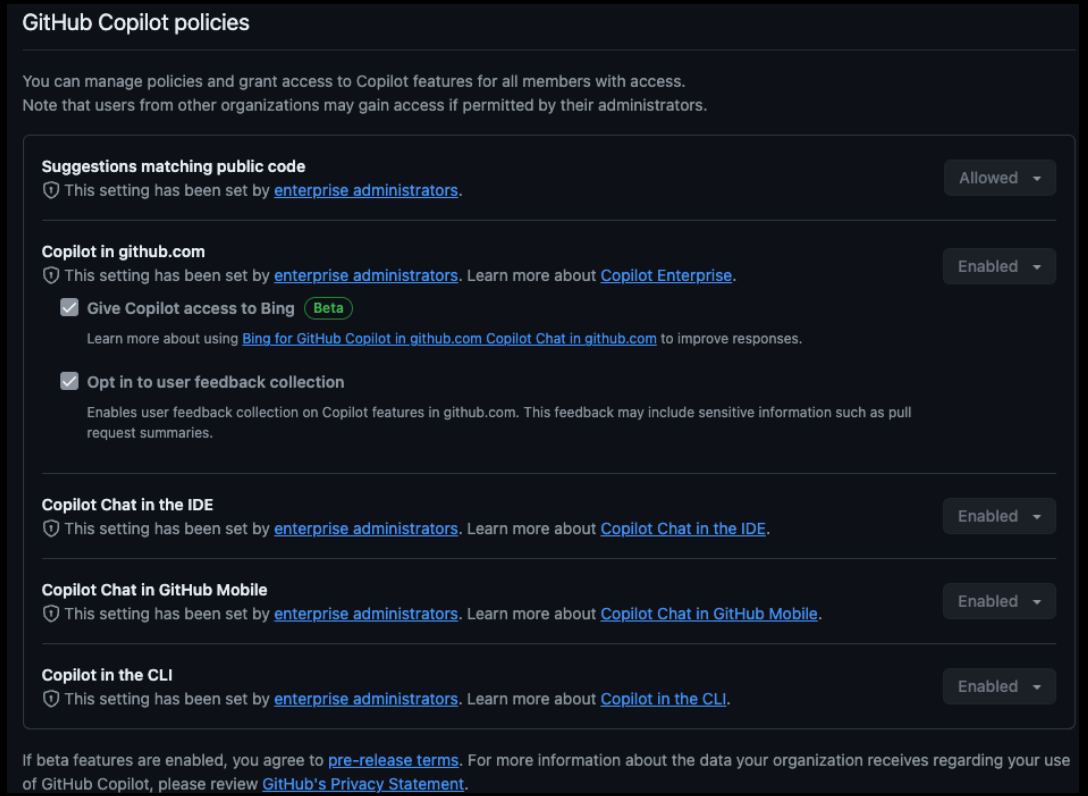
Access - Copilot user activity report (sample)

octodemo-seat-usage-1696435416

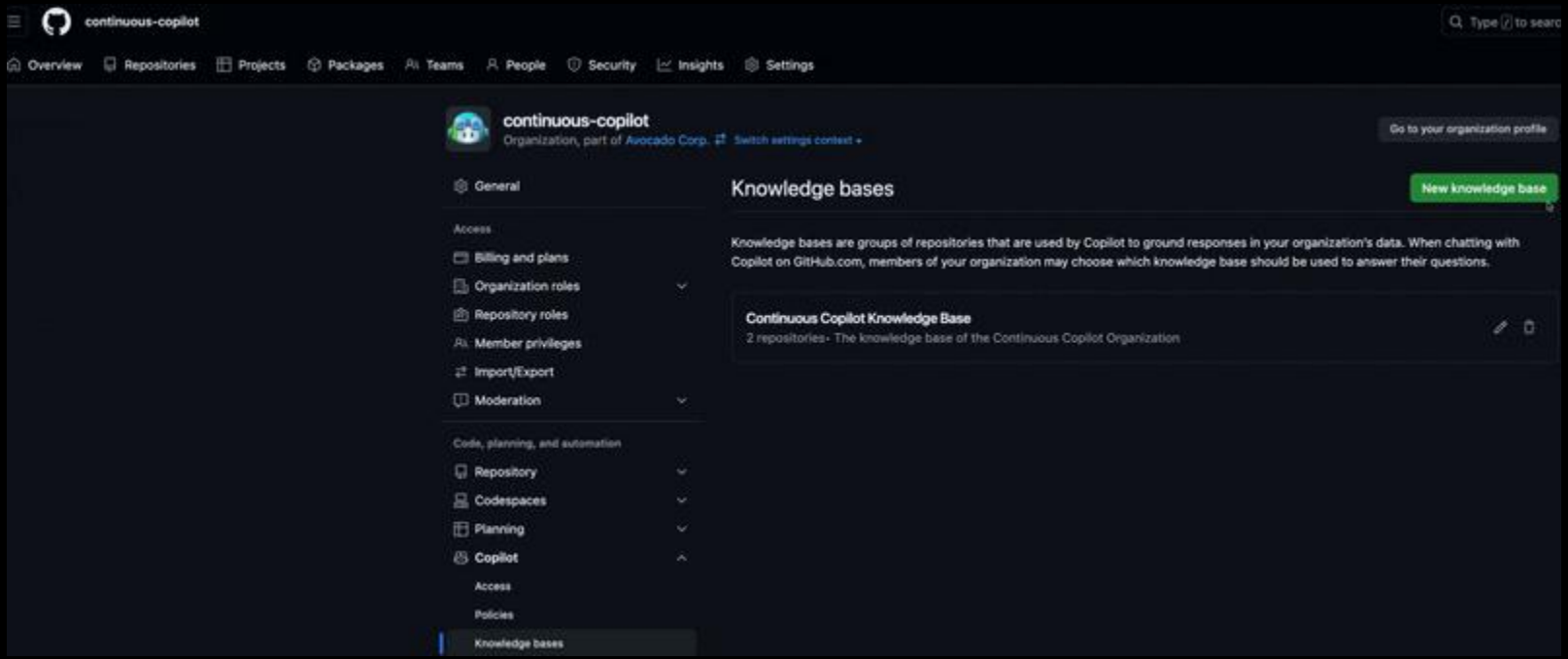
Login	Status	Team	Last Activity Date	Last Editor Used
Abc	Active	No team	2023-10-04	vscode/1.83.0-insider/copilot-chat/0.8.2023092902
Lakes	Active	No team	2023-09-13	vscode/1.82.0/copilot-chat/0.7.2023090101
Chaos	Active	No team	2023-10-04	vscode/1.82.1/copilot/1.111.404
Akjsda	Active	No team	2023-10-04	vscode/1.82.2/copilot-chat/0.7.1
Sbdkajs	Active	No team	2023-10-04	vscode/1.82.3/copilot-chat/0.7.1
Asa	Active	No team	2023-05-26	vscode/1.78.2/copilot/1.86.82
Baksjdb	Active	No team	2023-10-04	vscode/1.82.3/copilot-chat/0.7.2023090101
Jshbda	Active	No team	2023-10-04	/

