Microsoft

Let’s Learn MCP

Model Context Protocol

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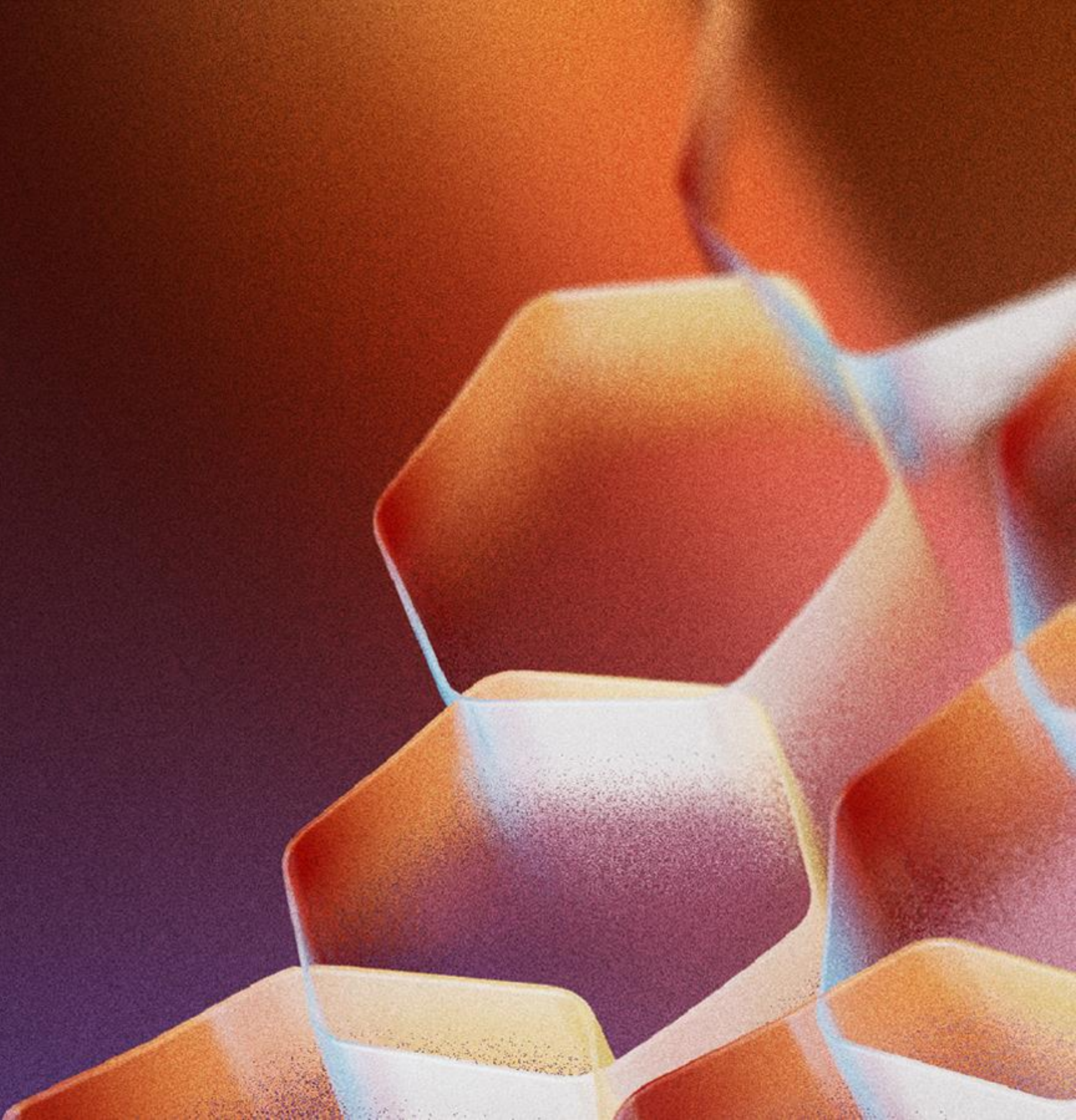
Technical PM & Cloud Advocate for Developer Community, Microsoft



Agenda

1. What is MCP? How does it work? How do you use it?
2. In-depth overview of MCP features
3. Building an MCP server in TypeScript

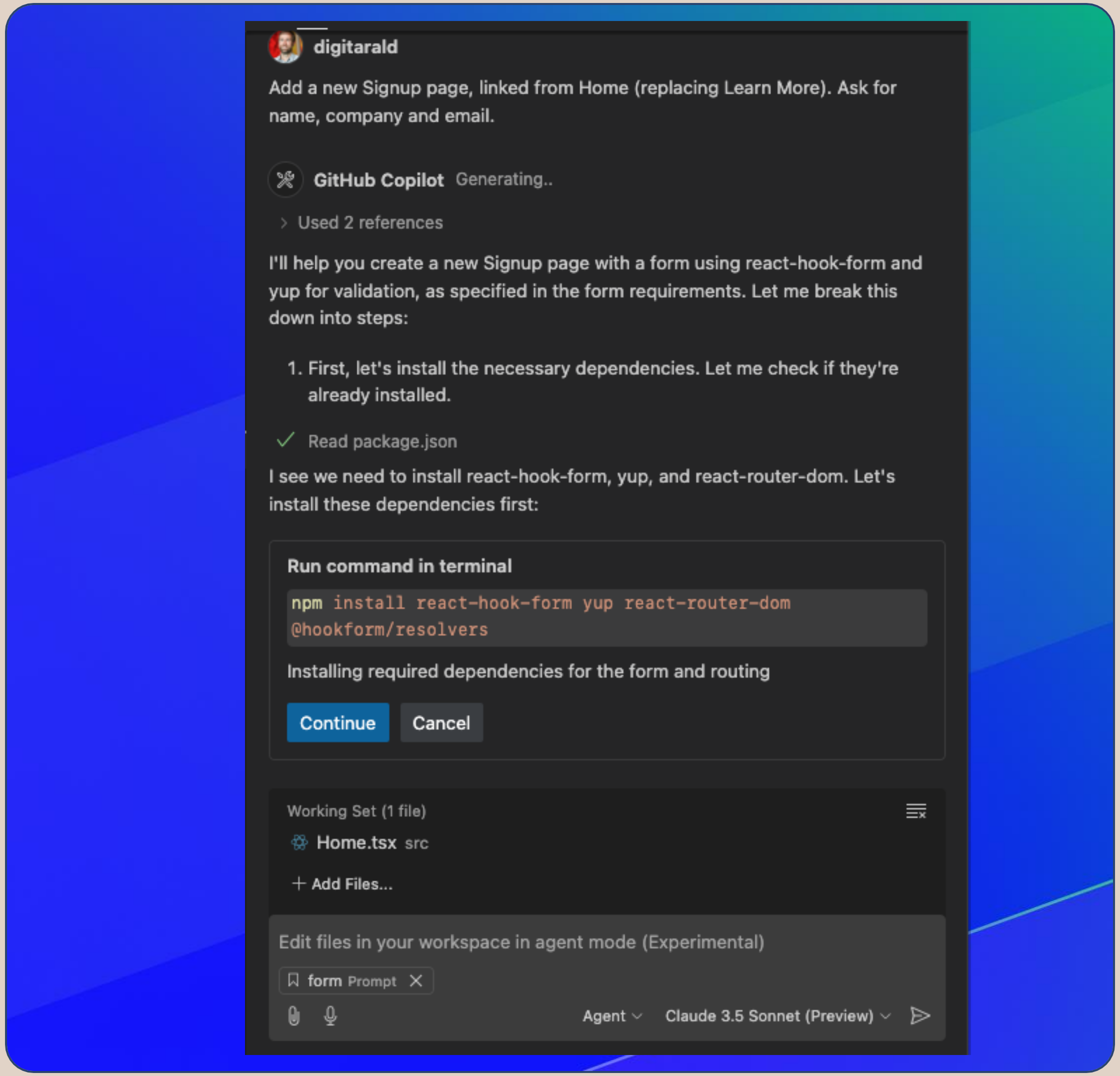
Tutorial: https://github.com/microsoft/lets-learn-mcp-javascript

Agent mode

Agentic coding

Accelerate delivery by shifting from code to outcomes

Autonomous AI pair programmer that **plans, executes, and iterates** on multi-step coding tasks – from editor to terminal, tests to debugger.



digitarald

Add a new Signup page, linked from Home (replacing Learn More). Ask for name, company and email.

GitHub Copilot Generating..

› Used 2 references

I'll help you create a new Signup page with a form using react-hook-form and yup for validation, as specified in the form requirements. Let me break this down into steps:

1. First, let's install the necessary dependencies. Let me check if they're already installed.

✓ Read package.json

I see we need to install react-hook-form, yup, and react-router-dom. Let's install these dependencies first:

Run command in terminal

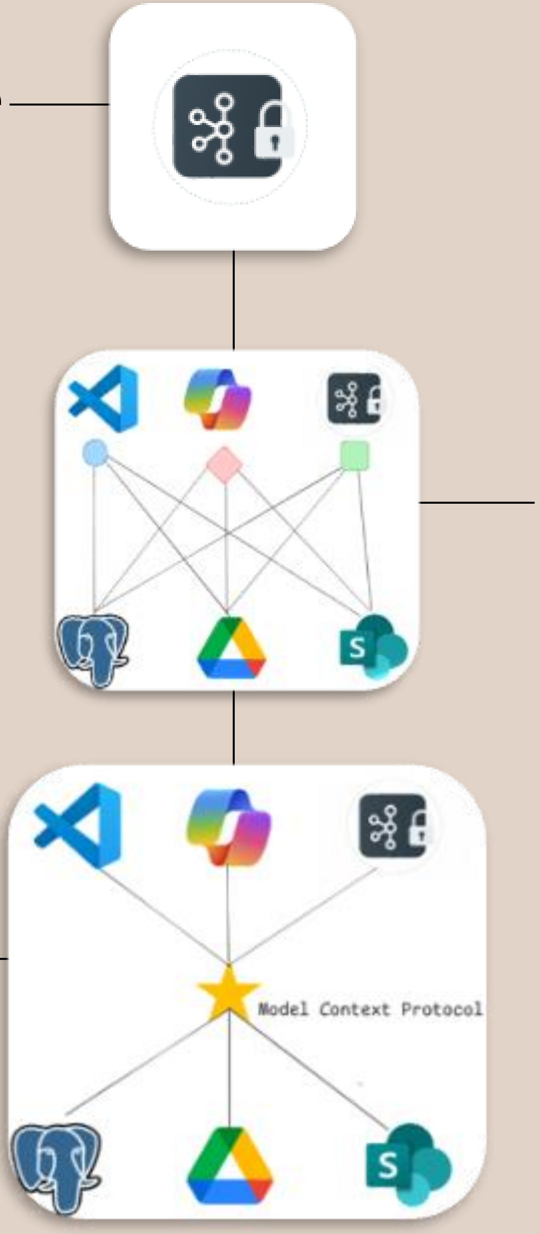
```
npm install react-hook-form yup react-router-dom
@hookform/resolvers
```

Installing required dependencies for the form and routing

Edit files in your workspace in agent mode (Experimental)

But how do we provide real time context?
How do we connect to our database? Query GitHub Issues? Run tests with natural language?
How can we bridge the gaps between our code, the client and LLM, and everything else?

The need for MCP arises – a Timeline



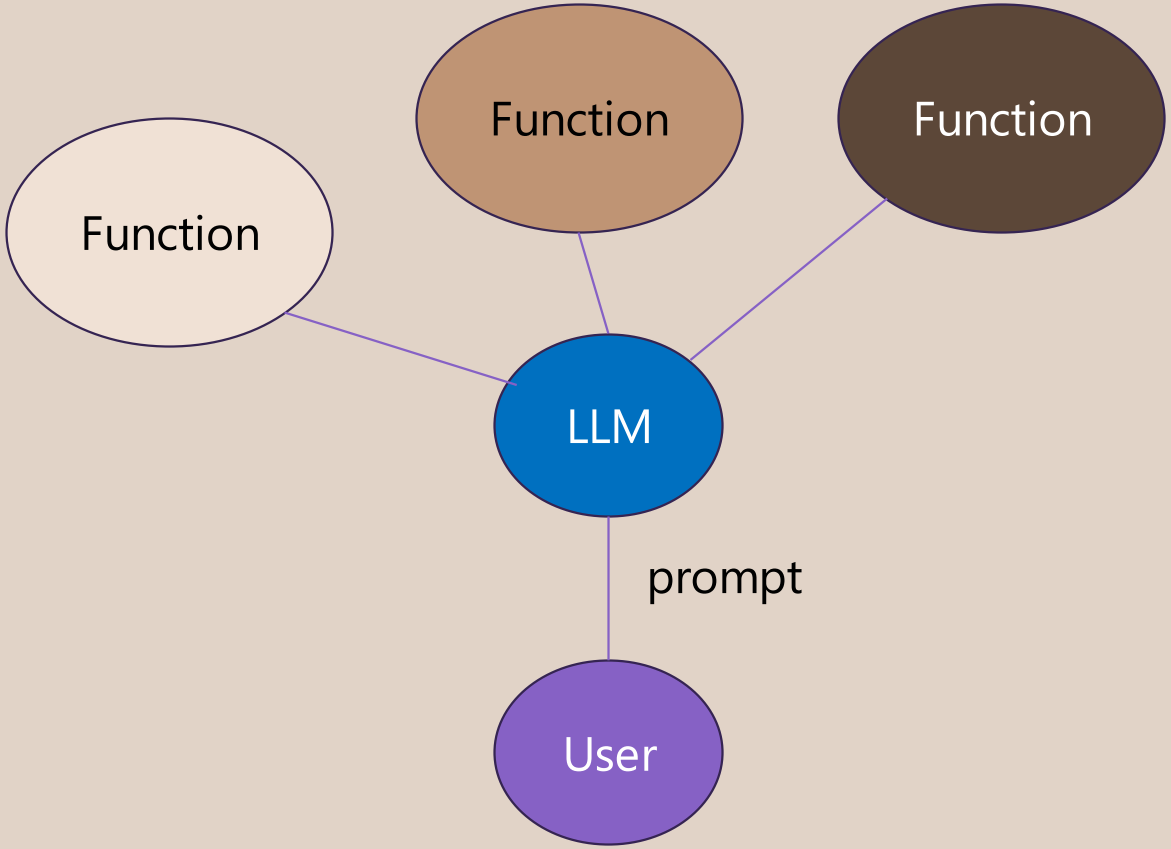
Tools are integral to Agent performance

Integration chaos!!!

