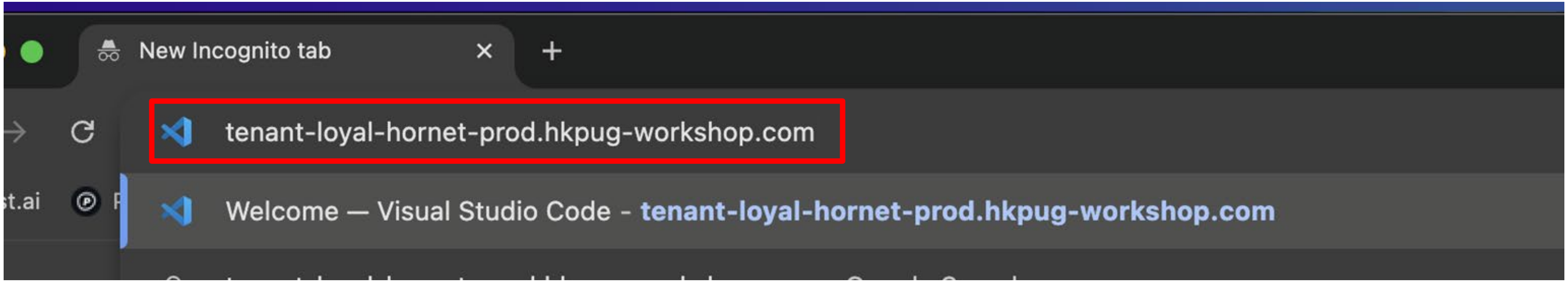
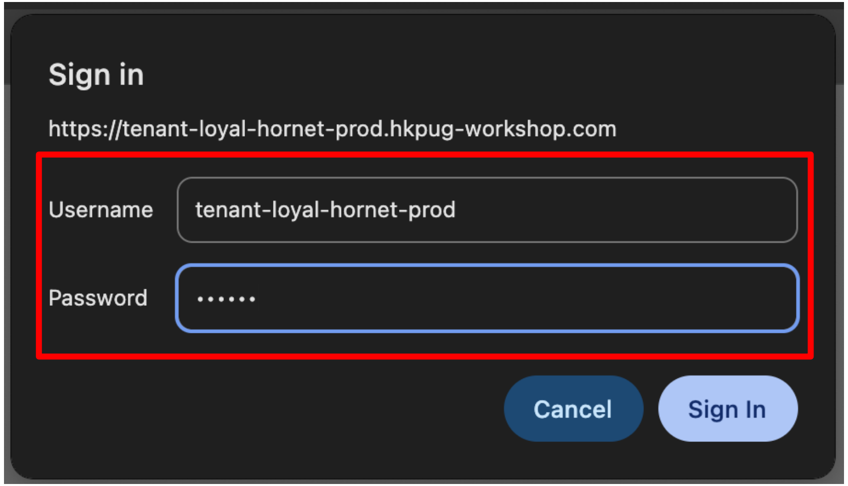
Pre-workshop Setup

Login to VS Code



tenant-loyal-hornet-prod.hkpug-workshop.com

Welcome — Visual Studio Code - tenant-loyal-hornet-prod.hkpug-workshop.com


Sign in

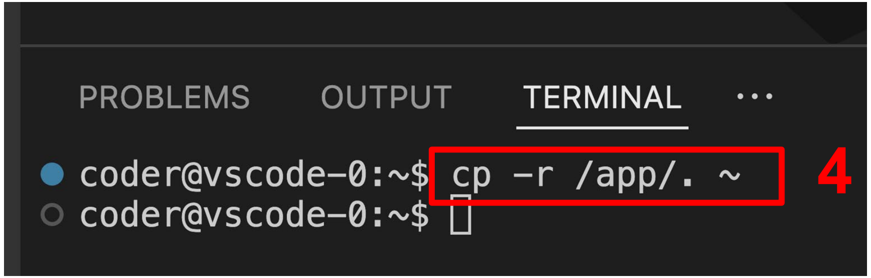
https://tenant-loyal-hornet-prod.hkpug-workshop.com