Organization Settings - Policies

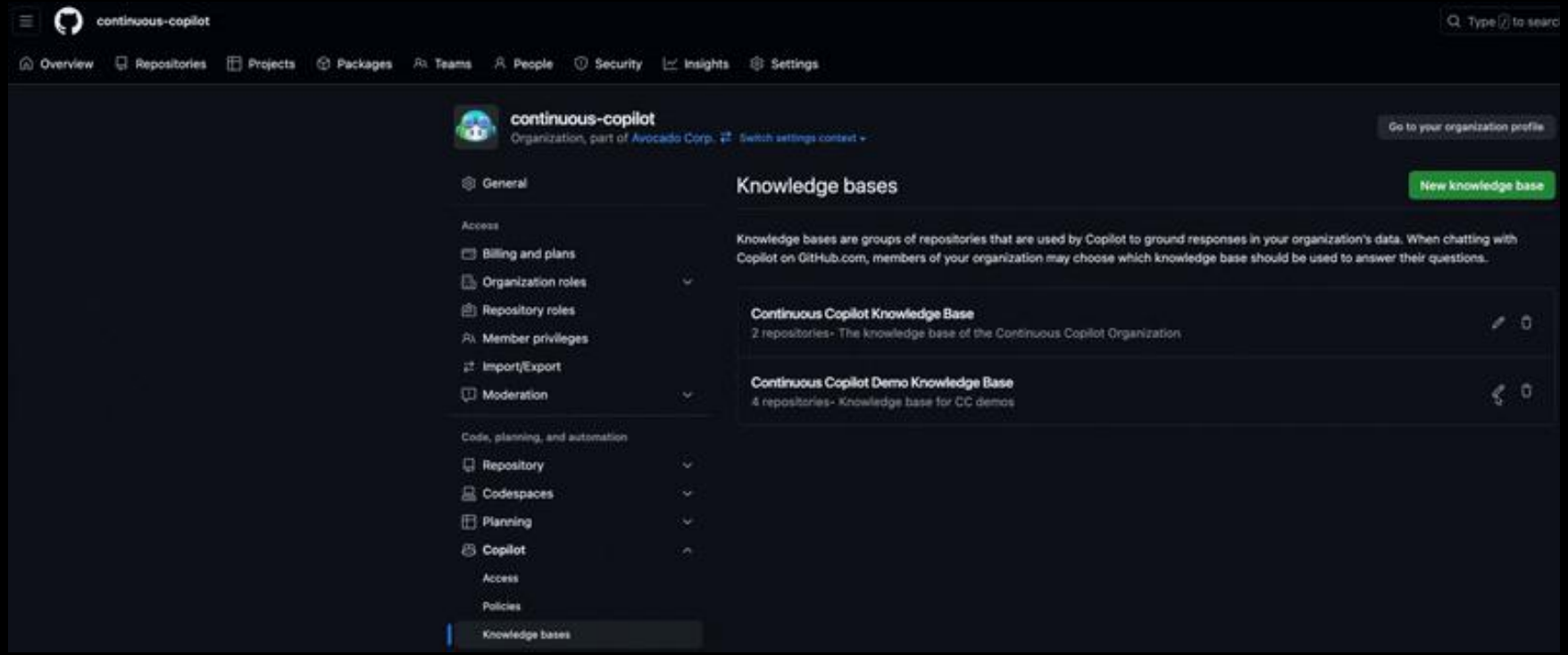
- Policies and features settings
- Allows Organization owners to define whether “**public code**” matching is allowed in suggestions
- Copilot in **github.com**
- Can users use **Copilot Chat in the supported IDE’s**
- Can users use **Copilot Chat in GitHub Mobile**
- Can users use **Copilot in the CLI**