The need for a standard (MCP)

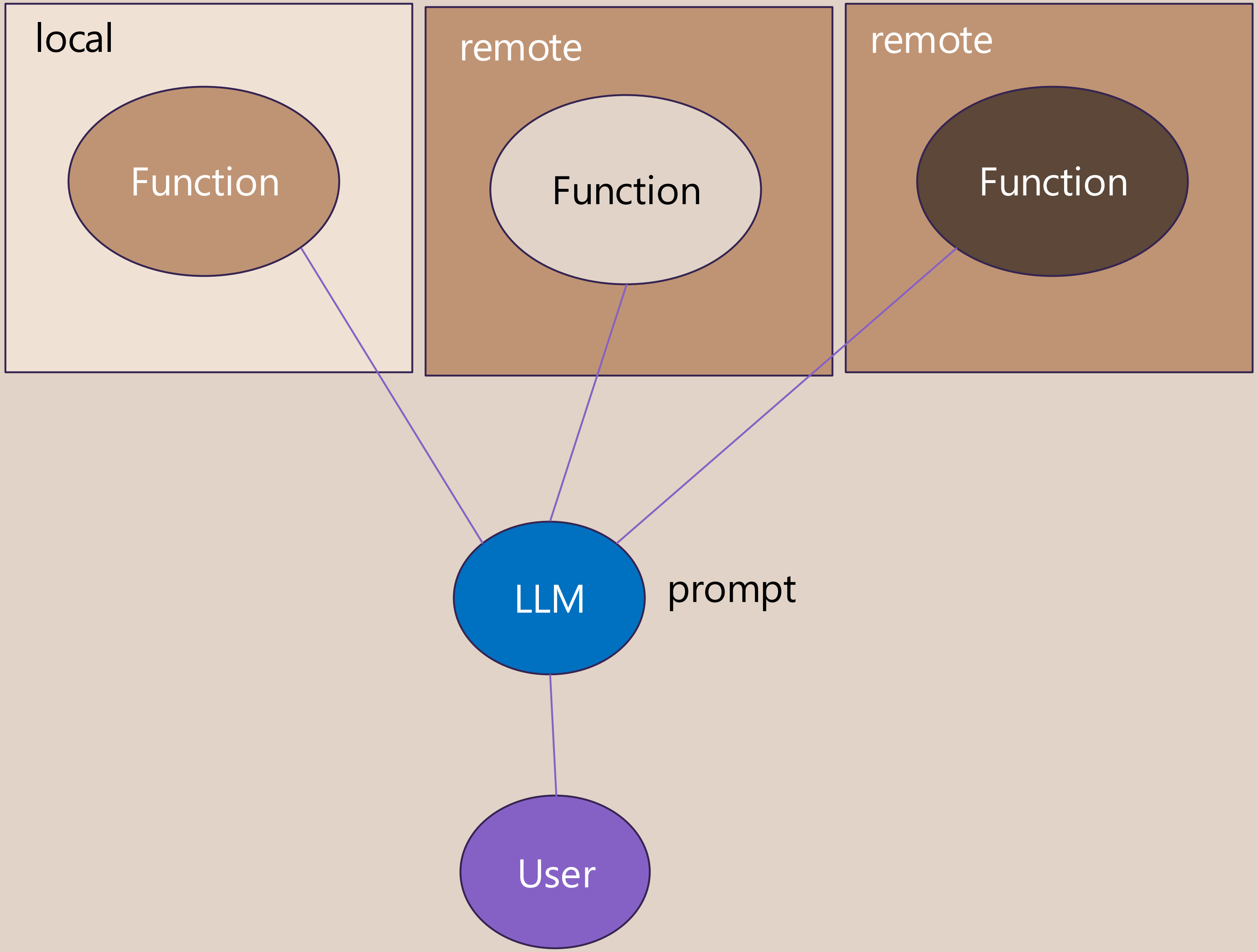
Function calling?

- It’s a way to give an LLM more capabilities
- Tell the LLM about function
- Give it a prompt, and let the LLM figure out what function to call
- *Gives more capabilities to LLMs*



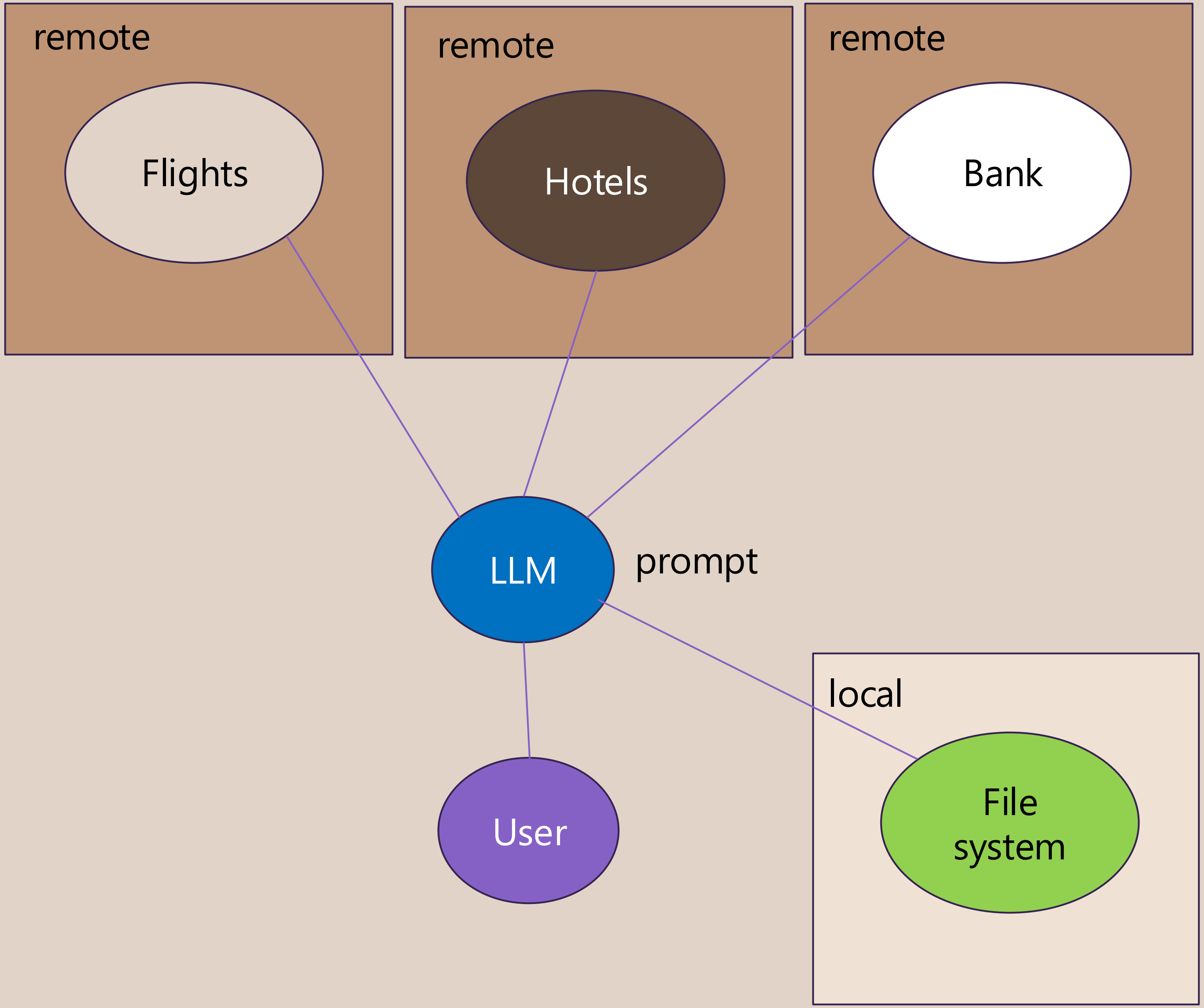
Function calling with MCP

- Functions/Features lives on servers
- Servers run remote and/or locally
- Decoupled architecture
- Use someone else's work to assemble an Agent



An example, travel booking

- Solve the problem with tools, resources and prompts on several servers
- Get flights, get hotels, pay with bank. Store PDF in local computer
- *User interface is a chat controlled by prompts*



MCP is an open protocol that standardizes how applications provide context to LLMs.

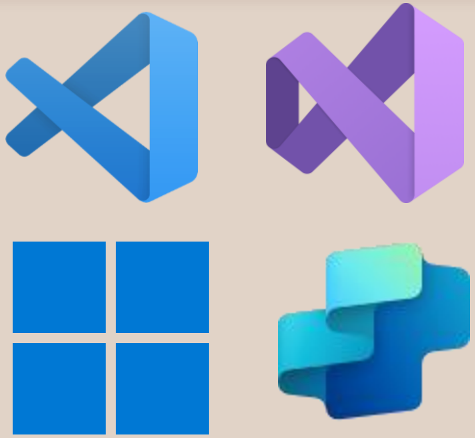
It's like USB-C but for AI

Model Context Protocol

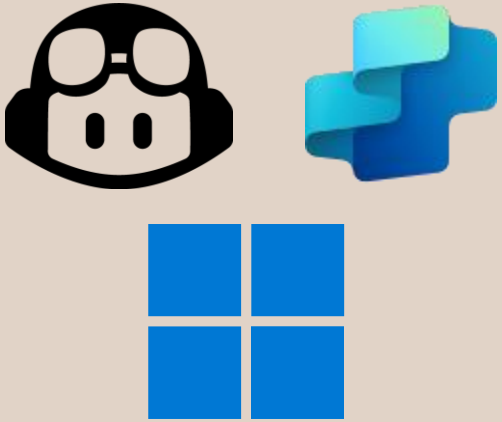
Created by Anthropic
Adopted by the AI community
Evolving Together

Parts of MCP

Hosts



Clients



Servers

Let’s show some practical MCP servers (without even coding)

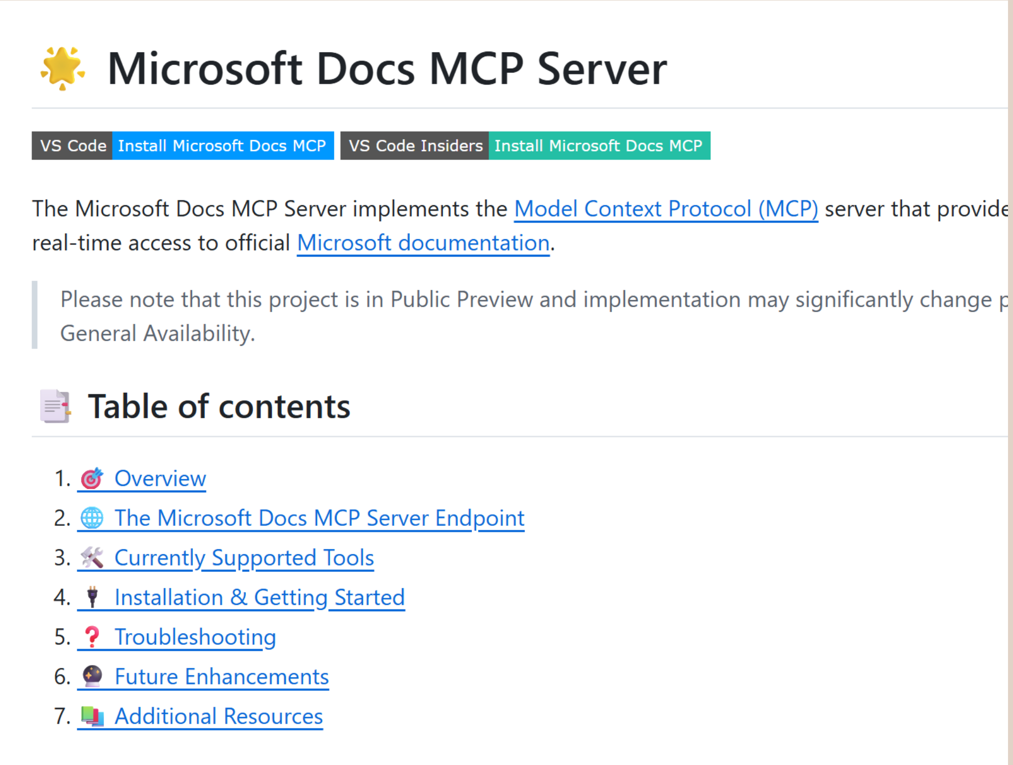
Documentation

Playwright, E2E testing/automation

File system

Documentation on the fly

- Docs and Learn as an MCP server
- Type what you need, e.g "Azure AI Foundry"
- https://github.com/MicrosoftDocs/mcp