Username: tenant-loyal-hornet-prod

Password: ••••••

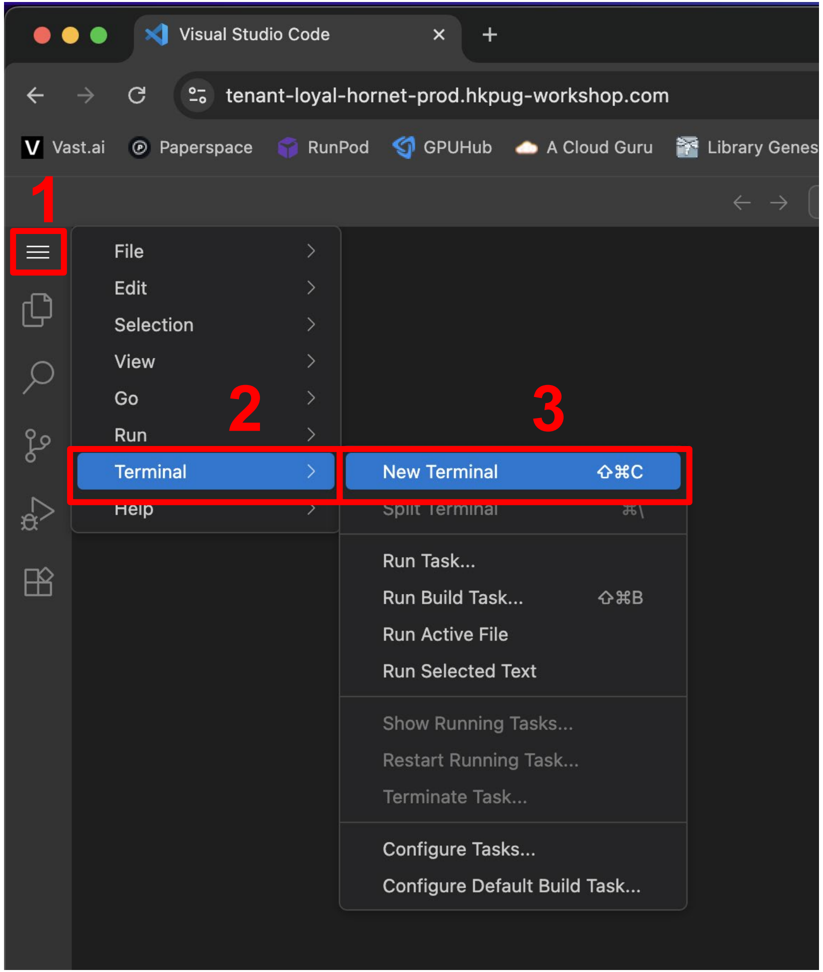
Make sure you have received your **Online Vscode URL** and **Password**!

Setup VS Code [1]

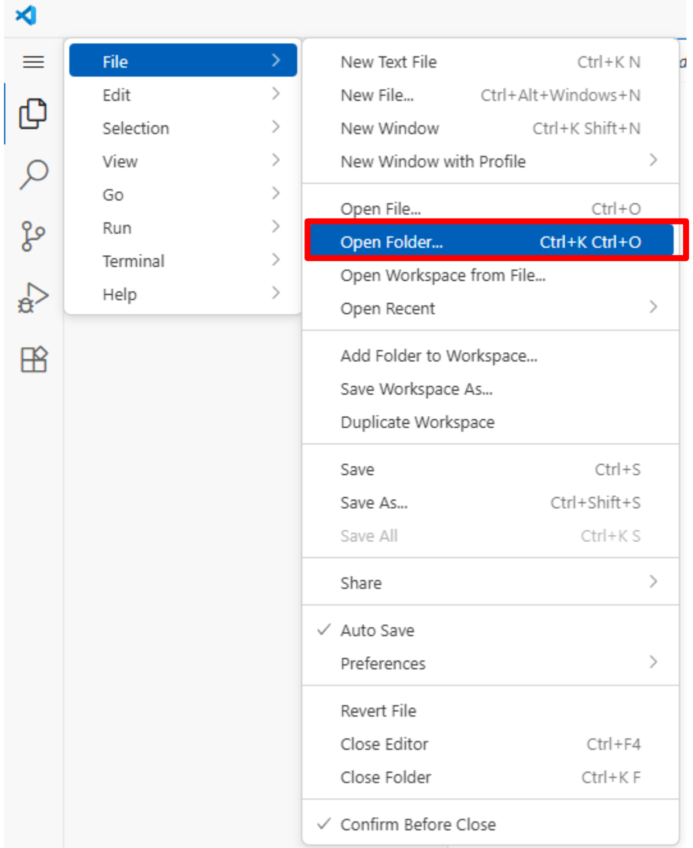


```
coder@vscode-0:~$ cp -r /app/. ~
coder@vscode-0:~$ 
```