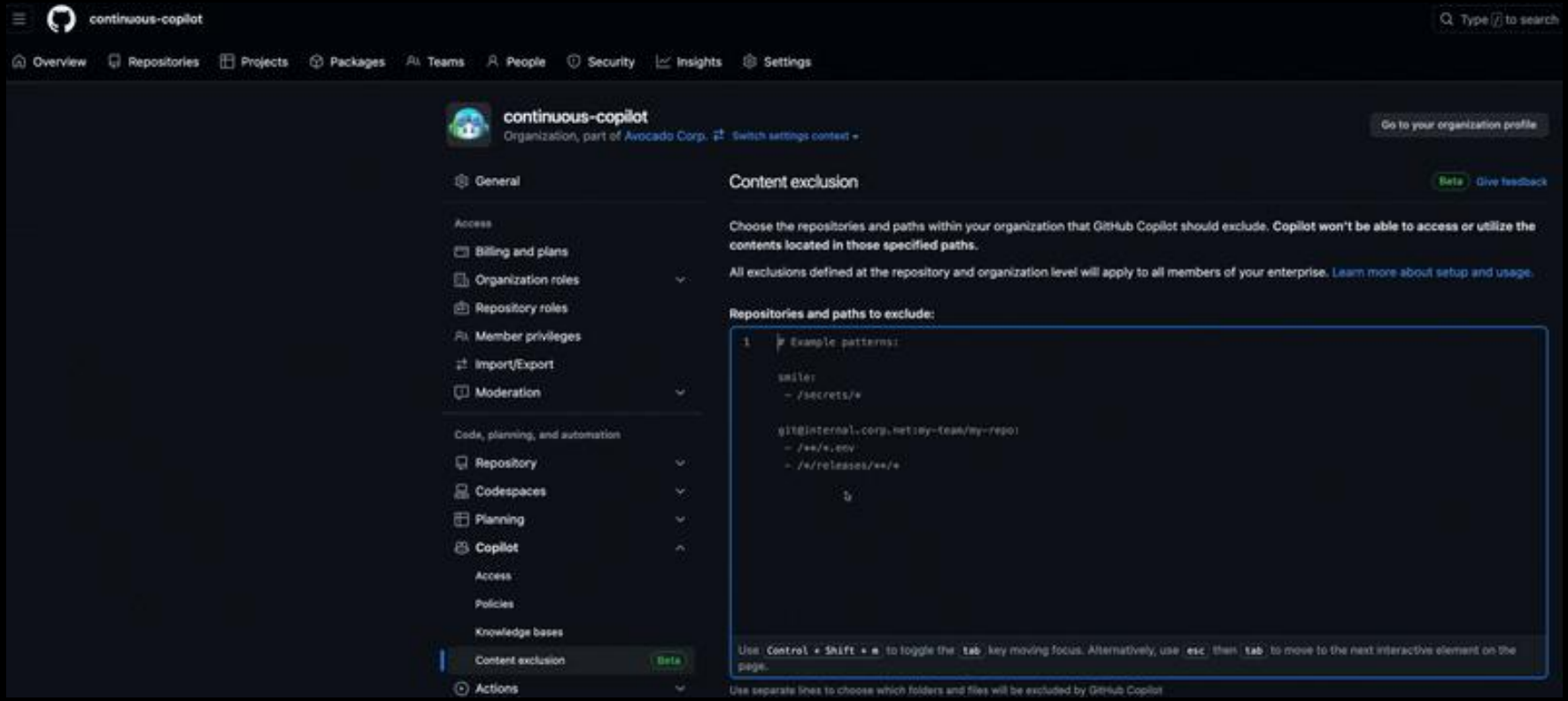
Organization Settings - Knowledge Bases



Organization Settings - Knowledge Bases



Organization Settings - Content Exclusion



Client Side Settings

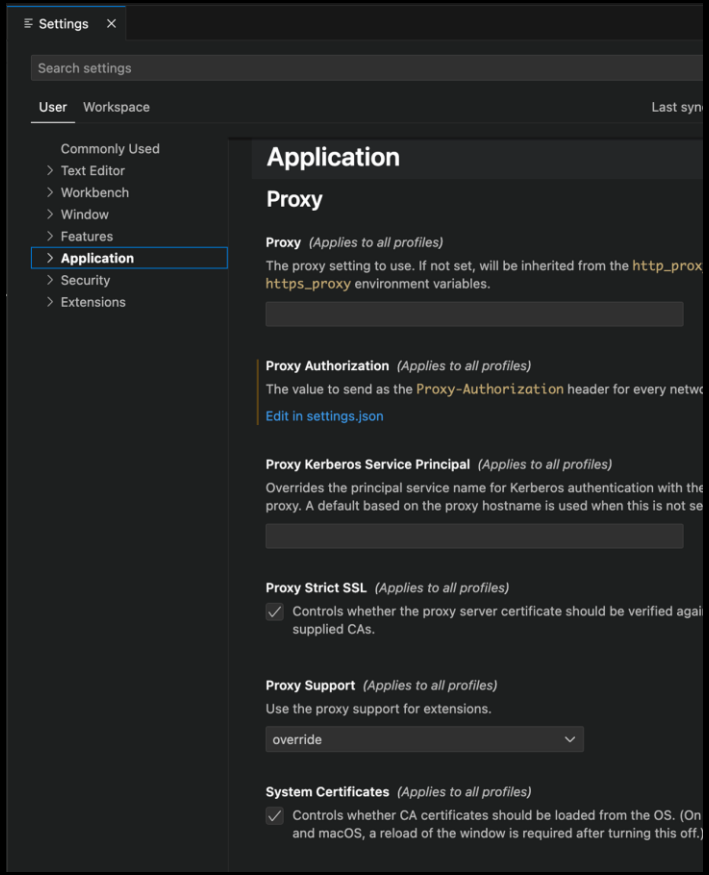
Network Settings

Proxy Settings

- GitHub Copilot supports basic HTTP proxy setups.
- If the proxy URL starts with https://, the proxy is not currently supported.
- If a proxy URL is set in any of the following environment variables, listed from highest to lowest priority.
  - HTTPS_PROXY
  - https_proxy
  - HTTP_PROXY
  - http_proxy

Authentication Modes

- Basic Authentication
- Kerberos Authentication



Firewall Settings

If you or your organization employs security measures like a firewall, it may be beneficial to include certain domain URLs in an "allowlist" and open specific ports and protocols.

Domain and/or URL	Purpose
`https://github.com/login/*`	Authentication
`https://api.github.com/user`	User Management
`https://api.github.com/copilot_internal/*`	User Management
`https://copilot-telemetry.githubusercontent.com/telemetry`	Telemetry
`https://default.exp-tas.com/`	Telemetry
`https://copilot-proxy.githubusercontent.com/`	API service for Copilot suggestions
`https://origin-tracker.githubusercontent.com`	API service for Copilot suggestions
`https://*.githubcopilot.com`	API service for Copilot suggestions

IDE Advanced Settings

Supported IDEs

Visual Studio

Visual Studio Code

Jet Brains

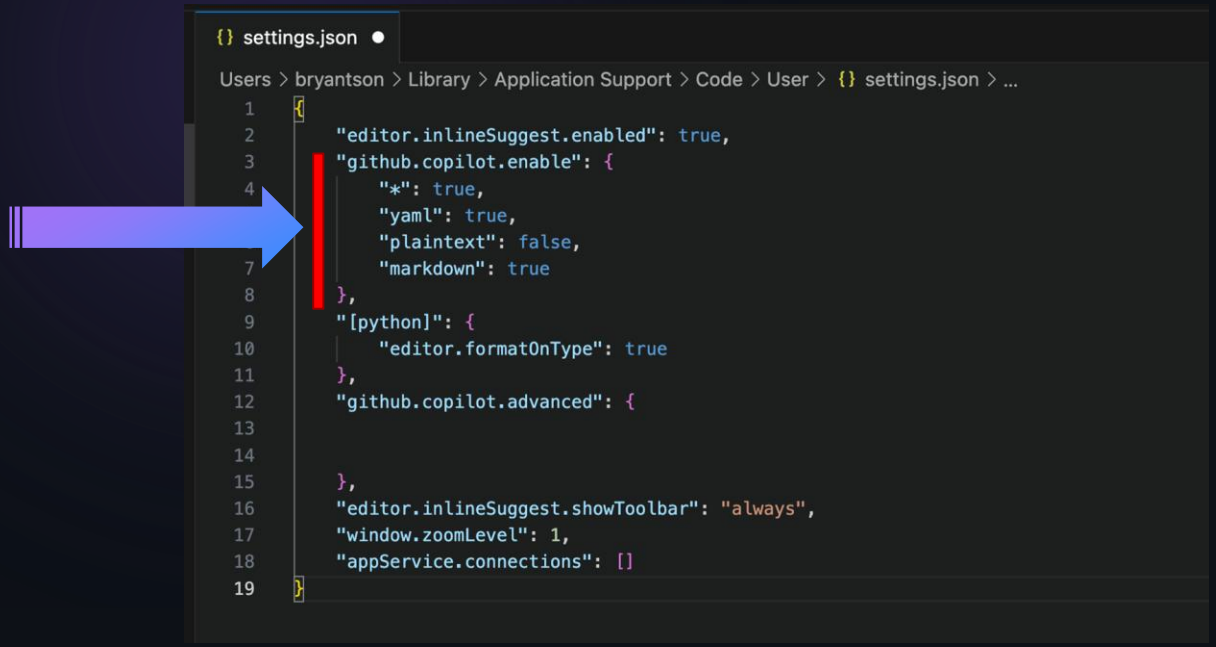
Vim/Neovim

Azure Data Studio

Enable non-programming Meta Files

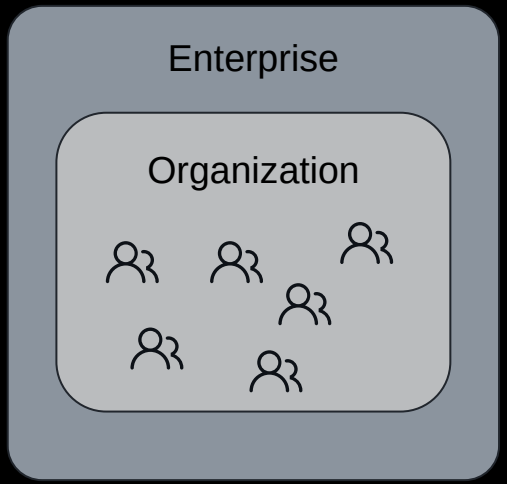
In settings.json, add

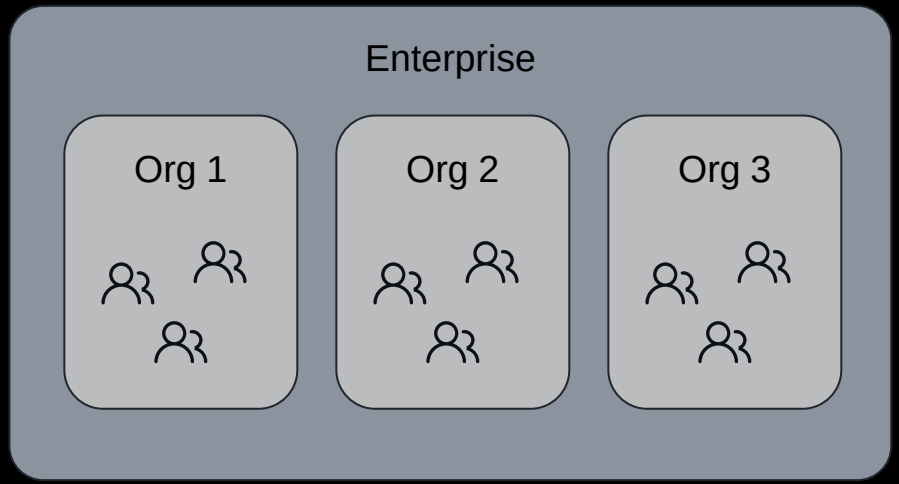
```
"github.copilot.enable":
{
    "*": true,
  "yaml": true,
  "plaintext": false,
  "markdown": true
}
```



User Onboarding Best Practices

Single Organization vs Multi Organization





DEMO

Telemetry

Insights about GitHub Copilot acceptance in your enterprise

Telemetry - GitHub REST API

Get Copilot for Business seat information and settings for an enterprise

Copilot Usage

OAuth app tokens and personal access tokens (classic) need the `copilot`, `manage_billing:copilot`, `admin:enterprise`, or `manage_billing:enterprise` scope to use this endpoint.