🌟 Microsoft Docs MCP Server

VS Code | Install Microsoft Docs MCP
VS Code Insiders | Install Microsoft Docs MCP

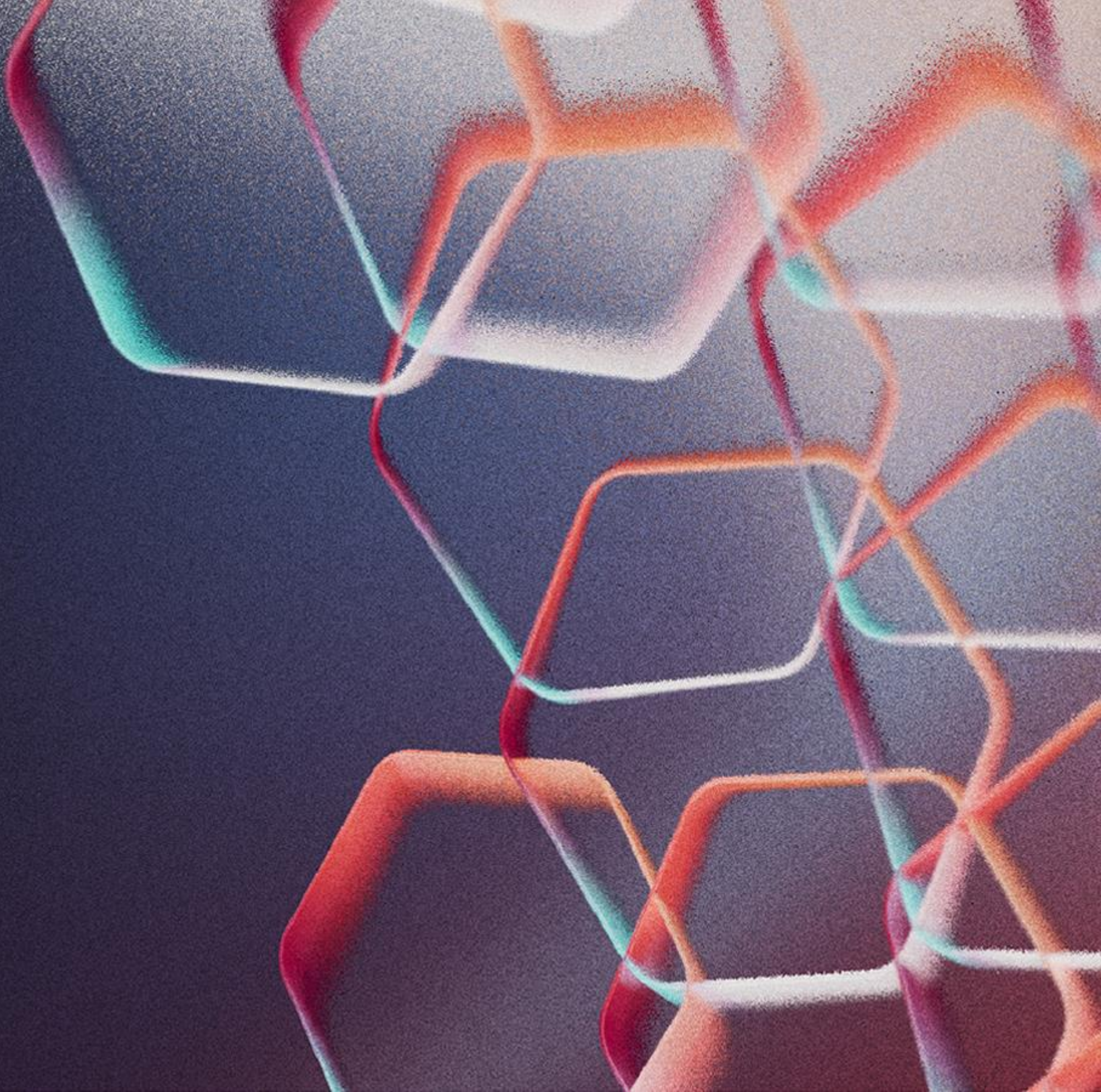
The Microsoft Docs MCP Server implements the Model Context Protocol (MCP) server that provide real-time access to official Microsoft documentation.

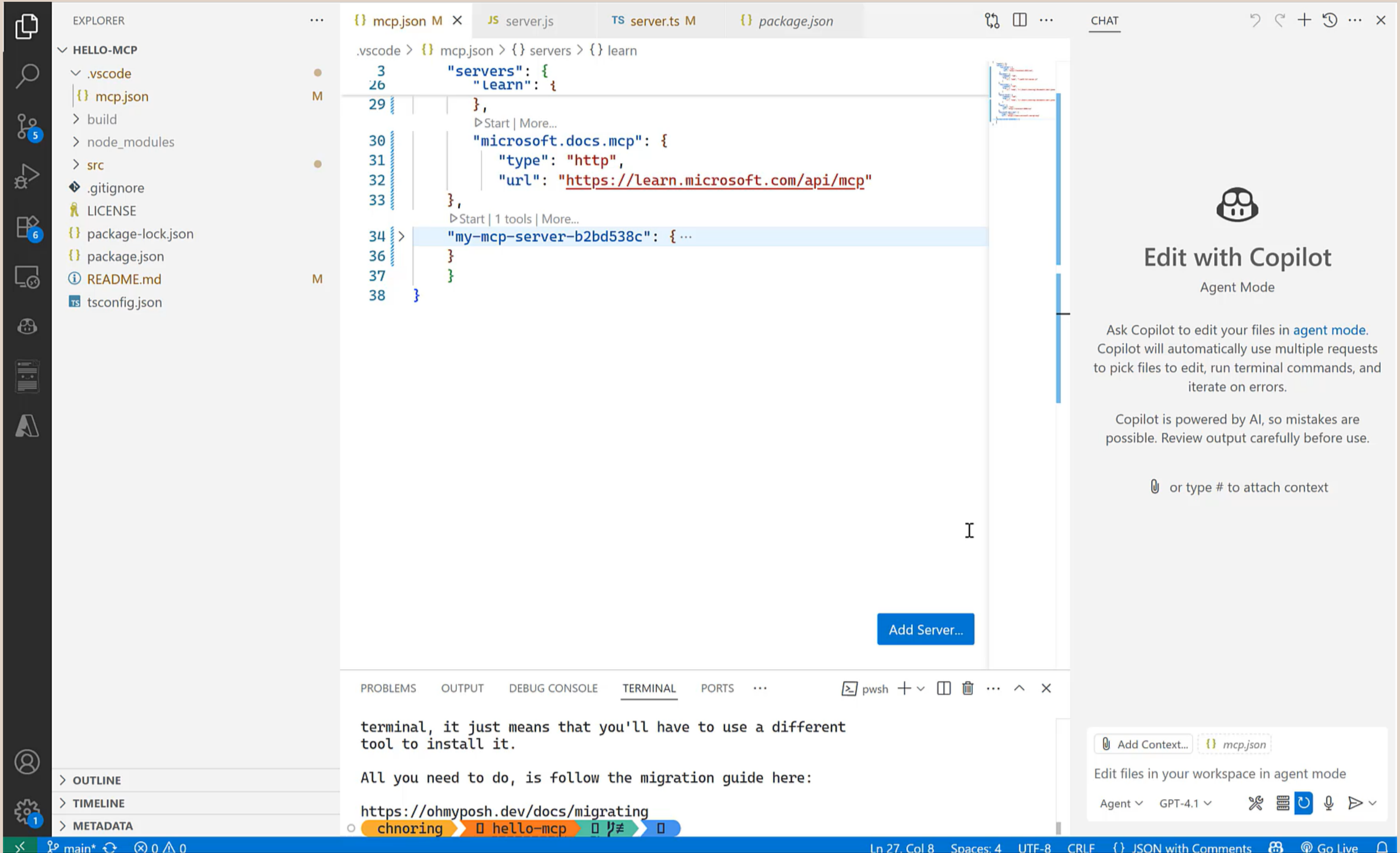
> Please note that this project is in Public Preview and implementation may significantly change p General Availability.

📑 Table of contents

Demo

Documentation in your IDE





```
    "servers": {
        "learn": {
        },
        ▷Start | More...
        "microsoft.docs.mcp": {
            "type": "http",
            "url": "https://learn.microsoft.com/api/mcp"
        },
        ▷Start | 1 tools | More...
        "my-mcp-server-b2bd538c": {···
        }
    }
}
```

```
terminal, it just means that you'll have to use a different
tool to install it.

All you need to do, is follow the migration guide here:

https://ohmyposh.dev/docs/migrating
chnoring  hello-mcp
```

Edit with Copilot

Agent Mode

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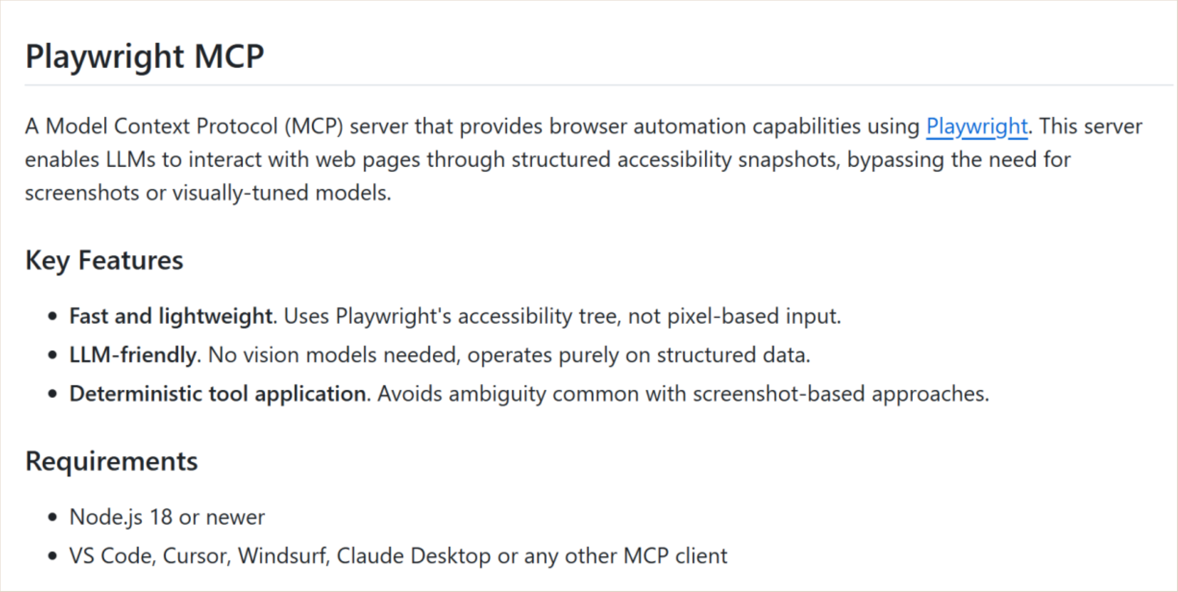
or type # to attach context

Edit files in your workspace in agent mode

Playwright MCP

- Automate tasks
- https://github.com/microsoft/playwright-mcp
- Crawl the web, retrieve information
- Try: https://www.tui.co.uk/

book your next trip ☺



Playwright MCP

A Model Context Protocol (MCP) server that provides browser automation capabilities using Playwright. This server enables LLMs to interact with web pages through structured accessibility snapshots, bypassing the need for screenshots or visually-tuned models.