Run cp -r /app/. ~

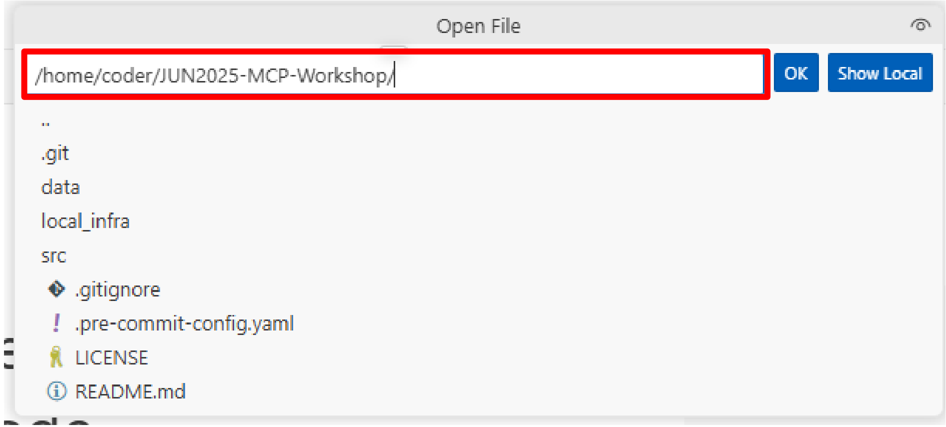


Setup VS Code [2]



1. Open Folder

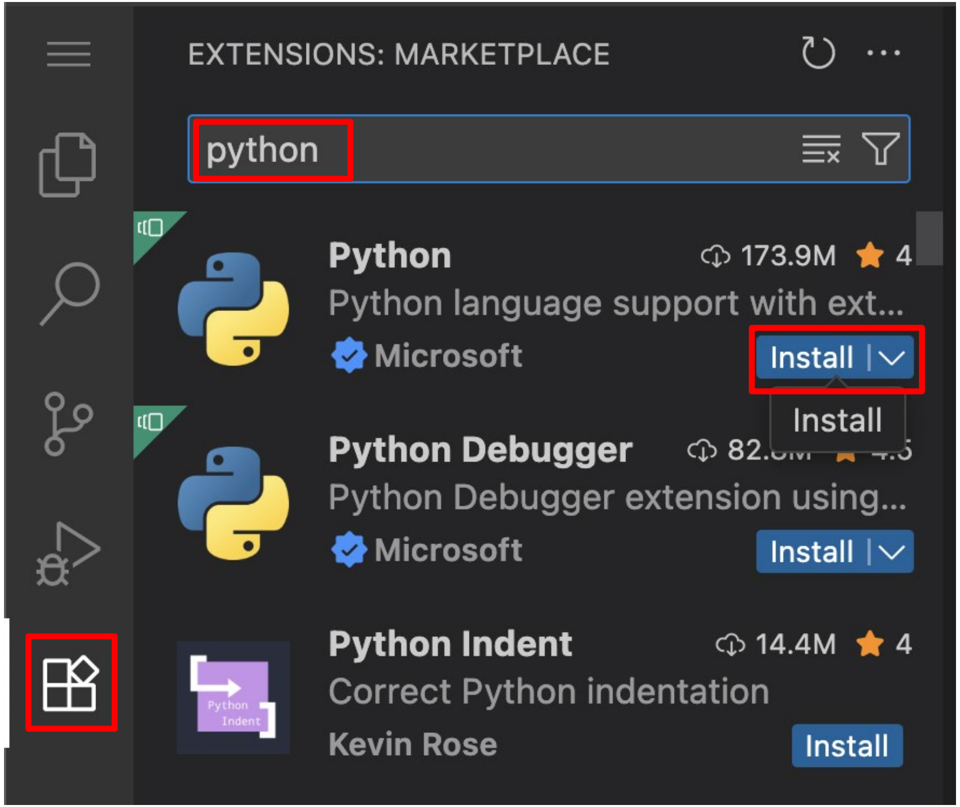
2. Go to JUN2025-MCP-Workshop



/home/coder/JUN2025-MCP-Workshop/

Setup VS Code [3]