GET /enterprises/{enterprise}/copilot/usage

cURL | JavaScript | GitHub CLI

```
curl -L \
  -H "Accept: application/vnd.github+json" \
  -H "Authorization: Bearer <YOUR-TOKEN>" \
  -H "X-GitHub-Api-Version: 2022-11-28" \
  https://api.github.com/enterprises/ENTERPRISE/copilot/usage
```

Response

Example response | Response schema

Example response | Response schema

Status: 200


```
[
  {
    "day": "2023-10-15",
    "total_suggestions_count": 5000,
    "total_acceptances_count": 3000,
    "total_lines_suggested": 7000,
    "total_lines_accepted": 3500,
    "total_active_users": 15,
    "total_chat_acceptances": 45,
    "total_chat_turns": 350,
    "total_active_chat_users": 8,
    "breakdown": [
      {
        "language": "python",
        "editor": "vscode",
        "suggestions_count": 3000,
        "acceptances_count": 2000,
        "lines_suggested": 3000,
        "lines_accepted": 1500,
```


Note: As of 24th April 2024 - The GitHub Copilot for Business API endpoints are in public beta and subject to change. GitHub OPEN API Schemas are available here

Telemetry - GitHub REST API

Get Copilot for Business seat information and settings for an organization

Copilot Usage

The token must have at least one of the following permission sets:

- `organization_copilot_seat_management:write`
- `organization_administration:read`

GET /orgs/{org}/copilot/usage

cURL | JavaScript | GitHub CLI

```
curl -L \
  -H "Accept: application/vnd.github+json" \
  -H "Authorization: Bearer <YOUR-TOKEN>" \
  -H "X-GitHub-Api-Version: 2022-11-28" \
  https://api.github.com/orgs/ORG/copilot/usage
```

Response

Example response | Response schema

Example response | Response schema

Status: 200


```
[
  {
    "day": "2023-10-15",
    "total_suggestions_count": 1000,
    "total_acceptances_count": 800,
    "total_lines_suggested": 1800,
    "total_lines_accepted": 1200,
    "total_active_users": 10,
    "total_chat_acceptances": 32,
    "total_chat_turns": 200,
    "total_active_chat_users": 4,
    "breakdown": [
      {
        "language": "python",
        "editor": "vscode",
        "suggestions_count": 300,
        "acceptances_count": 250,
        "lines_suggested": 900,
        "lines_accepted": 700,
```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Telemetry - GitHub REST API

Get Copilot for Business seat information and settings for an organization

Copilot User Management

Note: You must authenticate using an access token with the ***manage_billing:copilot*** scope

GET /orgs/{org}/copilot/billing

cURL | JavaScript | GitHub CLI

```
// Octokit.js
// https://github.com/octokit/core.js#readme
const octokit = new Octokit({
  auth: 'YOUR-TOKEN'
})

await octokit.request('GET /orgs/{org}/copilot/billing', {
  org: 'ORG',
  headers: {
    'X-GitHub-Api-Version': '2022-11-28'
  }
})
```

Example response | Response schema

Status: 200


```
{
  "seat_breakdown": {
    "total": 12,
    "added_this_cycle": 9,
    "pending_invitation": 0,
    "pending_cancellation": 0,
    "active_this_cycle": 12,
    "inactive_this_cycle": 11
  },
  "seat_management_setting": "assign_selected",
  "public_code_suggestions": "block"
}
```


Note: As of 24th April 2024 - The GitHub Copilot for Business API endpoints are in public beta and subject to change. GitHub OPEN API Schemas are available here

Telemetry - GitHub REST API

Get Copilot for Business seat information and settings for an organization

Copilot User Management

Note: You must authenticate using an access token with the ***manage_billing:copilot*** scope

GET /orgs/{org}/copilot/billing/seats

cURL | JavaScript | GitHub CLI

```
// Octokit.js
// https://github.com/octokit/core.js#readme
const octokit = new Octokit({
  auth: 'YOUR-TOKEN'
})

await octokit.request('GET /orgs/{org}/copilot/billing/seats', {
  org: 'ORG',
  headers: {
    'X-GitHub-Api-Version': '2022-11-28'
  }
})
```

Example response | Response schema

Status: 200


```
{
  "total_seats": 2,
  "seats": [
    {
      "created_at": "2021-08-03T18:00:00-06:00",
      "updated_at": "2021-09-23T15:00:00-06:00",
      "pending_cancellation_date": null,
      "last_activity_at": "2021-10-14T00:53:32-06:00",
      "last_activity_editor": "vscode/1.77.3/copilot/1.86.82",
      "assignee": {
        "login": "octocat",
        "id": 1,
        "node_id": "MDQ6VXNlcjE=",
        "avatar_url": "https://github.com/images/error/octocat_happy.gif",
        "gravatar_id": "",
        "url": "https://api.github.com/users/octocat",
        "html_url": "https://github.com/octocat",
        "followers_url": "https://api.github.com/users/octocat/followers",
        "following_url":
"https://api.github.com/users/octocat/following{/other_user}",
        "gists_url":
"https://api.github.com/users/octocat/gists{/gist_id}",
        "starred_url":
"https://api.github.com/users/octocat/starred{/owner}{/repo}",
        "subscriptions_url":
```


Note: As of 24th April 2024 - The GitHub Copilot for Business API endpoints are in public beta and subject to change. GitHub OPEN API Schemas are available here

Telemetry - GitHub REST API

Get Copilot for Business seat assignment details for a user

Copilot User Management

`GET` `/orgs/{org}/members/{username}/copilot`

cURL | JavaScript | GitHub CLI

```
// Octokit.js
// https://github.com/octokit/core.js#readme
const octokit = new Octokit({
  auth: 'YOUR-TOKEN'
})

await octokit.request('GET /orgs/{org}/members/{username}/copilot', {
  org: 'ORG',
  username: 'USERNAME',
  headers: {
    'X-GitHub-Api-Version': '2022-11-28'
  }
})
```

Example response

Status: 200

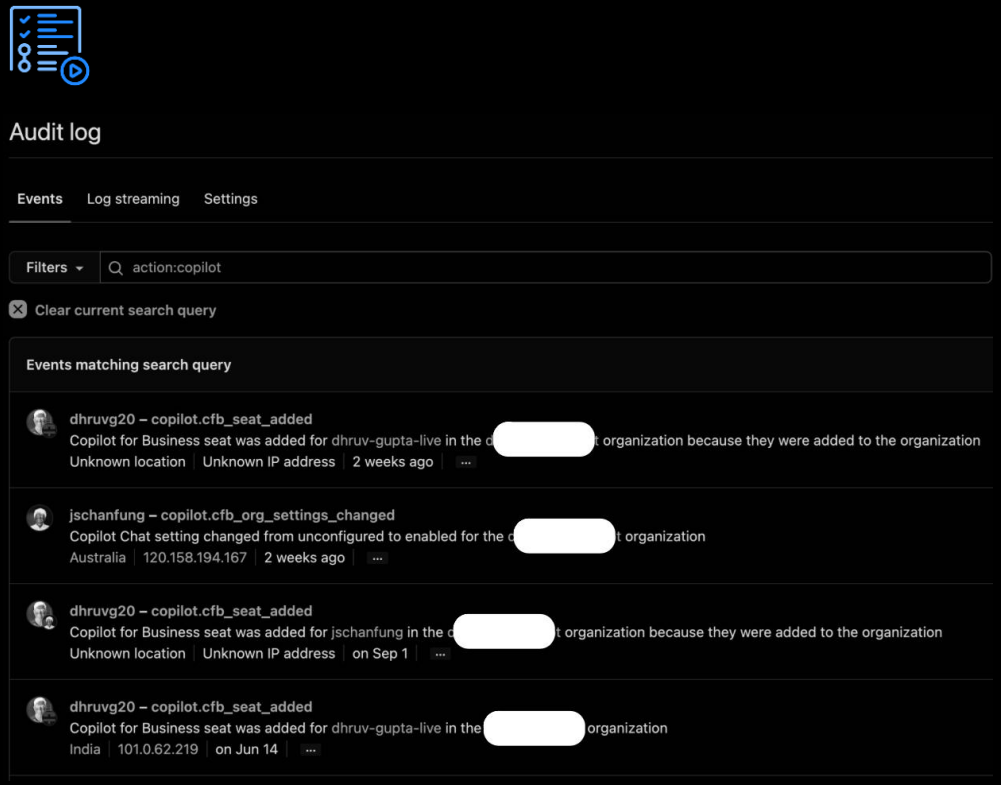

```
{
  "created_at": "2021-08-03T18:00:00-06:00",
  "updated_at": "2021-09-23T15:00:00-06:00",
  "pending_cancellation_date": null,
  "last_activity_at": "2021-10-14T00:53:32-06:00",
  "last_activity_editor": "vscode/1.77.3/copilot/1.86.82",
  "assignee": {
    "login": "octocat",
    "id": 1,
    "node_id": "MDQ6VXNlcjE=",
    "avatar_url": "https://github.com/images/error/octocat_happy.gif",
    "gravatar_id": "",
    "url": "https://api.github.com/users/octocat",
    "html_url": "https://github.com/octocat",
    "followers_url": "https://api.github.com/users/octocat/followers",
    "following_url":
```