Key Features

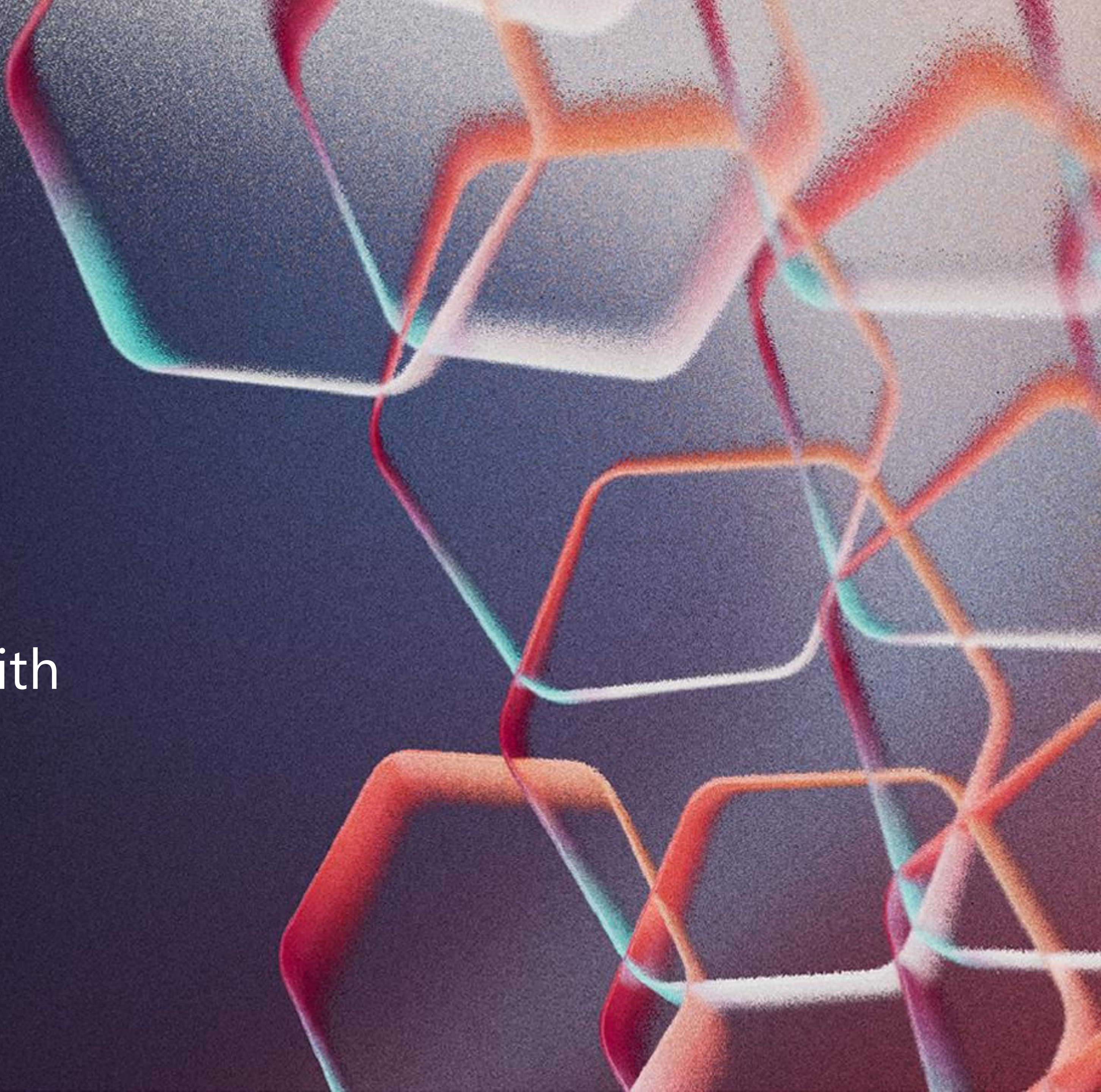
- **Fast and lightweight.** Uses Playwright's accessibility tree, not pixel-based input.
- **LLM-friendly.** No vision models needed, operates purely on structured data.
- **Deterministic tool application.** Avoids ambiguity common with screenshot-based approaches.

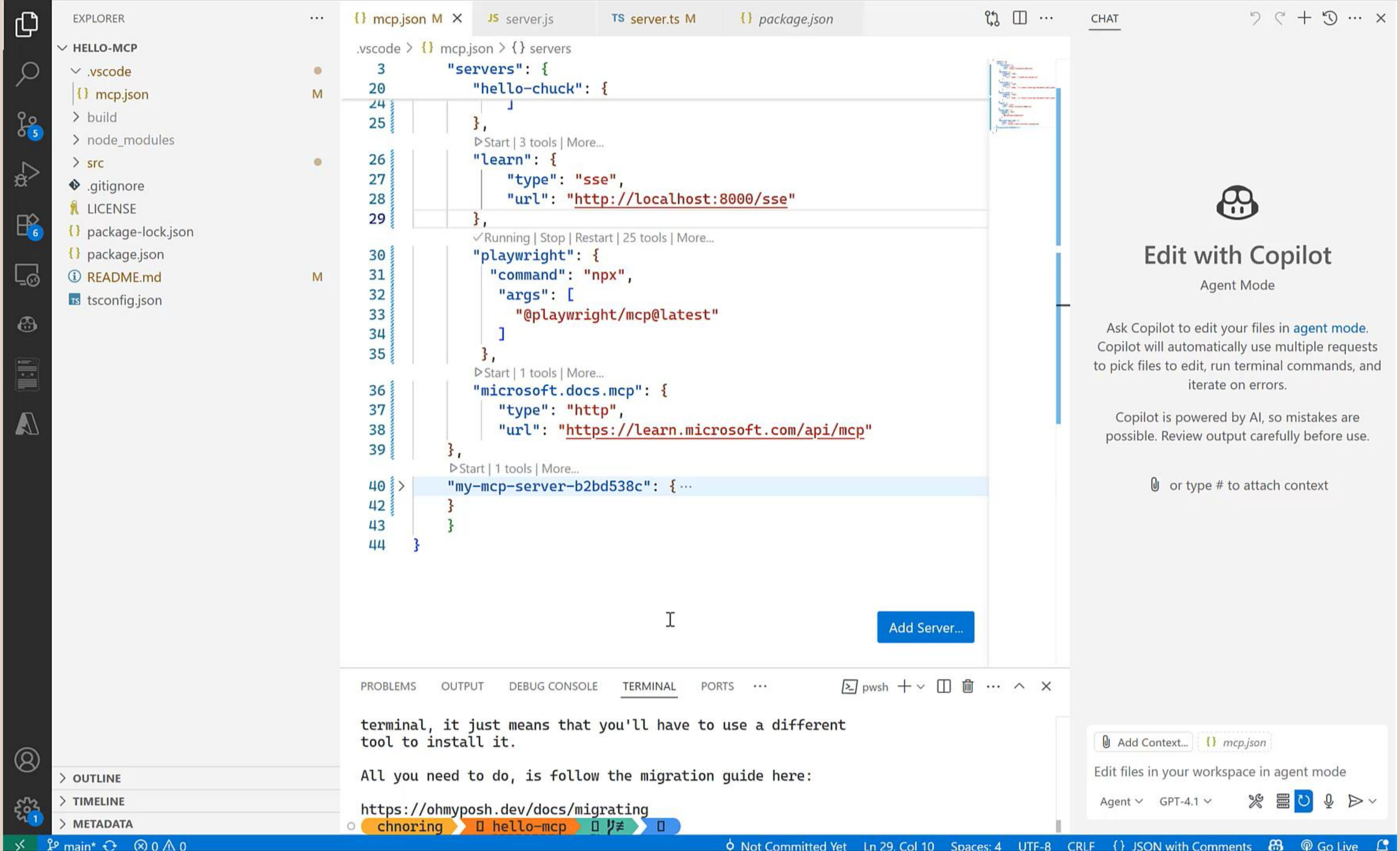
Requirements

- Node.js 18 or newer
- VS Code, Cursor, Windsurf, Claude Desktop or any other MCP client

Demo

Plan your travel from A to B with Playwright





```
    "servers": {
        "hello-chuck": {
            ]
        },
        ▷Start | 3 tools | More...
        "learn": {
            "type": "sse",
            "url": "http://localhost:8000/sse"
        },
        ✓Running | Stop | Restart | 25 tools | More...
        "playwright": {
          "command": "npx",
           "args": [
             "@playwright/mcp@latest"
           ]
         },
        ▷Start | 1 tools | More...
        "microsoft.docs.mcp": {
           "type": "http",
           "url": "https://learn.microsoft.com/api/mcp"
    },
    ▷Start | 1 tools | More...
    "my-mcp-server-b2bd538c": {···
    }
    }
}
```

```
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 chnoring  hello-mcp 
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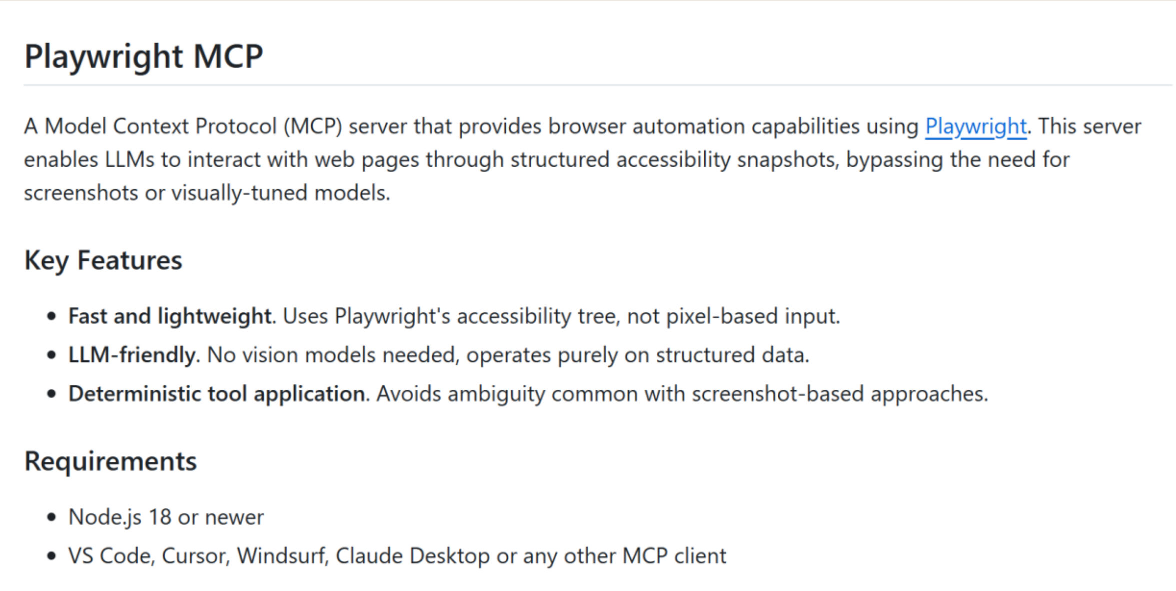
or type # to attach context

Edit files in your workspace in agent mode

Manage your files

- Interact with your files
- Allow it access to specific folders, CAREFUL!!
- Create files and folders
- Search content
- Remove and move files
- *You can run this in a Docker container if you worry about security*



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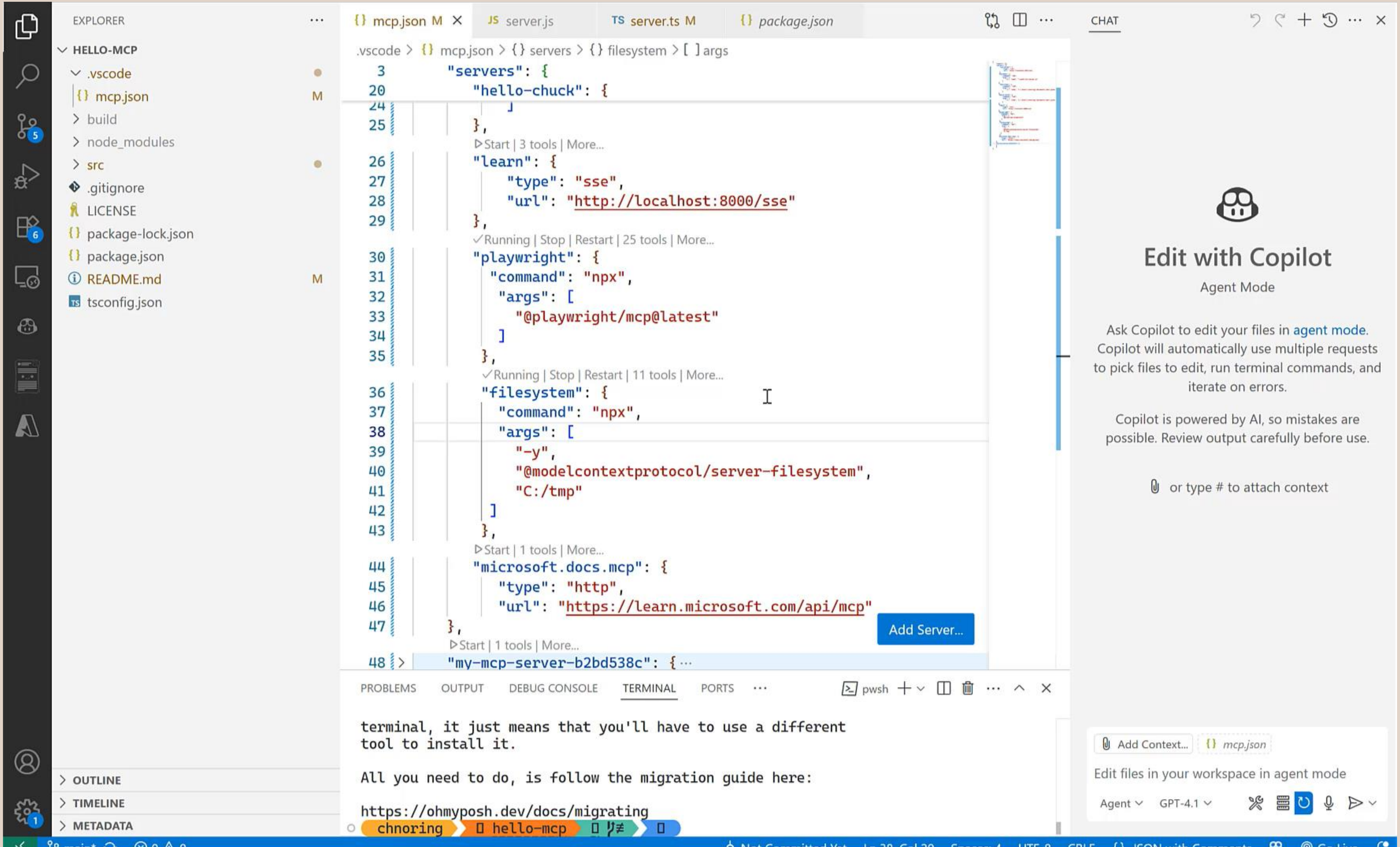
Demo

Manage your file system with MCP