2. Search for “reload”

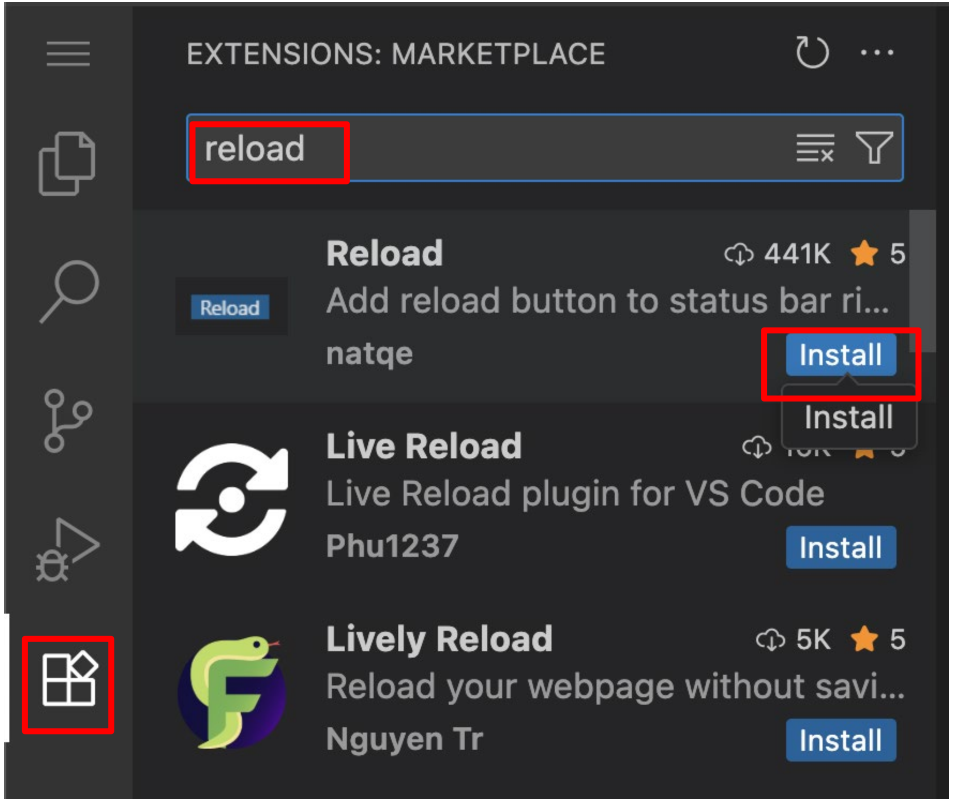


3. Click Install

1. Go to VSCode Extension

Setup VS Code [4]

2. Search for “reload”



Reload
Add reload button to status bar ri...
natqe

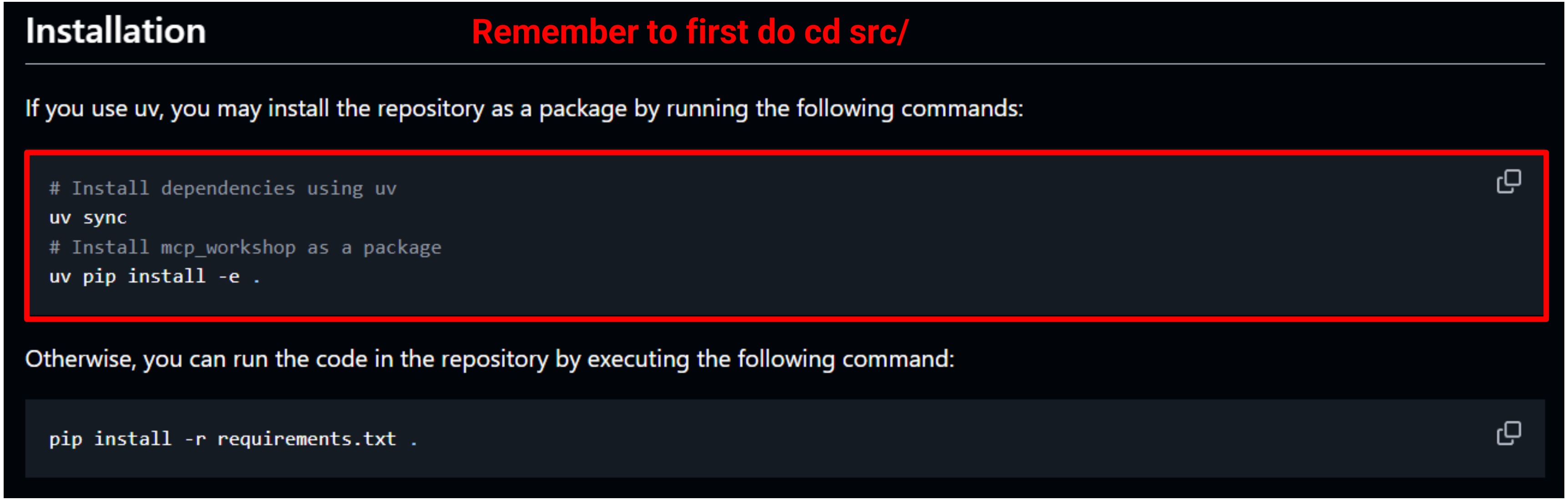
Live Reload
Live Reload plugin for VS Code
Phu1237

Lively Reload
Reload your webpage without savi...
Nguyen Tr

3. Click Install

1. Go to VSCode Extension

Install Dependencies for Workshop



Installation

Remember to first do cd src/

If you use uv, you may install the repository as a package by running the following commands:

```
# Install dependencies using uv
uv sync
# Install mcp_workshop as a package
uv pip install -e .
```

Otherwise, you can run the code in the repository by executing the following command:

```
pip install -r requirements.txt .
```

Follow the JUN2025-MCP-Workshop/src/README.md to install with uv.
Note that uv should be pre-installed in our cluster already.