Note: As of 24th April 2024 - The GitHub Copilot for Business API endpoints are in public beta and subject to change.

Telemetry - GitHub Audit Logs

Copilot for Business users will now be able to review updates and changes to their Copilot settings through the audit log.

In large organizations or enterprises, tracking setting updates and purchases is crucial.
Our goal is to empower organization and enterprise admins to investigate changes to their Copilot for Business account and settings independently, eliminating the need to rely on support.



DEMO

Integrations

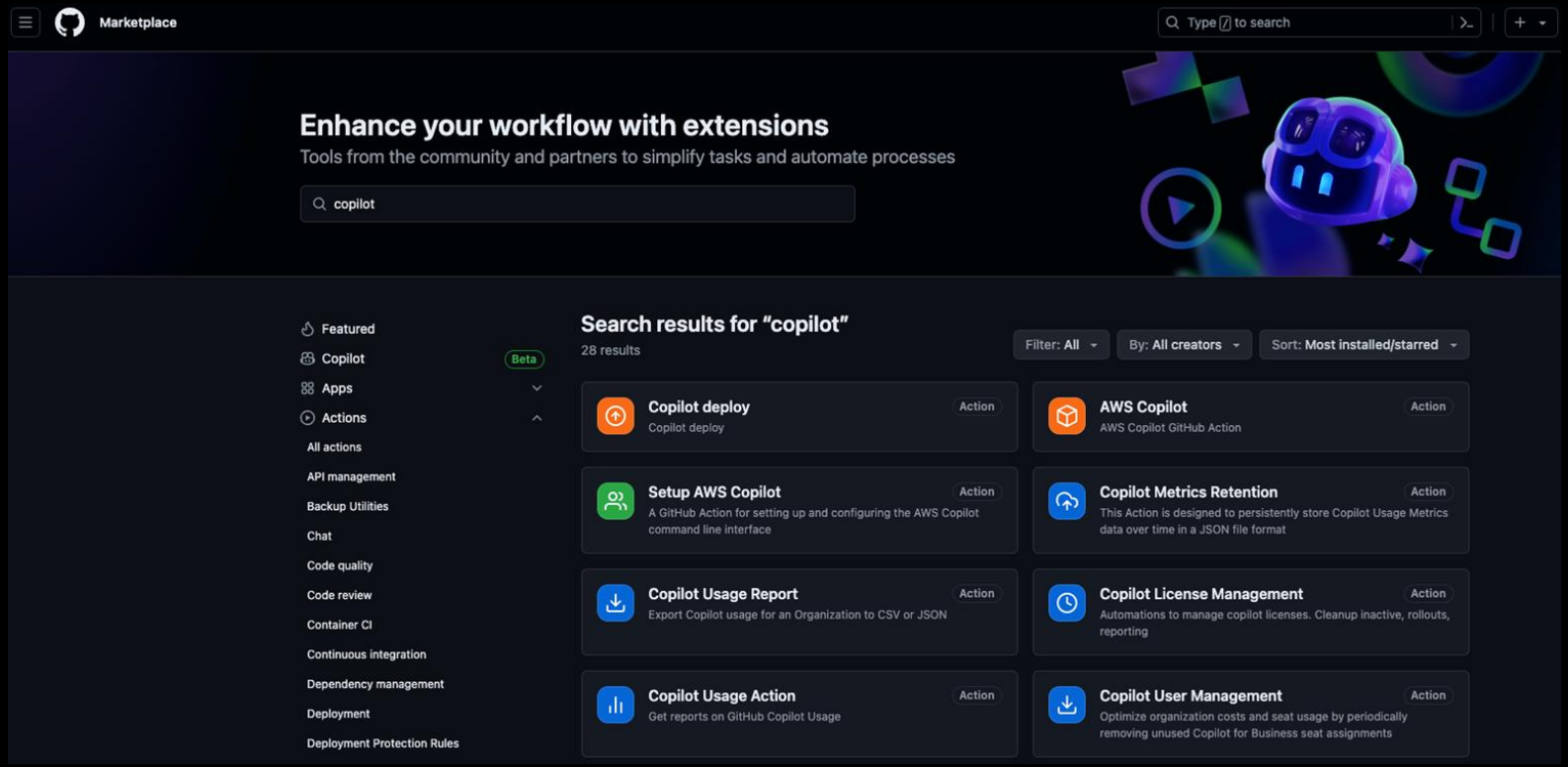
Use GitHub Copilot Endpoints and data with Enterprise tools

REST API - Copilot for Business

- Copilot usage
  - `GET /enterprises/{enterprise}/copilot/usage`
  - `GET /orgs/{org}/copilot/usage`
- Copilot user management
  - `GET /orgs/{org}/copilot/billing`
  - `GET /orgs/{org}/copilot/billing/seats`
  - `POST /orgs/{org}/copilot/billing/selected_teams`
  - `DELETE /orgs/{org}/copilot/billing/selected_teams`
  - `POST /orgs/{org}/copilot/billing/selected_users`
  - `DELETE /orgs/{org}/copilot/billing/selected_users`
  - `GET /orgs/{org}/members/{username}/copilot`