```
    "servers": {
      "hello-chuck": {
        ]
      },
      ▷Start | 3 tools | More...
      "learn": {
          "type": "sse",
          "url": "http://localhost:8000/sse"
      },
      ✓Running | Stop | Restart | 25 tools | More...
      "playwright": {
        "command": "npx",
         "args": [
           "@playwright/mcp@latest"
         ]
       },
       ✓Running | Stop | Restart | 11 tools | More...
       "filesystem": {
         "command": "npx",
         "args": [
           "-y",
           "@modelcontextprotocol/server-filesystem",
           "C:/tmp"
         ]
       },
      ▷Start | 1 tools | More...
      "microsoft.docs.mcp": {
         "type": "http",
         "url": "https://learn.microsoft.com/api/mcp"
    },
    ▷Start | 1 tools | More...
    "my-mcp-server-b2bd538c": {…
```

```
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or type # to attach context

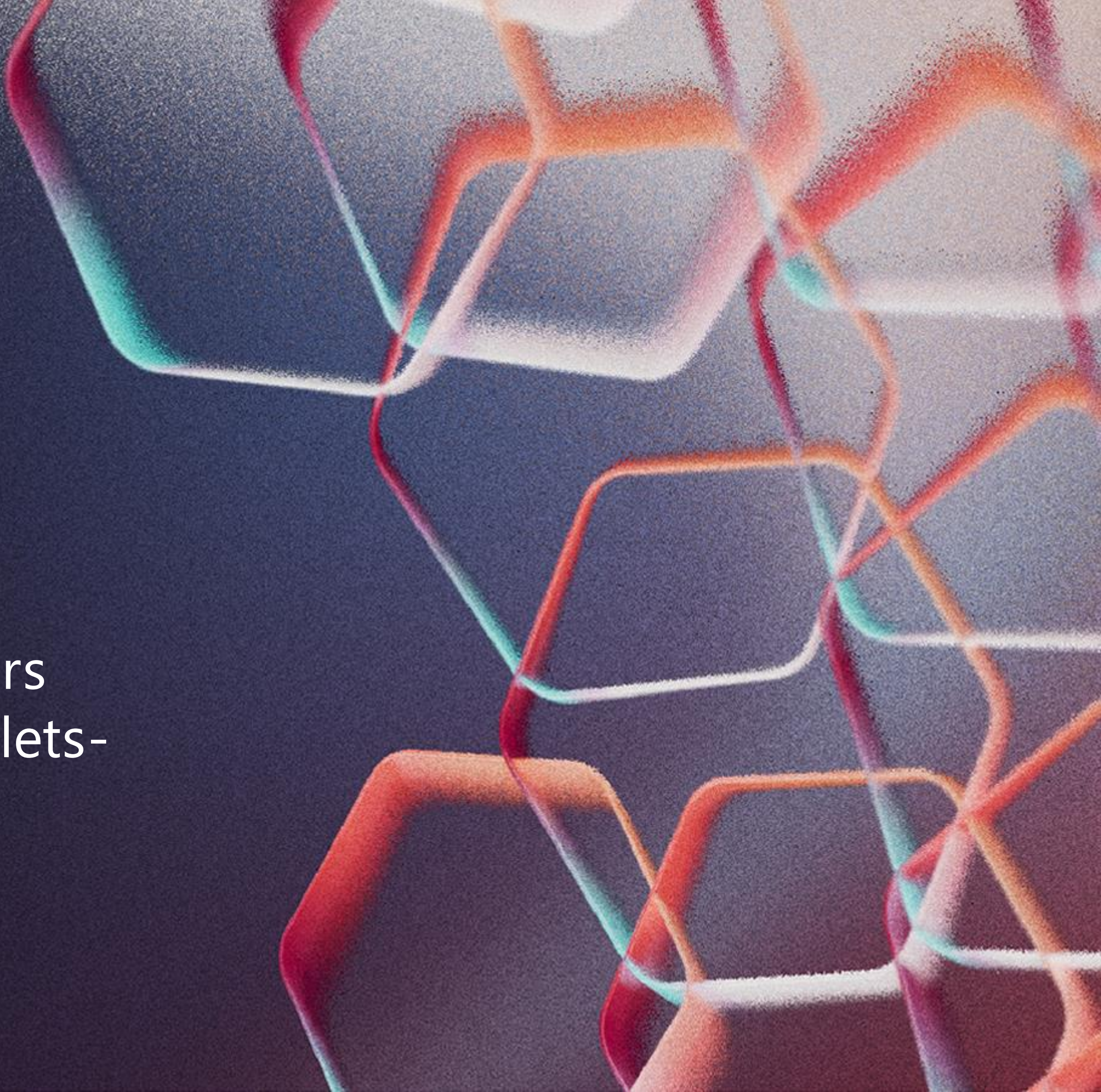
Add Context... mcp.json

Edit files in your workspace in agent mode

Agent GPT-4.1

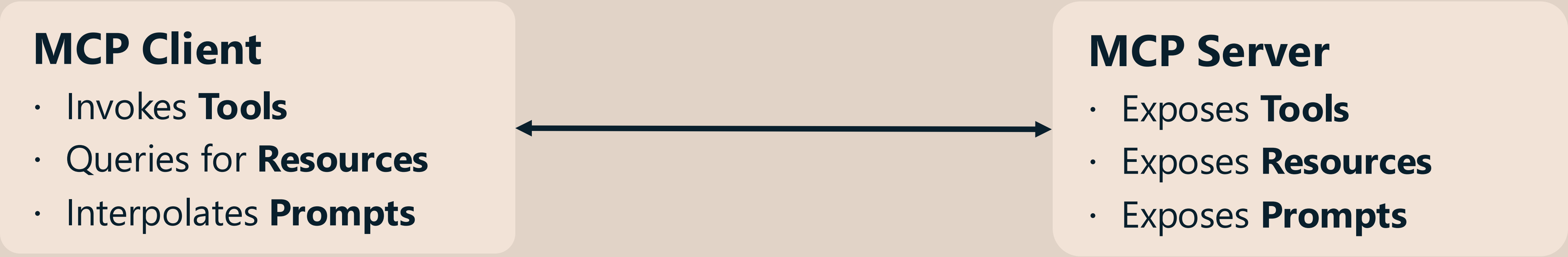
Demo

Setting up & using MCP servers
https://github.com/microsoft/lets-learn-mcp-javascript



MCP Deep-Dive

Adapted from Mahesh Murag (Anthropic) AI Engineer session



MCP Client

- Invokes **Tools**
- Queries for **Resources**
- Interpolates **Prompts**

MCP Server

- Exposes **Tools**
- Exposes **Resources**
- Exposes **Prompts**

Tools

Model-controlled

Functions invoked by the model

- Retrieve / search
- Send a message
- Update DB records

Resources

Application-controlled

Data exposed to the application

- Files
- Database records
- API Responses

Prompts

User-controlled

Pre-defined templates for AI interactions

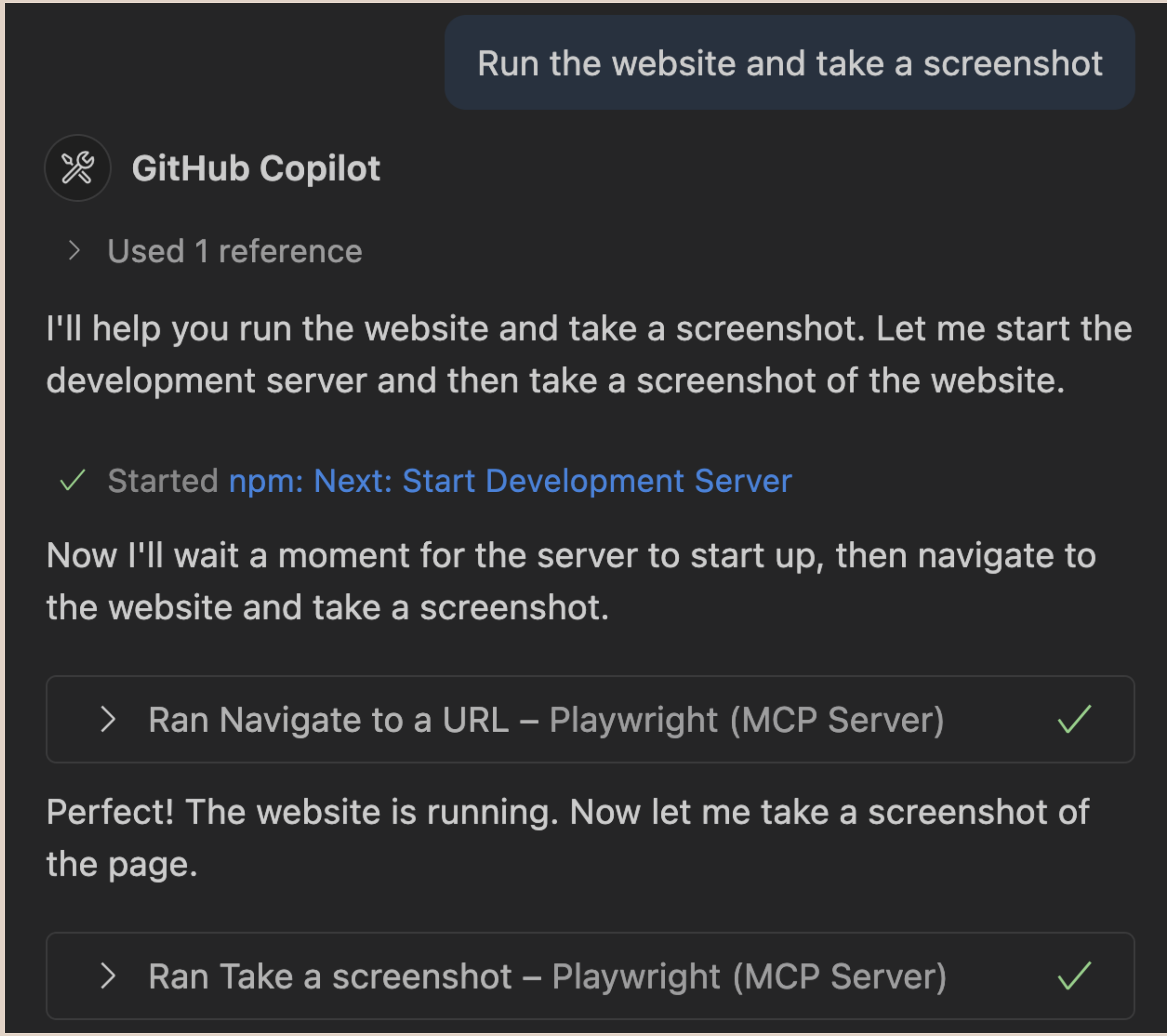
- Document Q&A
- Transcript Summary
- Output as JSON

The popular basic primitive

Tools

- Functions that LLMs can call to perform specific **actions** - basically function calling.

- Send email
- Update todos
- Run tests
- File issue bug



Run the website and take a screenshot

GitHub Copilot

› Used 1 reference

I'll help you run the website and take a screenshot. Let me start the development server and then take a screenshot of the website.

✓ Started npm: Next: Start Development Server

Now I'll wait a moment for the server to start up, then navigate to the website and take a screenshot.

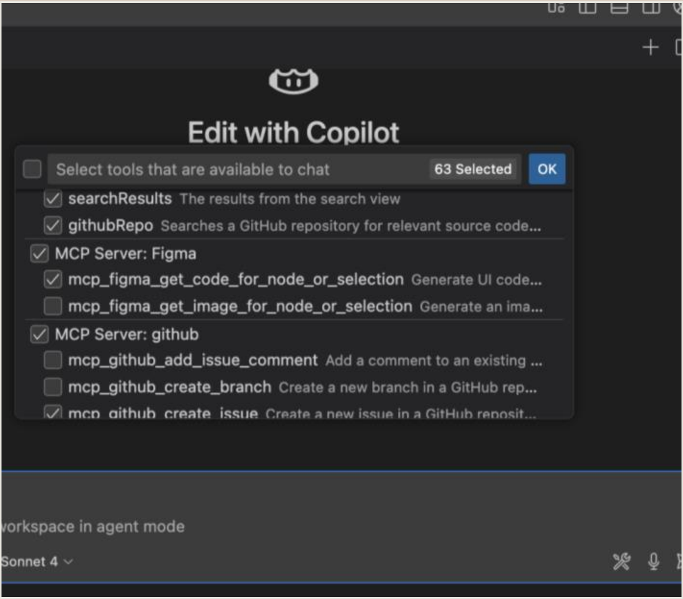
› Ran Navigate to a URL – Playwright (MCP Server) ✓

Perfect! The website is running. Now let me take a screenshot of the page.