MCP Server 101

Python User Group Workshop
28 June 2025

Quick Introduction

- Speaker: Henry Wong
    - Data Scientist
    - Researcher
- Infrastructure & Support: Alex Au
    - Cloud Engineer
    - Ex-Silicon engineer

QR Codes

Slides for Today

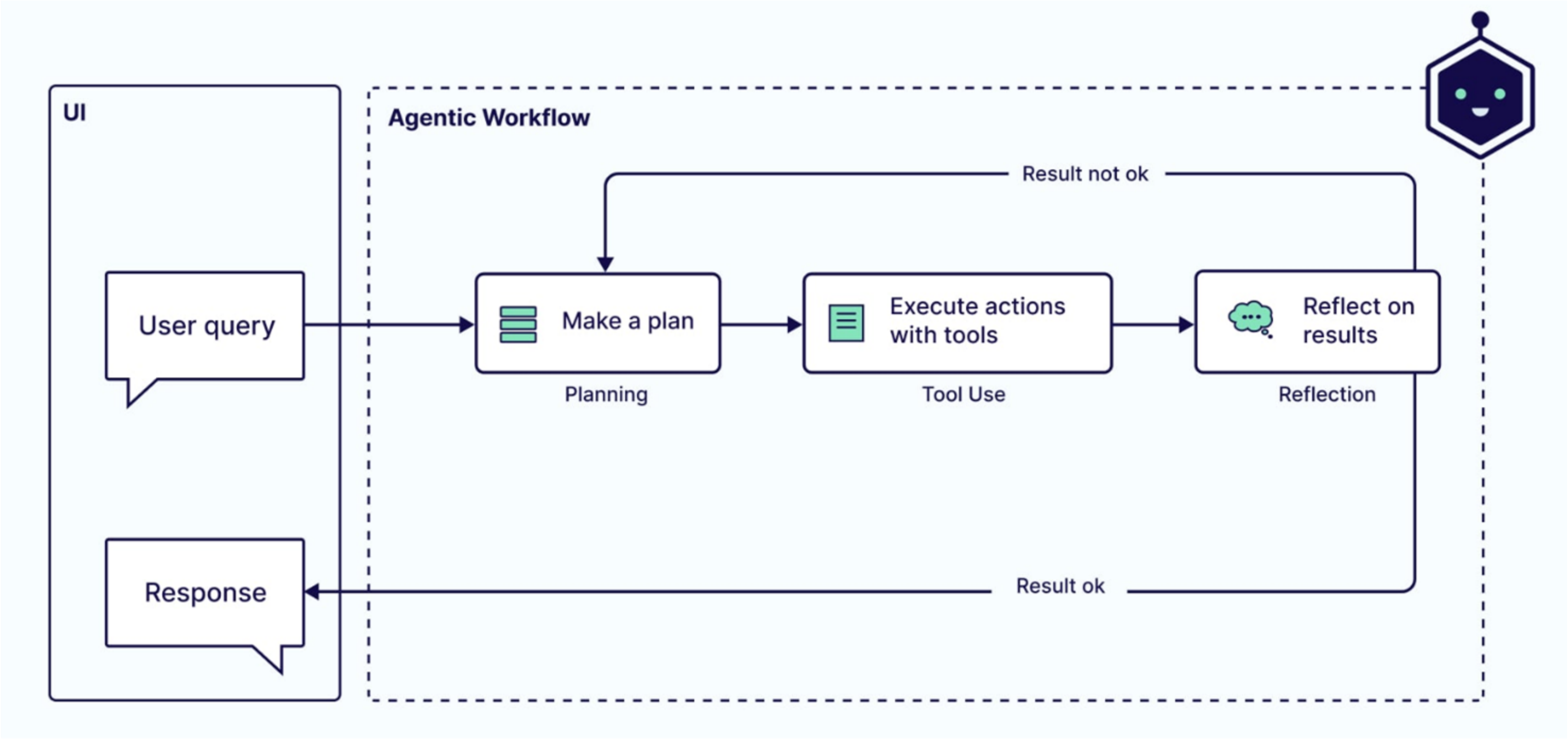
Repository

Agenda

- Brief Recap: From Agentic Workflow to MCP.
- What is Model Context Protocol (MCP).
- A Taste of MCP Server:
  - Hands-on: using MCP server from marketplace.
  - Hands-on: connect to your own MCP server.
  - Hands-on: write your own MCP server.