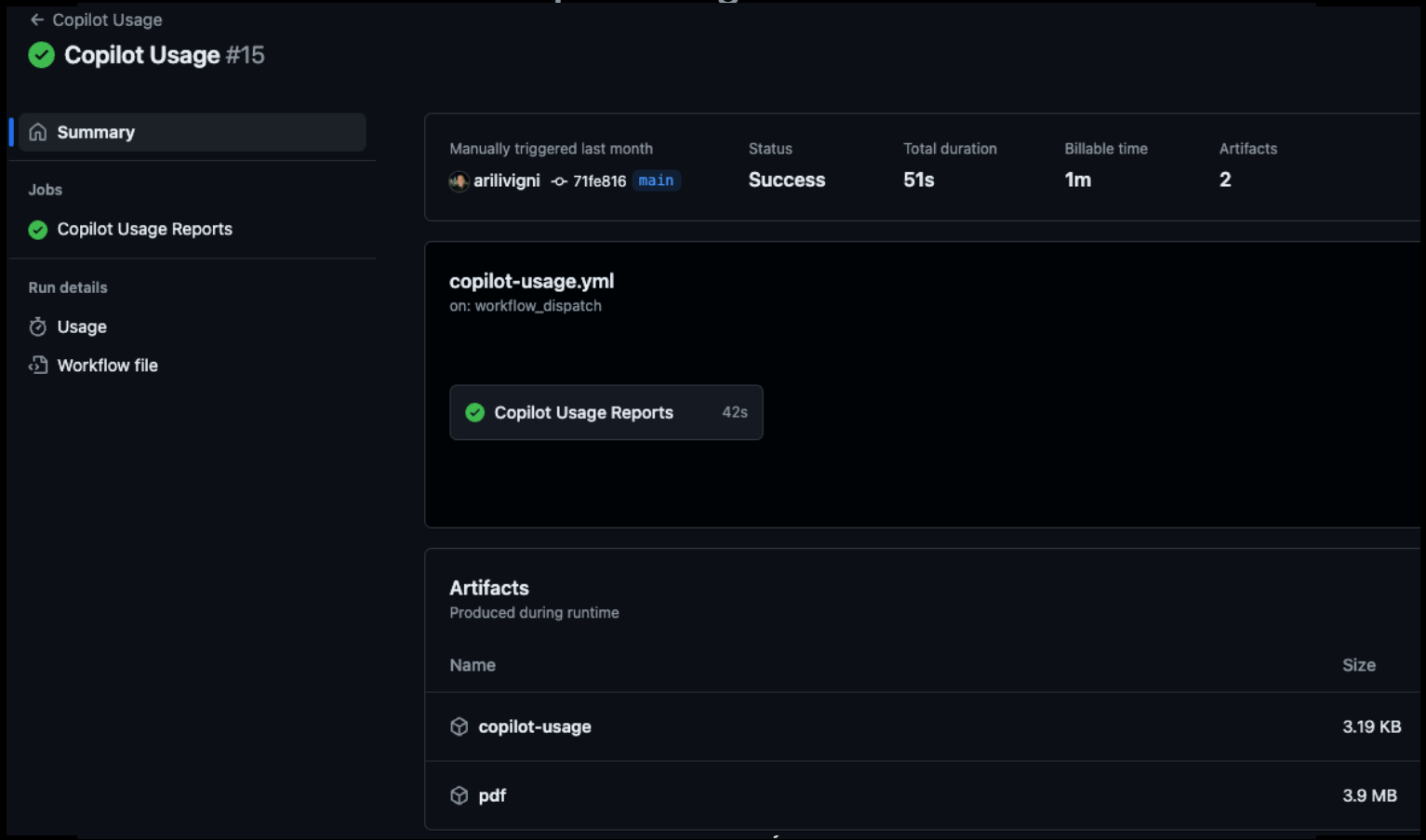
GitHub Copilot Usage and User Management

GitHub Actions Marketplace for Copilot



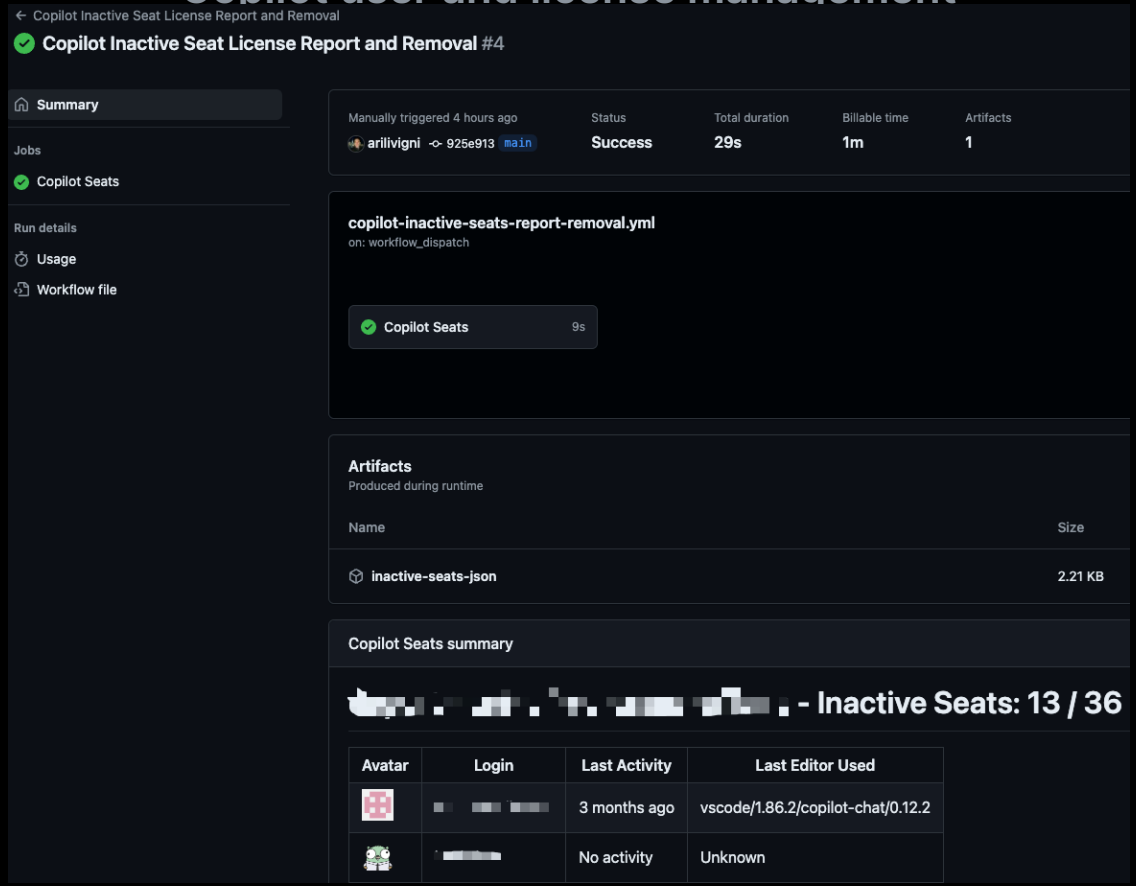
GitHub Copilot Usage

Copilot usage action



GitHub Copilot User Management

Copilot user and license management



Audit Logs

Review the configuration actions taken by users at an Organization & Enterprise level.

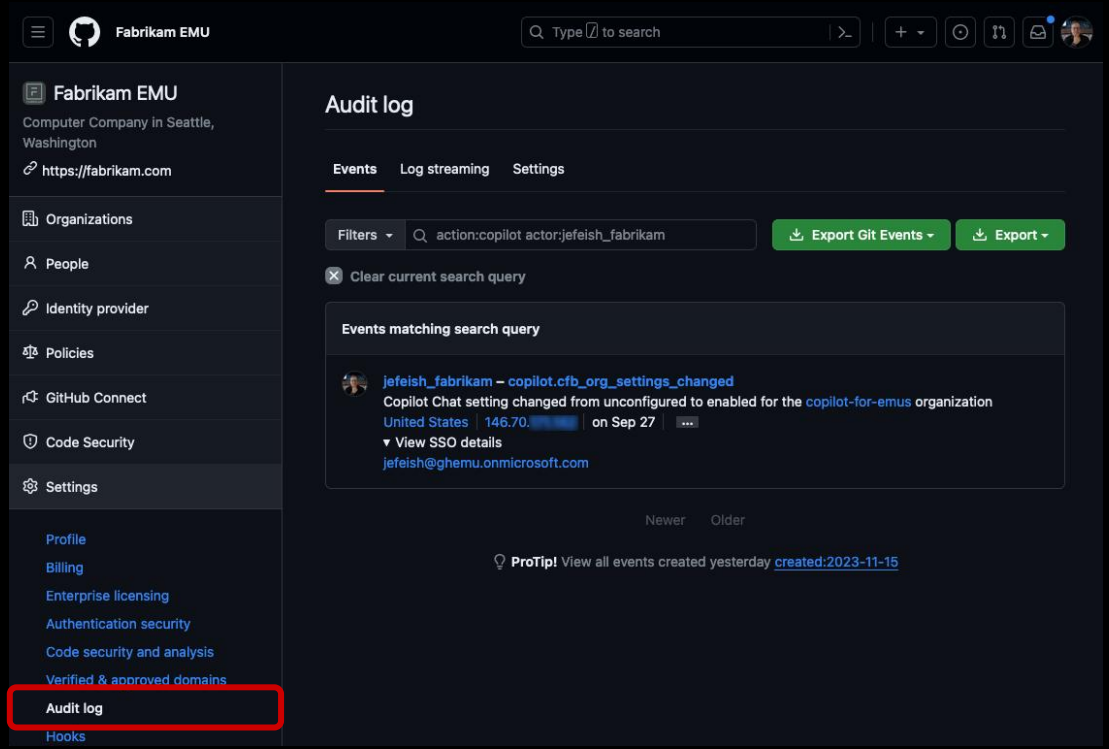
- Organization's Copilot settings and policies
  - Changes to the Enablement Policy
  - Organization Settings changes
  - Enterprise settings changes
- Addition or removal of seats
  - Seat management changed
  - Seat assignment reused
  - Seat assignment refreshed
- Editor chat Settings
- Code Referencing Settings