› Ran Take a screenshot – Playwright (MCP Server) ✓

Tools: User controls

Provide user controls to fine-tune and improve tool calls



Edit with Copilot

□ Select tools that are available to chat 63 Selected OK

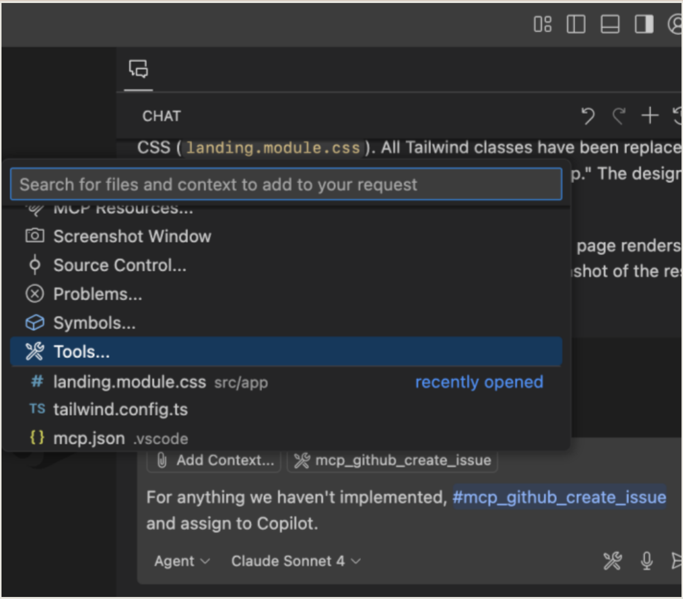
- ☑ searchResults The results from the search view
- ☑ githubRepo Searches a GitHub repository for relevant source code...
- ☑ MCP Server: Figma
  - ☑ mcp_figma_get_code_for_node_or_selection Generate UI code...
  - □ mcp_figma_get_image_for_node_or_selection Generate an ima...
- ☑ MCP Server: github
  - □ mcp_github_add_issue_comment Add a comment to an existing ...
  - □ mcp_github_create_branch Create a new branch in a GitHub rep...
  - ☑ mcp_github_create_issue Create a new issue in a GitHub reposit...

orkspace in agent mode

Sonnet 4

Per-chat tool selection

Manually reduce tools required to complete a specific task



CHAT

CSS (`landing.module.css`). All Tailwind classes have been replace

p." The design

page renders

shot of the re

Search for files and context to add to your request

- MCP Resources...
- Screenshot Window
- Source Control...
- Problems...
- Symbols...
- Tools...
- landing.module.css src/app recently opened
- tailwind.config.ts
- mcp.json .vscode

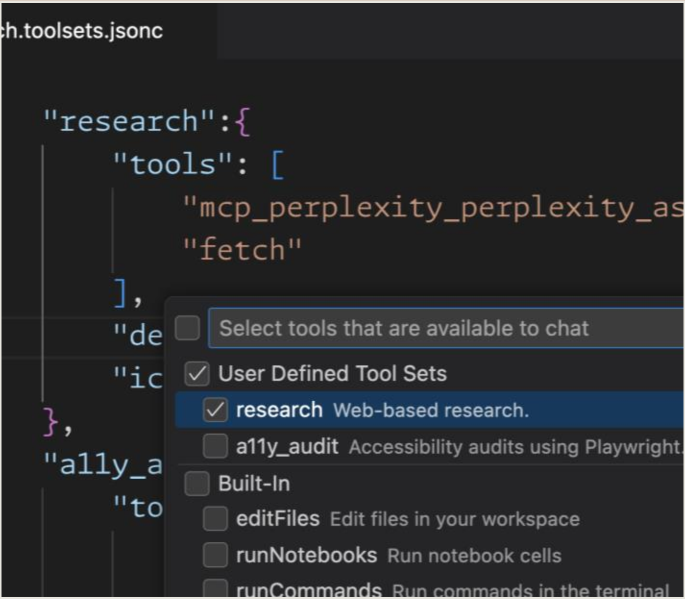
Add Context... mcp_github_create_issue

For anything we haven't implemented, #mcp_github_create_issue and assign to Copilot.

Agent Claude Sonnet 4

Mention tools in prompts

Reduce the guessing and reference tools as needed.



h.toolsets.jsonc

```
"research":{
    "tools": [
        "mcp_perplexity_perplexity_as
        "fetch"
    ],
    "de
    "ic
},
"a11y_a
    "to
```

□ Select tools that are available to chat

- ☑ User Defined Tool Sets
  - ☑ research Web-based research.
  - □ a11y_audit Accessibility audits using Playwright.
- □ Built-In
  - □ editFiles Edit files in your workspace
  - □ runNotebooks Run notebook cells
  - □ runCommands Run commands in the terminal

User-defined tool sets

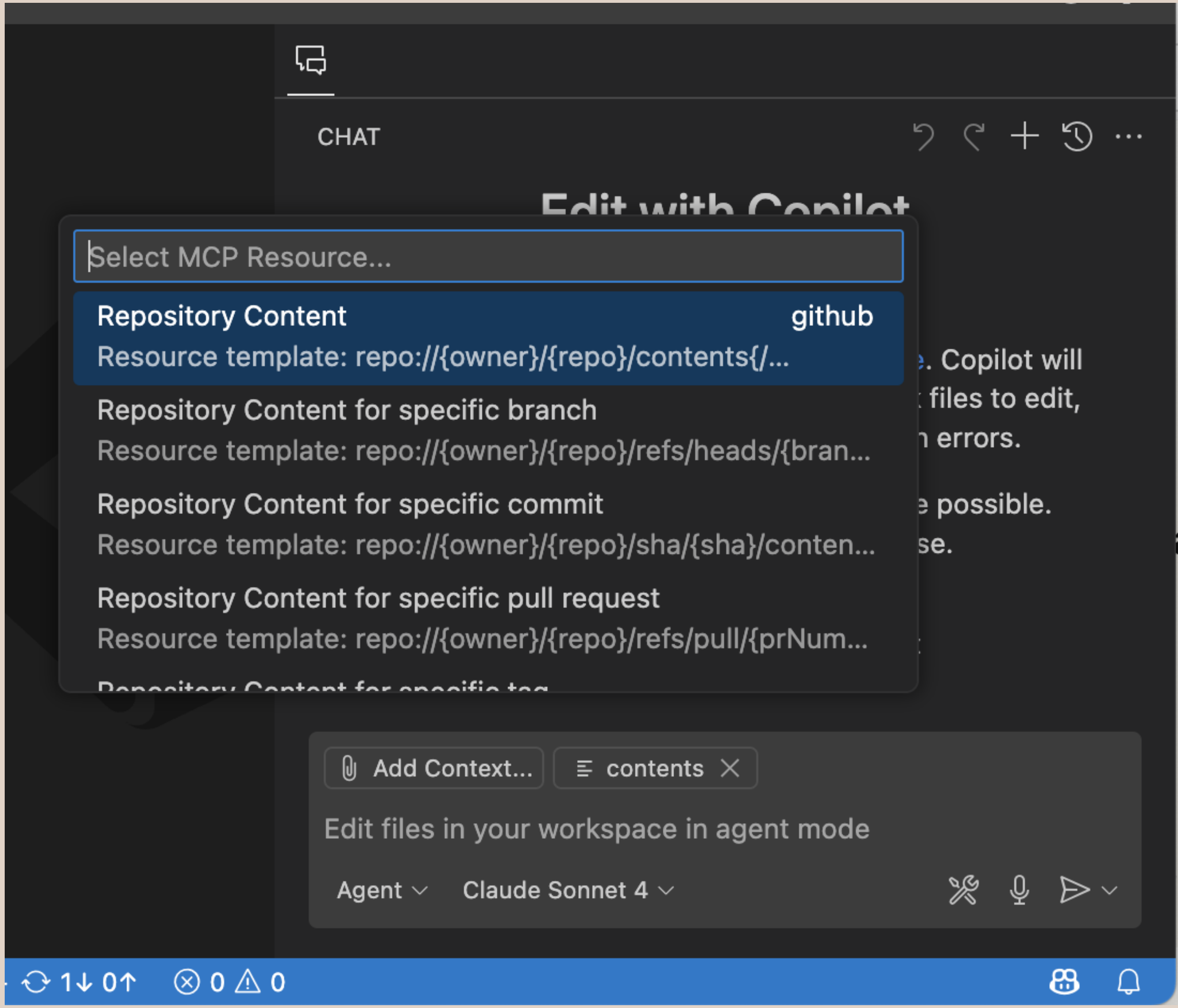
Re-use task-specific tools across tasks

Ease of adding and returning data

Resources

- Expose data in a read-only fashion as URIs client/agent/user.

- Files
- Documents
- Database entries/schemas
- Images



Select MCP Resource...

Repository Content   github
Resource template: repo://{owner}/{repo}/contents{/...

Repository Content for specific branch
Resource template: repo://{owner}/{repo}/refs/heads/{bran...

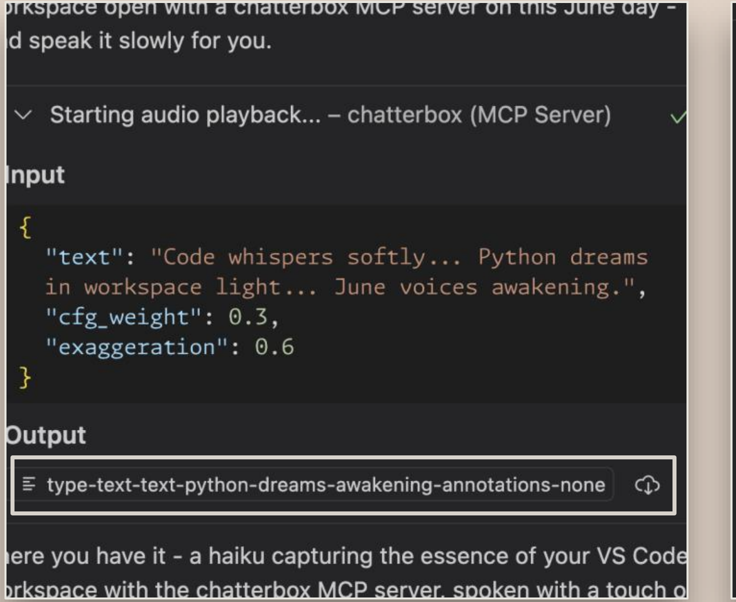
Repository Content for specific commit
Resource template: repo://{owner}/{repo}/sha/{sha}/conten...

Repository Content for specific pull request
Resource template: repo://{owner}/{repo}/refs/pull/{prNum...

Repository Content for specific tag

Resources: Use cases

Make data accessible to clients and users



orkspace open with a chatterbox MCP server on this June day -
d speak it slowly for you.

Starting audio playback... – chatterbox (MCP Server)

Input

```
{
  "text": "Code whispers softly... Python dreams
  in workspace light... June voices awakening.",
  "cfg_weight": 0.3,
  "exaggeration": 0.6
}
```

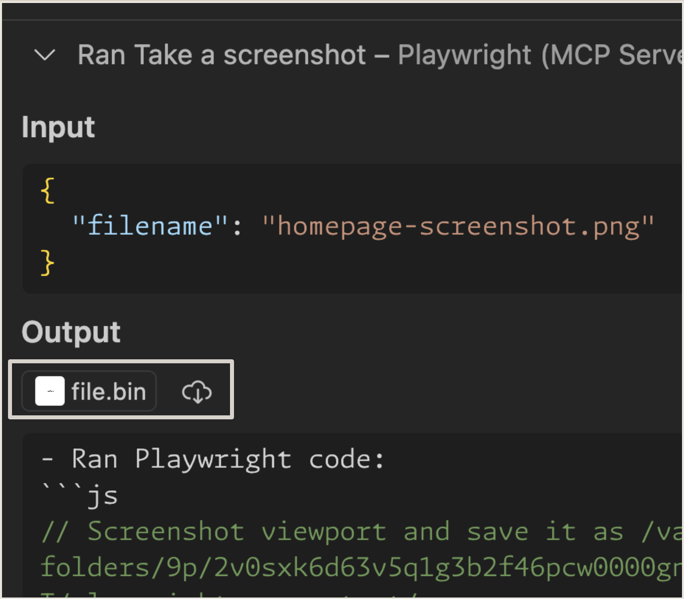
Output

type-text-text-python-dreams-awakening-annotations-none

ere you have it - a haiku capturing the essence of your VS Code
orkspace with the chatterbox MCP server, spoken with a touch o

Reduce response tokens

Returning embedded resources lets the agent pull the data.