Quick Recap of Last Workshop:
A Taste of Agentic Workflow

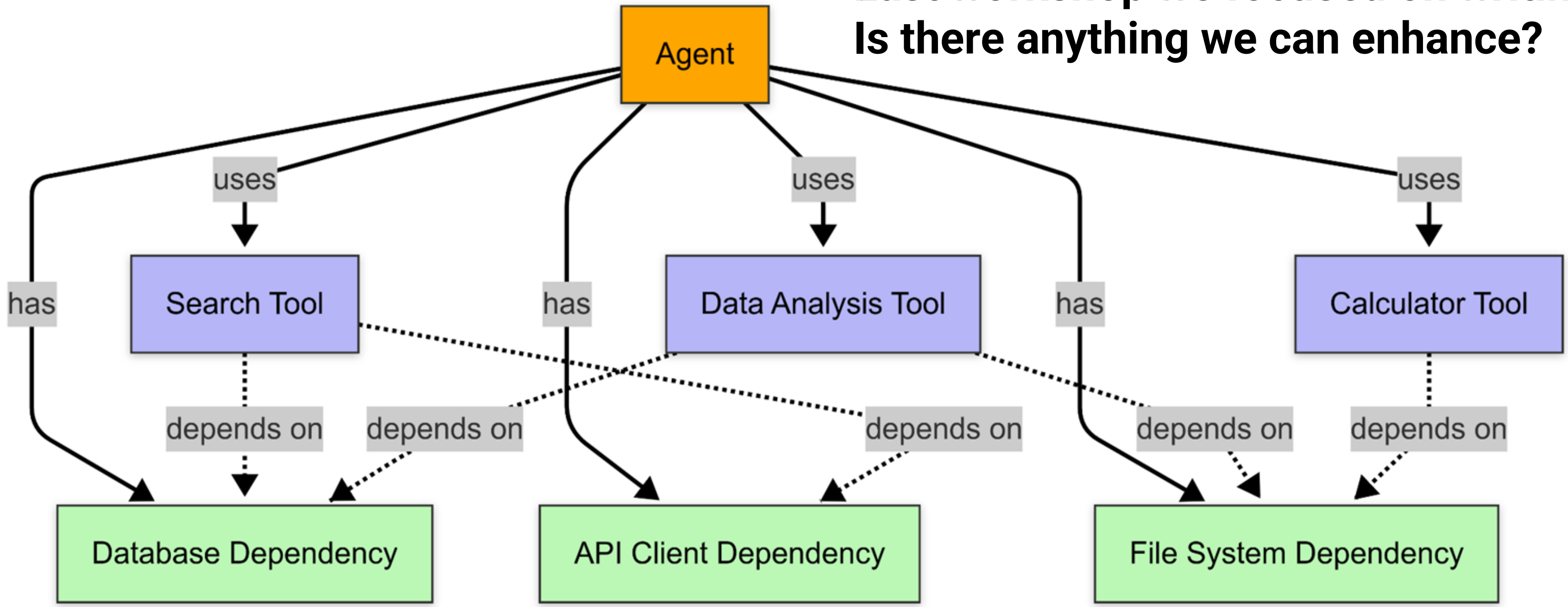
Agentic Workflow



From What Are Agentic Workflows? Patterns, Use Cases, Examples, and More

Last Workshop - A Taste of Agentic Workflow

Last workshop we focused on writing tools.
Is there anything we can enhance?