Audit Log Events

cfb_enterprise_settings_changed	copilot.cfb_seat_cancelled
copilot.cfb_enterprise_org_enablement_changed	copilot.cfb_seat_assignment_reused
clickwrap_save_event	copilot.cfb_seat_assignment_refreshed
cfb_org_settings_changed	copilot.cfb_seat_assignment_created
copilot.cfb_seat_cancelled_by_staff	copilot.cfb_seat_assignment_unassigned
cfb_seat_management_changed	editor_chat_setting
copilot.cfb_seat_added	code_referencing_setting

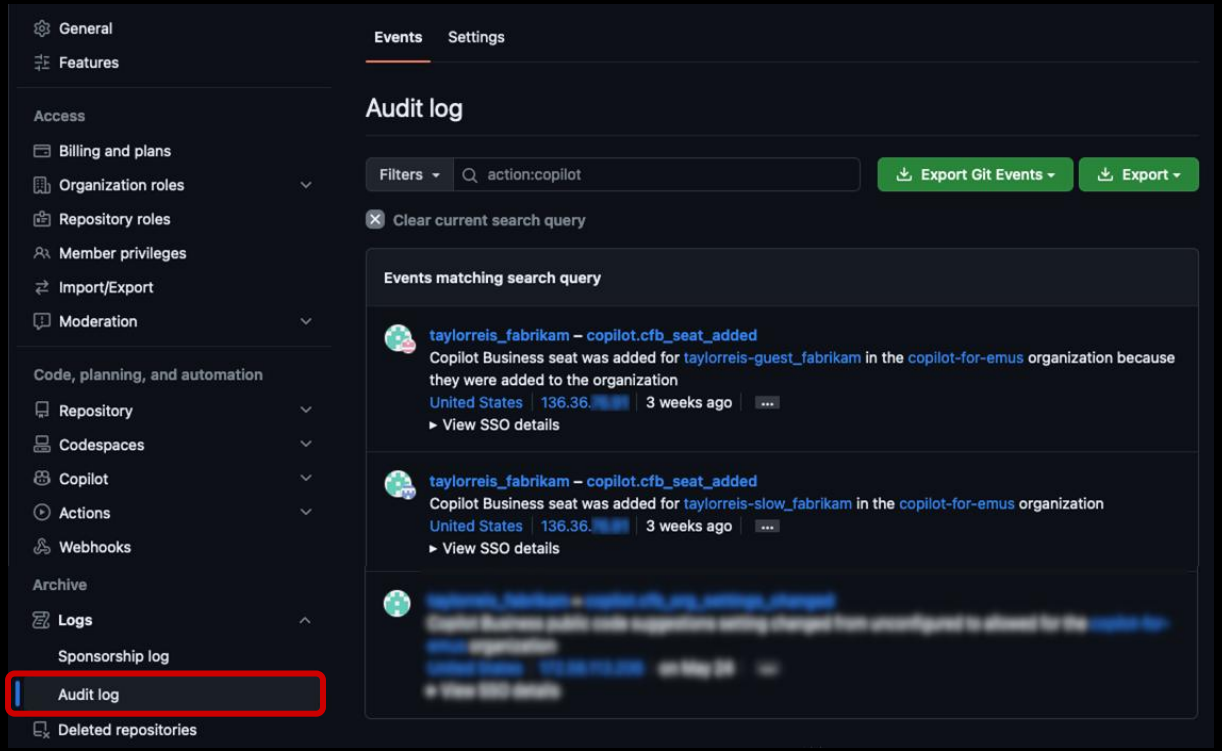
Audit Logs

To review the actions taken by users at an Enterprise level.

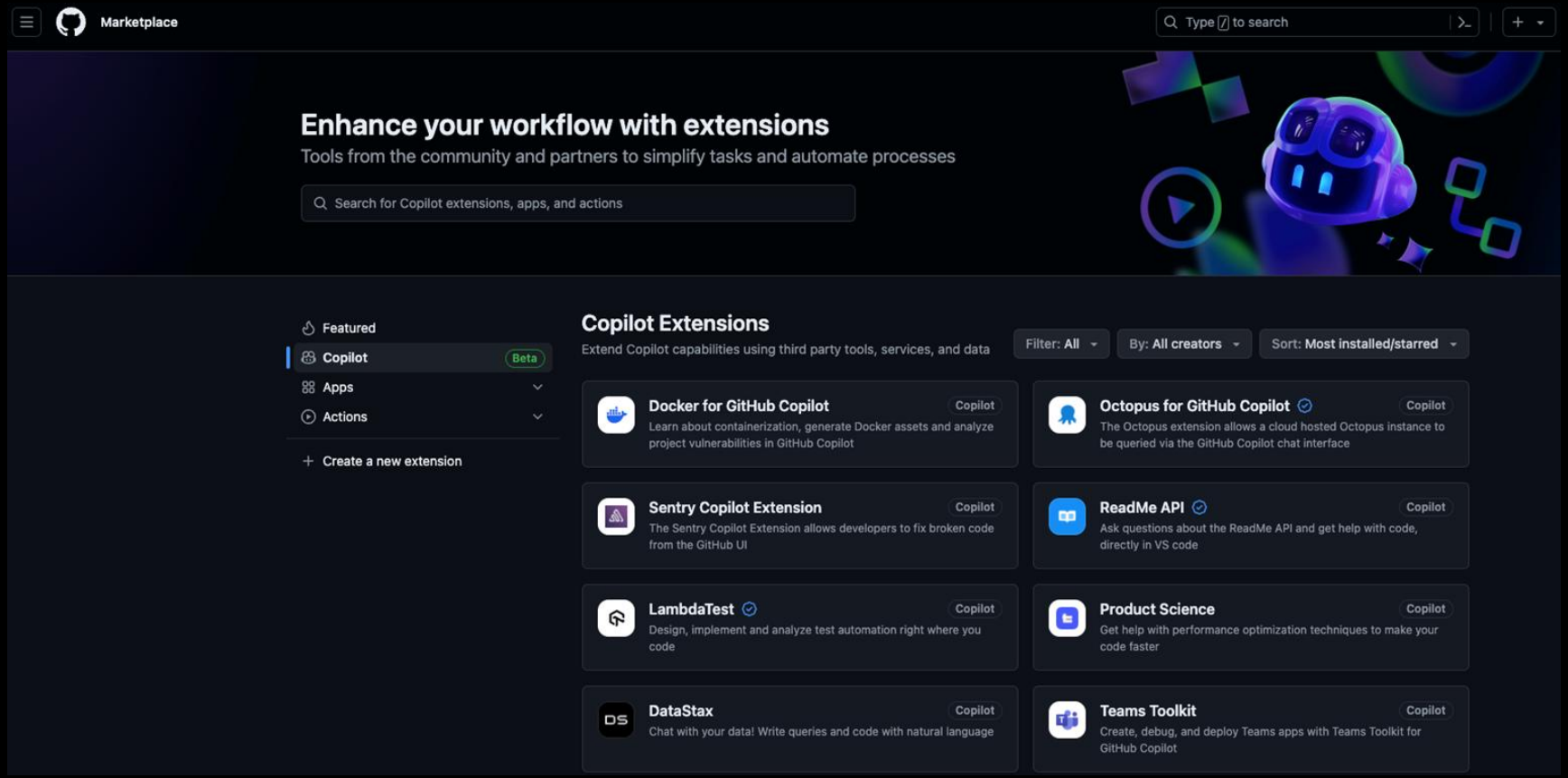


Audit Logs

To review the actions taken by users at an Organisation level.