Ran Take a screenshot – Playwright (MCP Serve

Input

```
{
  "filename": "homepage-screenshot.png"
}
```

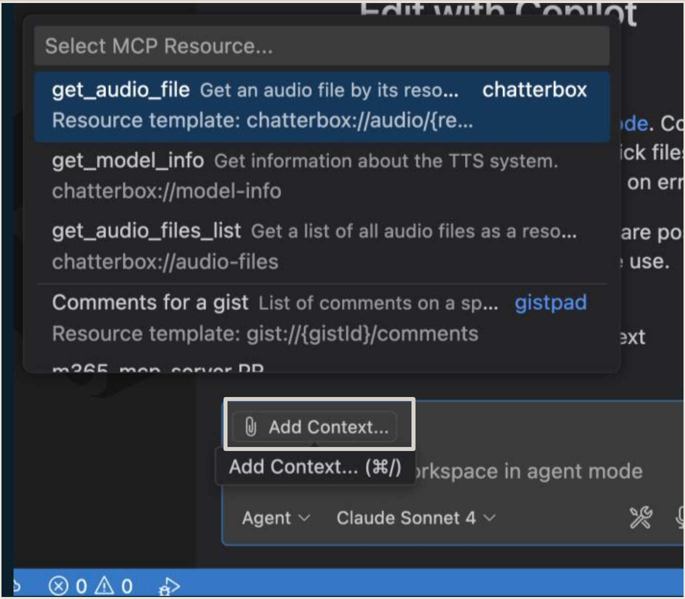
Output

file.bin

~~~
- Ran Playwright code:
```js
// Screenshot viewport and save it as /va
folders/9p/2v0sxk6d63v5q1g3b2f46pcw0000gr
~~~

Expose data/files to user

Provide to assets for the user to act on, not LLM context.



Select MCP Resource...

get_audio_file Get an audio file by its reso... chatterbox
Resource template: chatterbox://audio/{re...

get_model_info Get information about the TTS system.
chatterbox://model-info

get_audio_files_list Get a list of all audio files as a reso...
chatterbox://audio-files

Comments for a gist List of comments on a sp... gistpad
Resource template: gist://{gistId}/comments

Attach as context

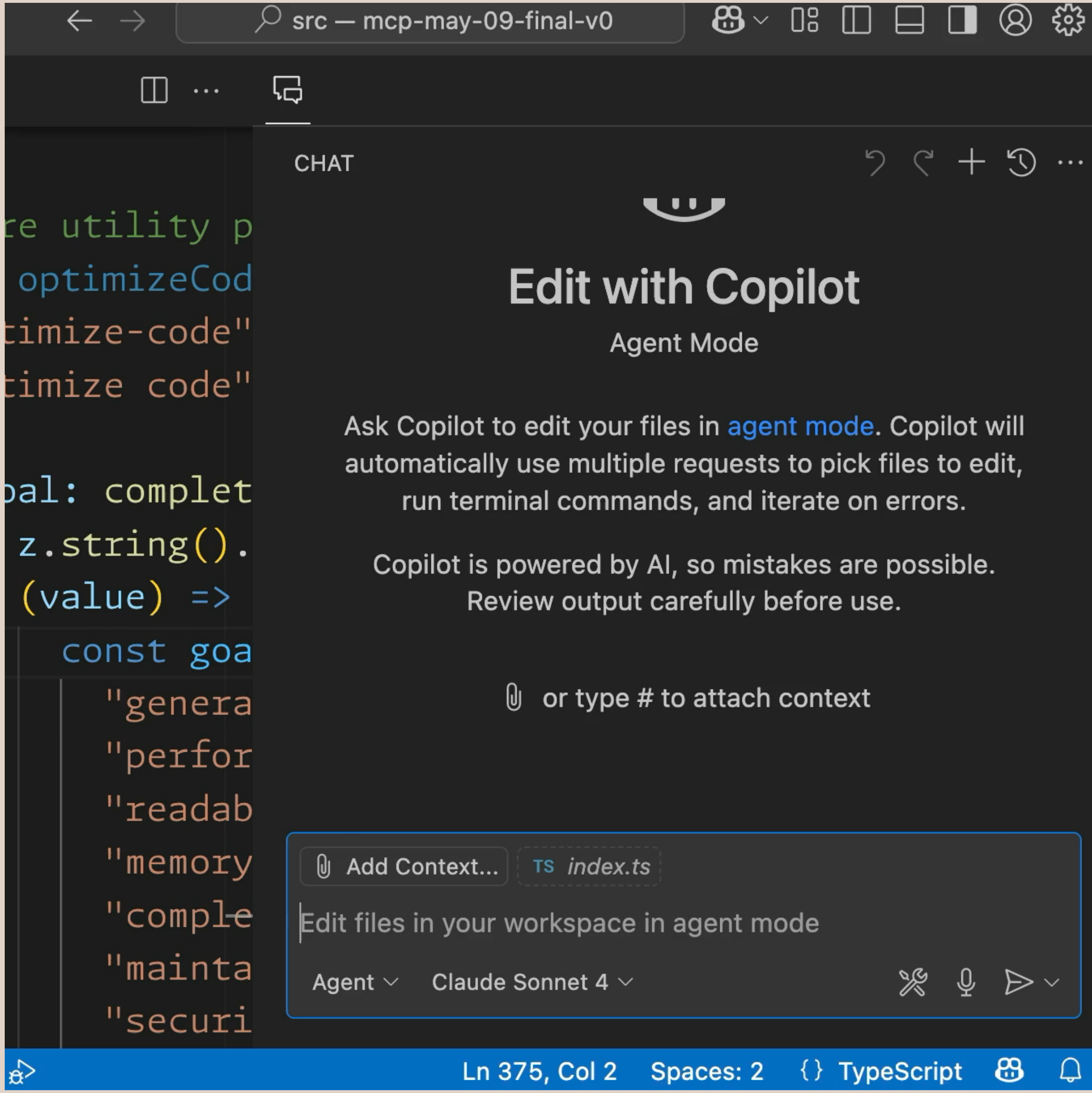
Reducing tool lookups with specific resources attached.

Quick

Prompts

- Pre-defined templates for AI tasks, explicitly invoked by the user.

- Static presets
- Reusable with placeholders
- Dynamically generated



```
re utility p
 optimizeCod
timize-code"
timize code"