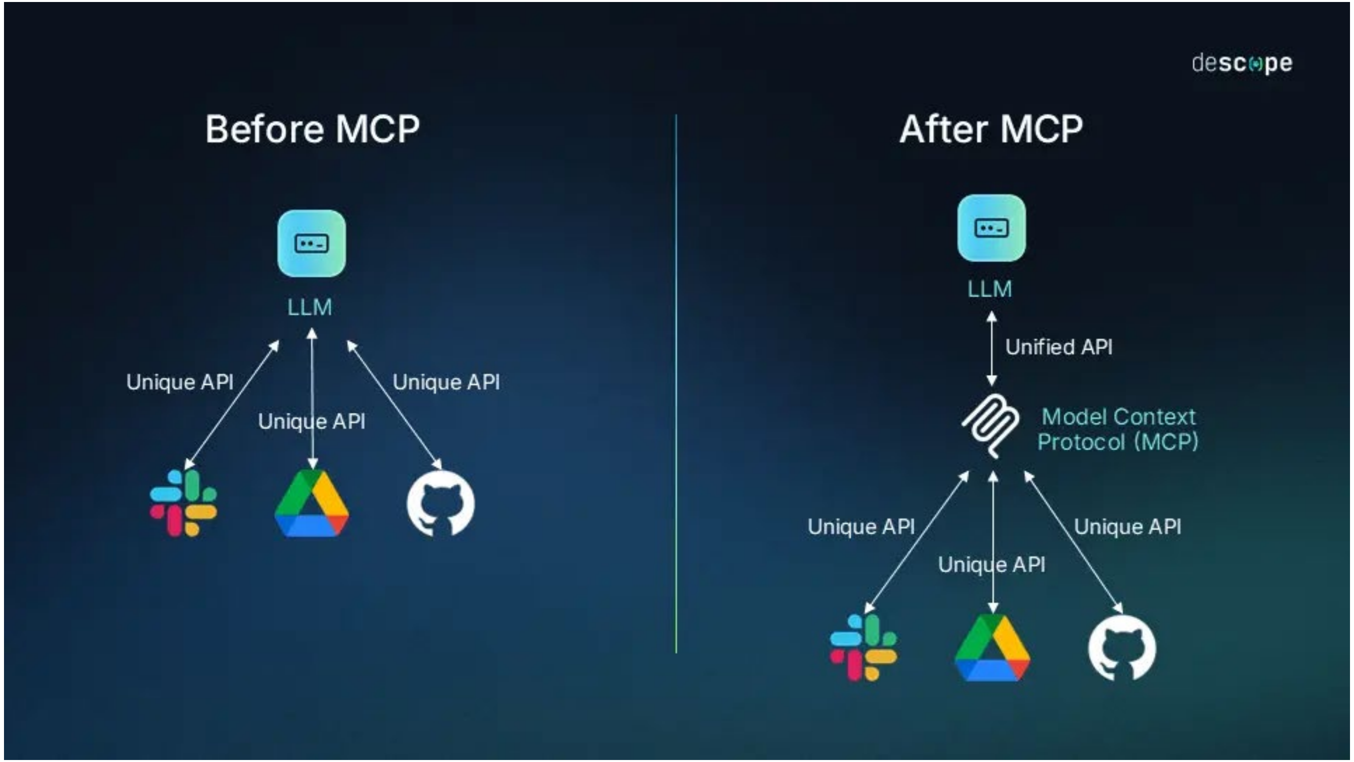


Model Context Protocol (MCP)

Model Context Protocol

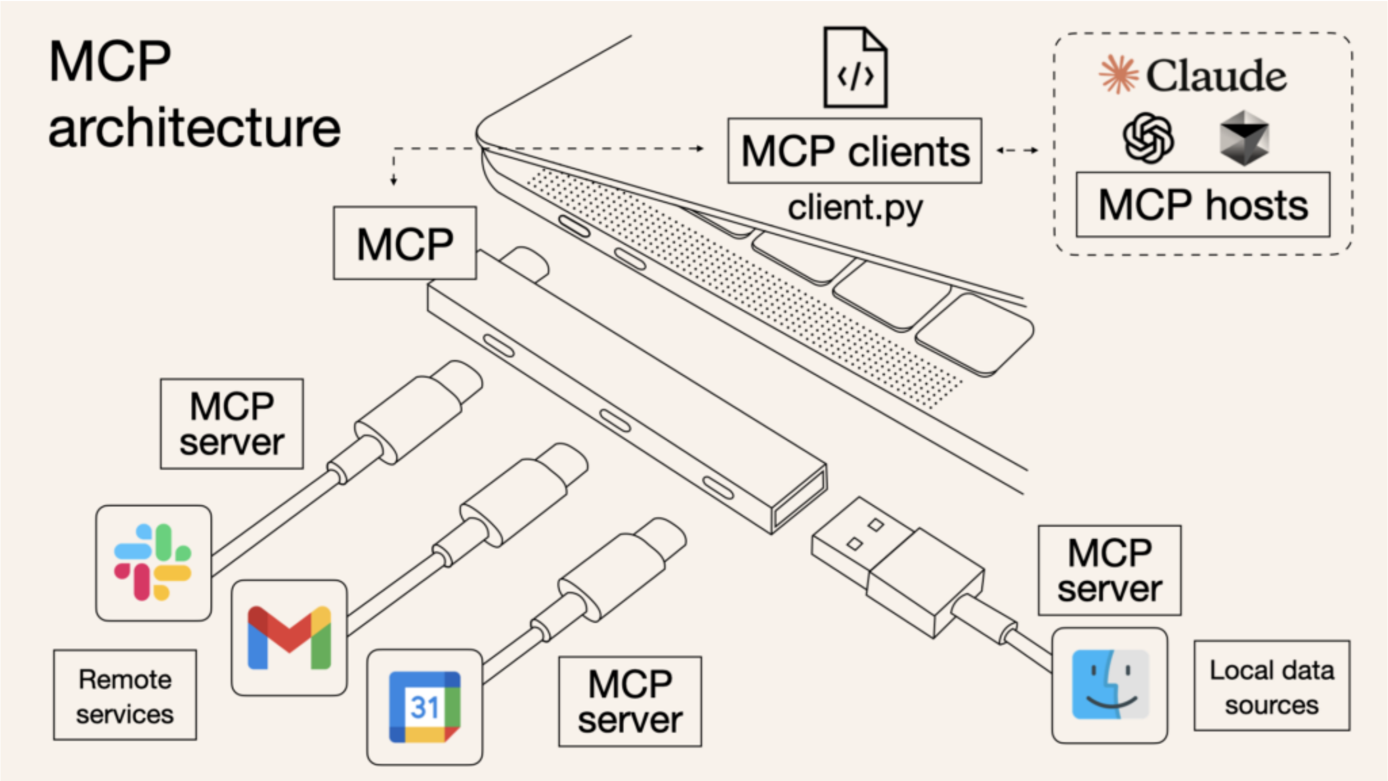
- First released by Anthropic on November 25, 2024, see Anthropic News.
- **Standardization** (open-source protocol) for resource access and tool execution.
- **Does not boost the capability of LLMs**.
- Better organized agentic workflow, unifying the way LLMs access tools or any kind of resources.