GitHub Copilot Extensions



DEMO

Troubleshooting

Common issues and where to look

Common Issues

- GitHub's Status Page
- Update GitHub Copilot Extension
- Error: "GitHub Copilot could not connect to server. Extension activation failed"
- Open Discussions on Copilot Community with relevant files

Viewing Logs for GitHub Copilot

Supported IDEs

Visual Studio

Visual Studio Code

Vim/Neovim

Jet Brains

Firewall settings

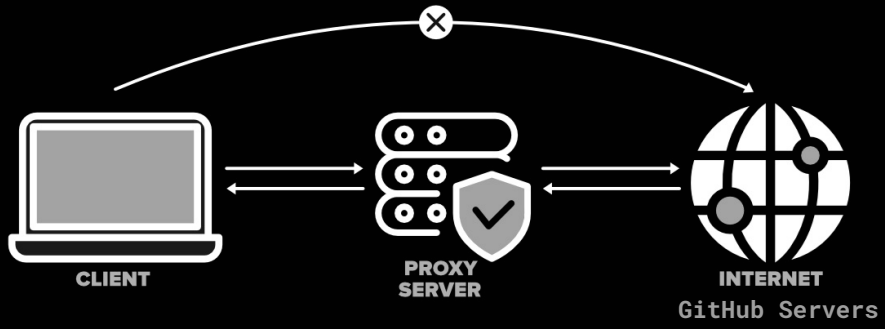
PROBLEMS 1 DEBUG CONSOLE OUTPUT TERMINAL PORTS AZURE COMMENTS GitHub Copilot

```
2024-05-30 14:27:04.461 [info] [fetcher] Using Electron fetcher, feature flag is enabled.
2024-05-30 14:29:45.019 [info] [fetchCompletions] request.response: [https://copilot-proxy.githubusercontent.com/v1/
engines/copilot-codex/completions] took 304 ms
2024-05-30 14:29:45.027 [error] [fetchCompletions] Unhandled status from server: 503 <html>
<head>
<title>[redacted] - Web Application Blocked (Restricted App-ID)</title>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8">
<META HTTP-EQUIV="PRAGMA" CONTENT="NO-CACHE">
<meta name="viewport" content="initial-scale=1.0">
<style>
  #content {
    border:3px solid#aaa;
    background-color:#fff;
    margin:1.5em;
    padding:1.5em;
    font-family:Tahoma,Helvetica,Arial,sans-serif;
    font-size:1em;
  }
  h1 {
    font-size:1.3em;
    font-weight:bold;
    color:#cc6600;
  }
  b {
    font-weight:bold;
  color:#cc6600;
  }

</stvle>
```

Network Proxy setup

- Company Equipment or Corporate Network
- Connecting to Internet via VPN or HTTP Proxy server
- Prevent connecting to GitHub' Servers



Network Proxy Errors

- Error: GitHub Copilot could not connect to server. Extension activation failed: "read ETIMEDOUT" or "read ECONNRESET"

- Configuring network settings for GitHub Copilot

- Proxy Specific errors:
  - Proxy's URL https:// currently not supported by GitHub Copilot
  - Authenticated supported basic authentication or with Kerberos
  - Custom certificates issues

Diagnosing Network Issues

- `curl requests with --verbose`
- `curl --verbose https://copilot-proxy.githubusercontent.com/_ping`
- `curl --verbose -x http://YOUR-PROXY-URL:PORT -i -L` https://copilot-proxy.githubusercontent.com/_ping
  `--insecure` -> Certificate related issues
- Diagnostic logs from editors

Certificate Problems

- Errors: "certificate signature failure", "custom certificate", or "unable to verify the first certificate"
- Github Copilot for Business supports Custom Certificates
- Corporate proxy configurations
- Check GitHub Copilot certificate path
- Ignore Certificate Errors in Proxy settings
  Warning: Ignoring certificate errors can cause security issues and is not recommended

Issues with GitHub Copilot Chat

- Organization or Enterprise owners give access to GitHub Copilot Chat beta for users
- Install GitHub Copilot Chat Prerequisites
- Authentication Issues
- Error: "Oops, your response got filtered"

DEMO

Data privacy

How GitHub protects your data

What Personal Data is Collected & How?

- User Engagement Data
  - Events generated with an IDE
  - Personal Data such as pseudonymous identifiers

- Prompts
  - Collection of code & contextual information to generate suggestions
  - User using a designated keyboard shortcut or pauses typing to request a suggestion

- Suggestions
  - One or more lines of proposed code and other output returned

Personal Data

- Uses the source code in IDE only to generate a suggestion.
- Performs several scans to identify and remove certain information within a prompt.
- Prompts are only transmitted to the AI model to generate suggestions in real-time
- Deleted once the suggestions are generated.
- User engagement data is used to improve the performance of the Copilot Service; specifically, it's used to
    a. Evaluating GitHub Copilot
    b. Sort algorithms
    c. Detecting potential abuse of GitHub Copilot

Under the hood - Responding to a prompt

- Suggestions are not copied and pasted from any code database.
- Uses probabilistic reasoning to generate suggestions.
- GitHub Copilot sends a prompt to its AI model, which makes a probabilistic determination of what is likely to come next in your coding sequence and provides suggestions.

Aiding Secure Development

GitHub Copilot leverages a variety of security measures

- Remove sensitive information in code
- Block insecure coding patterns *
- Detect vulnerable patterns in incomplete fragments of code.

** The Copilot prompt needs to be specific in it's request*

FAQ

- How long the collected personal data will be retained?
  - User Engagement Data - 24 Months
  - Prompts - Discarded once a suggestion is returned
  - Suggestions - Not Retained

- Can the users control the sharing & use of their data?
  - User engagement data is required for the use of GitHub Copilot
    - General usage data
    - Pseudonymous identifiers

FAQ

- How does our collected data gets processed by GitHub?
  - Billing & Account Management
  - Produce Aggregated Reports

- How's our collected data used?
  - To measure the impact it has on the user
  - Fine Tune ranking & Sorting Algorithms and Prompt Crafting
  - Detect violation of Acceptable Use Policies.
  - Developers and their use of developer tools and services.

FAQ

- Is Telemetry available?
  - Yes, Telemetry is available for Copilot
- Organization-wide policy management
  - Yes, Policy settings can be implemented at an Organization level.
- Audit Logs?
  - Yes, Audit Logs are available along with Copilot specific events
- Http Proxy Support
  - Yes, HTTP proxy support via custom certificates available

GitHub Copilot Trust Center

As GitHub's Chief Legal Officer, I understand the nuanced challenges of enabling company-wide AI adoption, especially in an evolving regulatory landscape. GitHub Copilot is enterprise-ready, but organizations need to clearly understand how the tool meets their compliance, security, and accessibility requirements.

Our aim is to bring you that clarity with the **GitHub Copilot Trust Center**.

https://resources.github.com/copilot-trust-center/

DEMO

Q & A

Thank you