oal: complet
 z.string().
 (value) =>
   const goa
     "genera
     "perfor
     "readab
     "memory
     "comple
     "mainta
     "securi
```

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Edit files in your workspace in agent mode

Prompts: Use cases

From static templates to dynamically generates workflows

- /welcome
- /setup

Onboarding prompts

Welcome prompts for users to verify setup and tour the tools

- /need-info {issue}
- /impl-metric {name}

Common workflows

One-shot tasks, parameterized for reusability

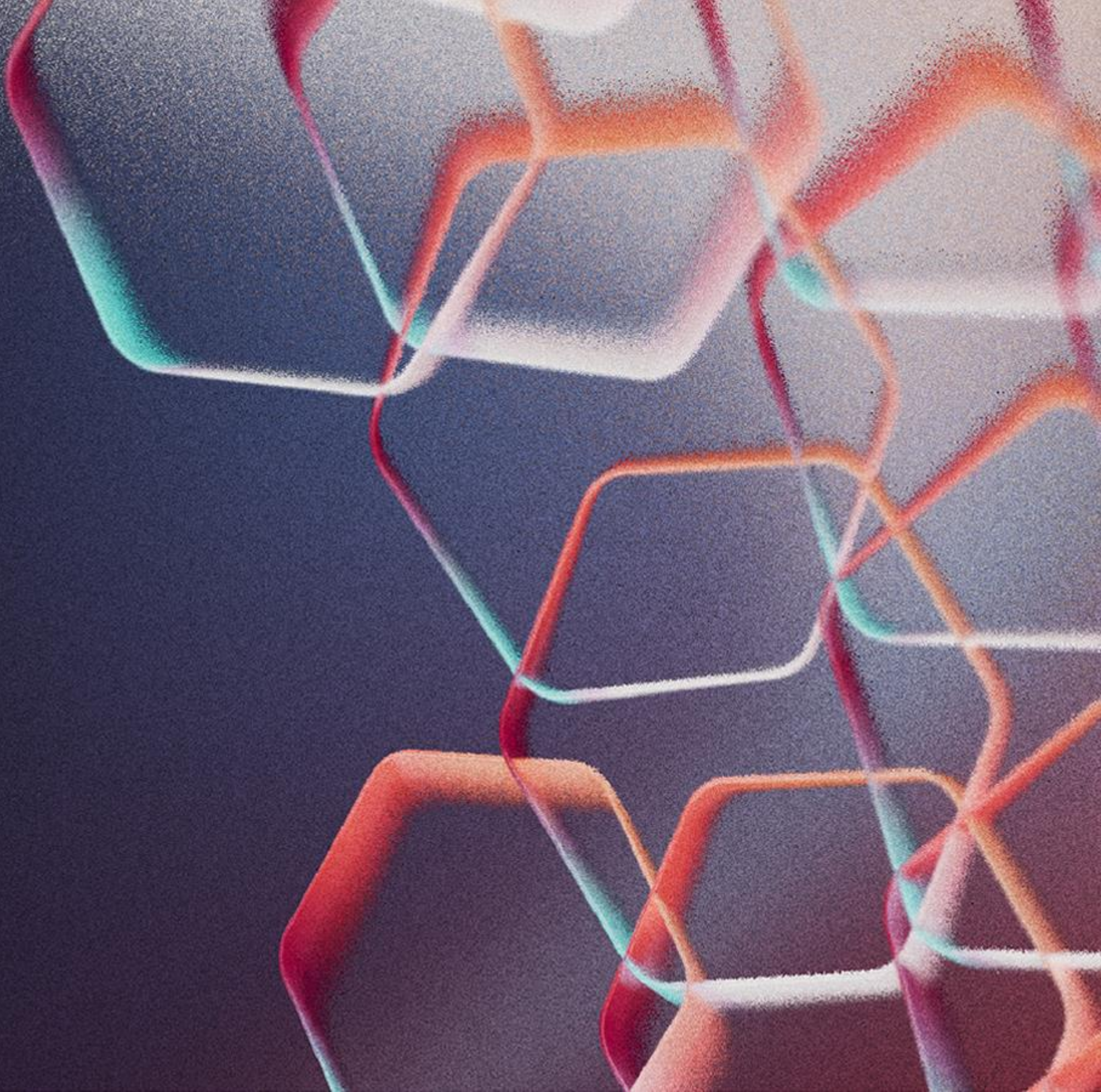
- /migrate-db …
- /root-cause-wizard

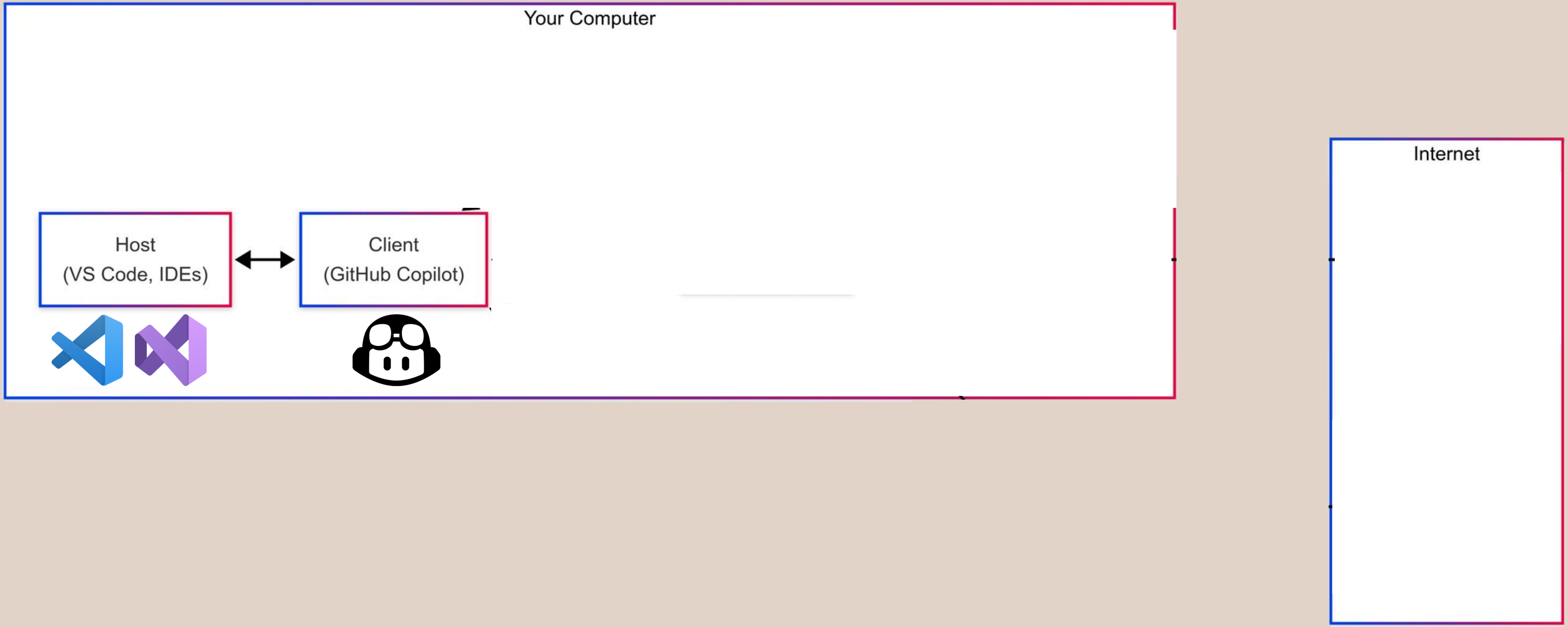
Context-aware workflows

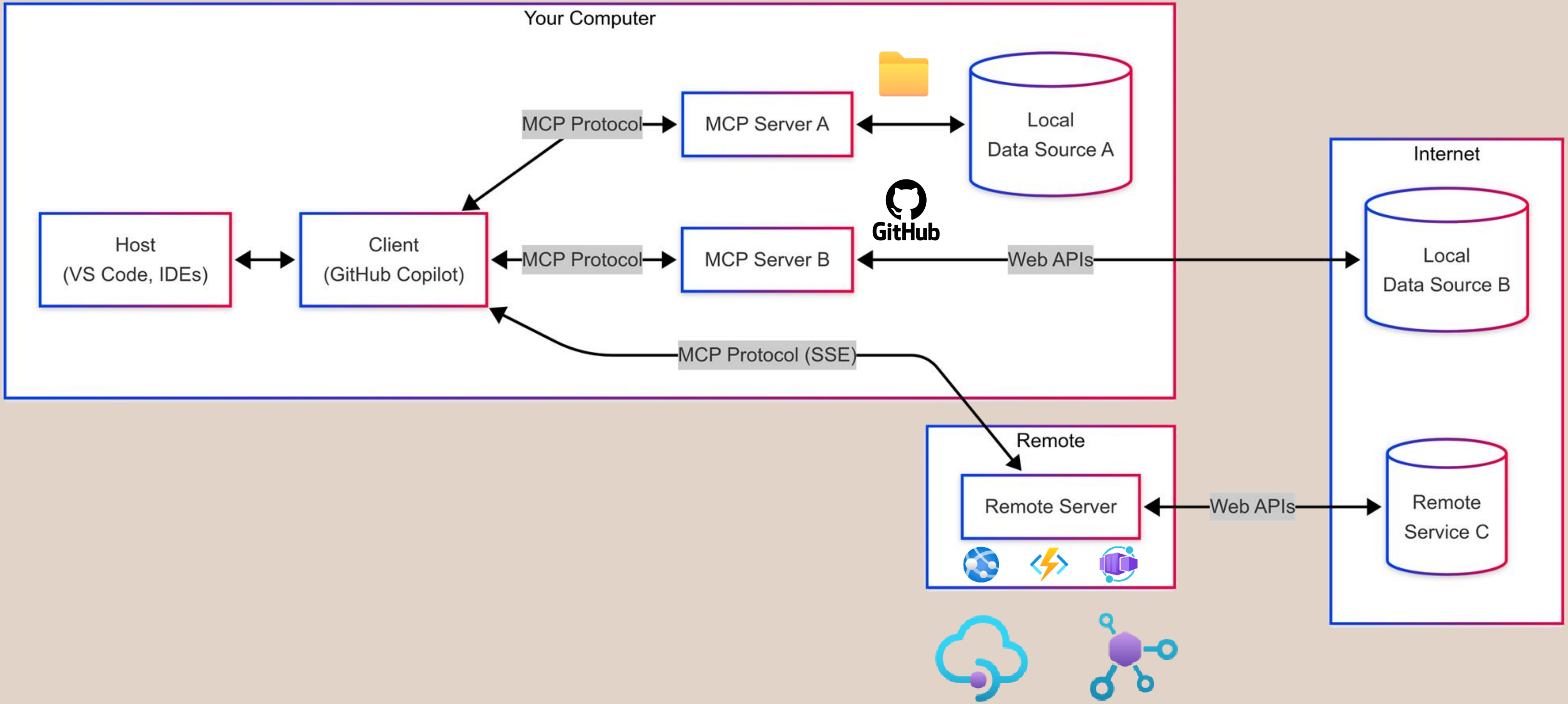
Dynamically customized for the current user/codebase

Demo

Prompts, resources, & more!




Your Computer
Host
(VS Code, IDEs)
Client
(GitHub Copilot)
Internet

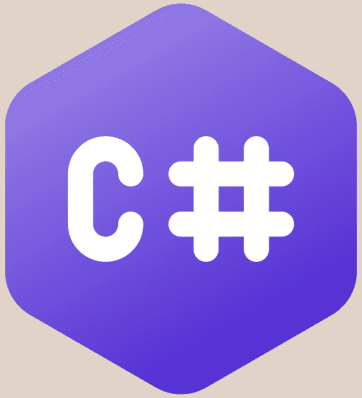


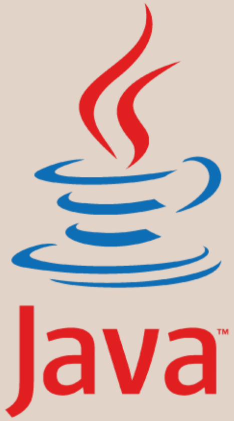
Your Computer
MCP Protocol
MCP Server A
Local
Data Source A
Host
(VS Code, IDEs)
Client
(GitHub Copilot)
MCP Protocol
MCP Server B
GitHub
Web APIs
Internet
Local
Data Source B
MCP Protocol (SSE)
Remote
Remote Server
Web APIs
Remote
Service C

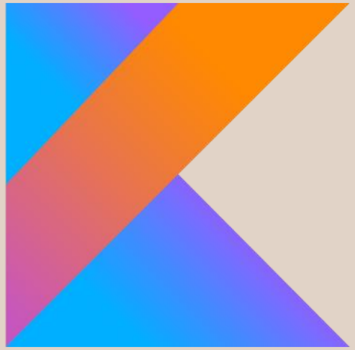
Building an MCP

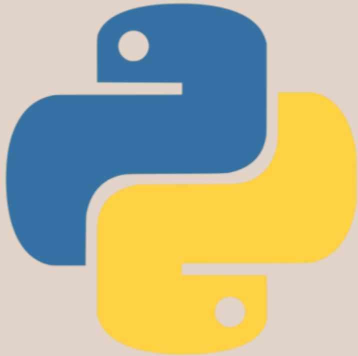
aka.ms/letslearnmcp-csharp

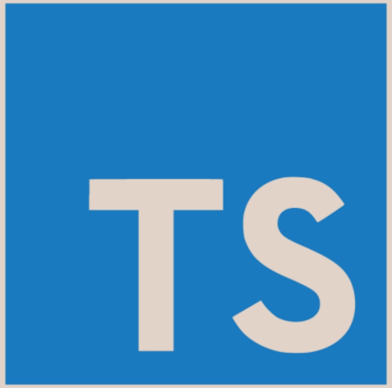
Official SDKs





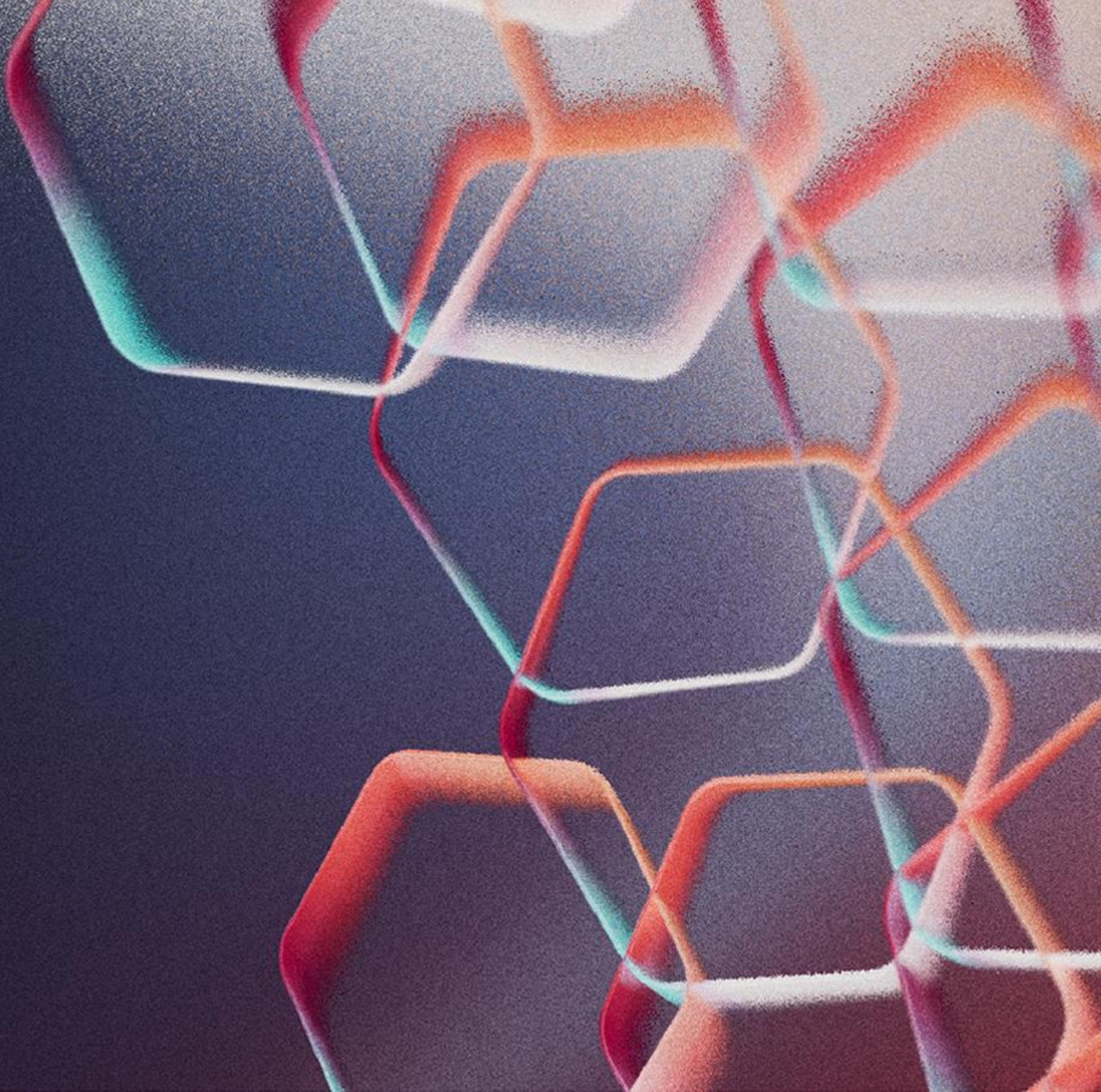




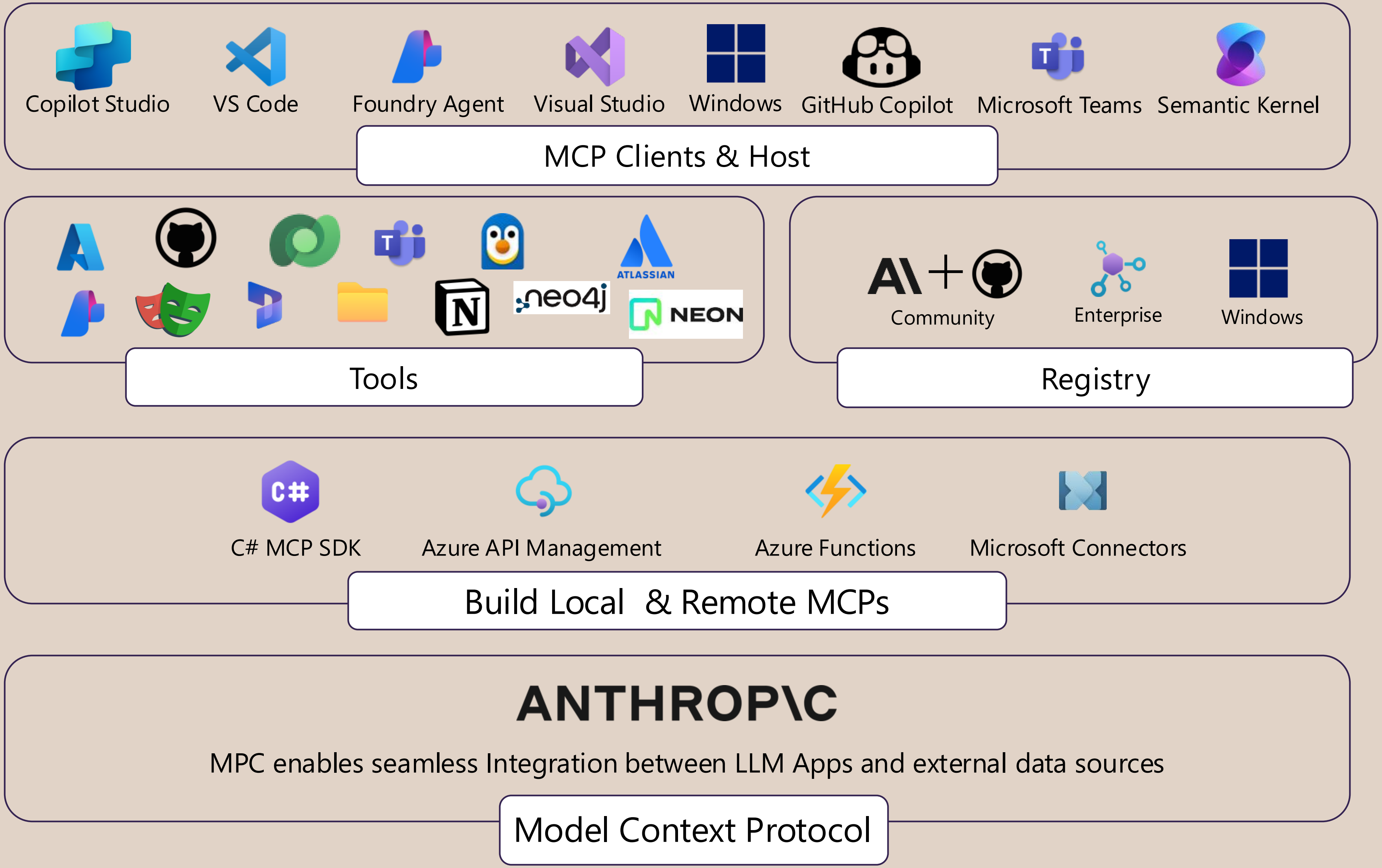


Demo

Building an MCP Server



Model Context Protocol At Microsoft



Copilot Studio

VS Code

Foundry Agent

Visual Studio

Windows

GitHub Copilot

Microsoft Teams

Semantic Kernel

MCP Clients & Host

Tools

Community

Enterprise

Windows

Registry

C# MCP SDK

Azure API Management

Azure Functions

Microsoft Connectors

Build Local & Remote MCPs

MPC enables seamless Integration between LLM Apps and external data sources

Model Context Protocol

Microsoft

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July 29th & 30th

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More training

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C# SDK for MCP

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Model Context Protocol

modelcontextprotocol.io

MCP Dev Days – July 29 & 30

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Register: https://aka.ms/mcpdevdays