Illustration of MCP



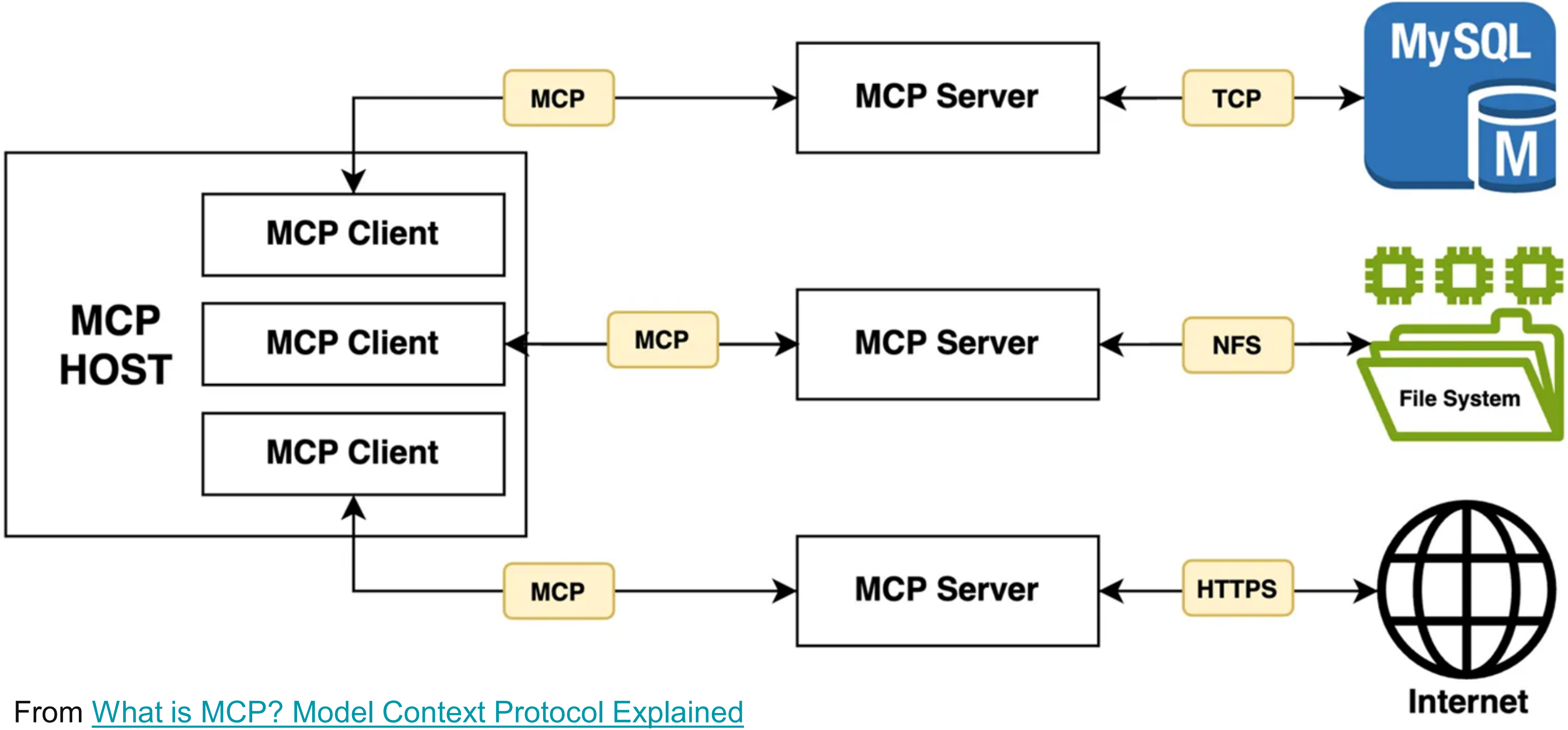
From [What Is the Model Context Protocol (MCP) and How It Works]

More Simple Illustration



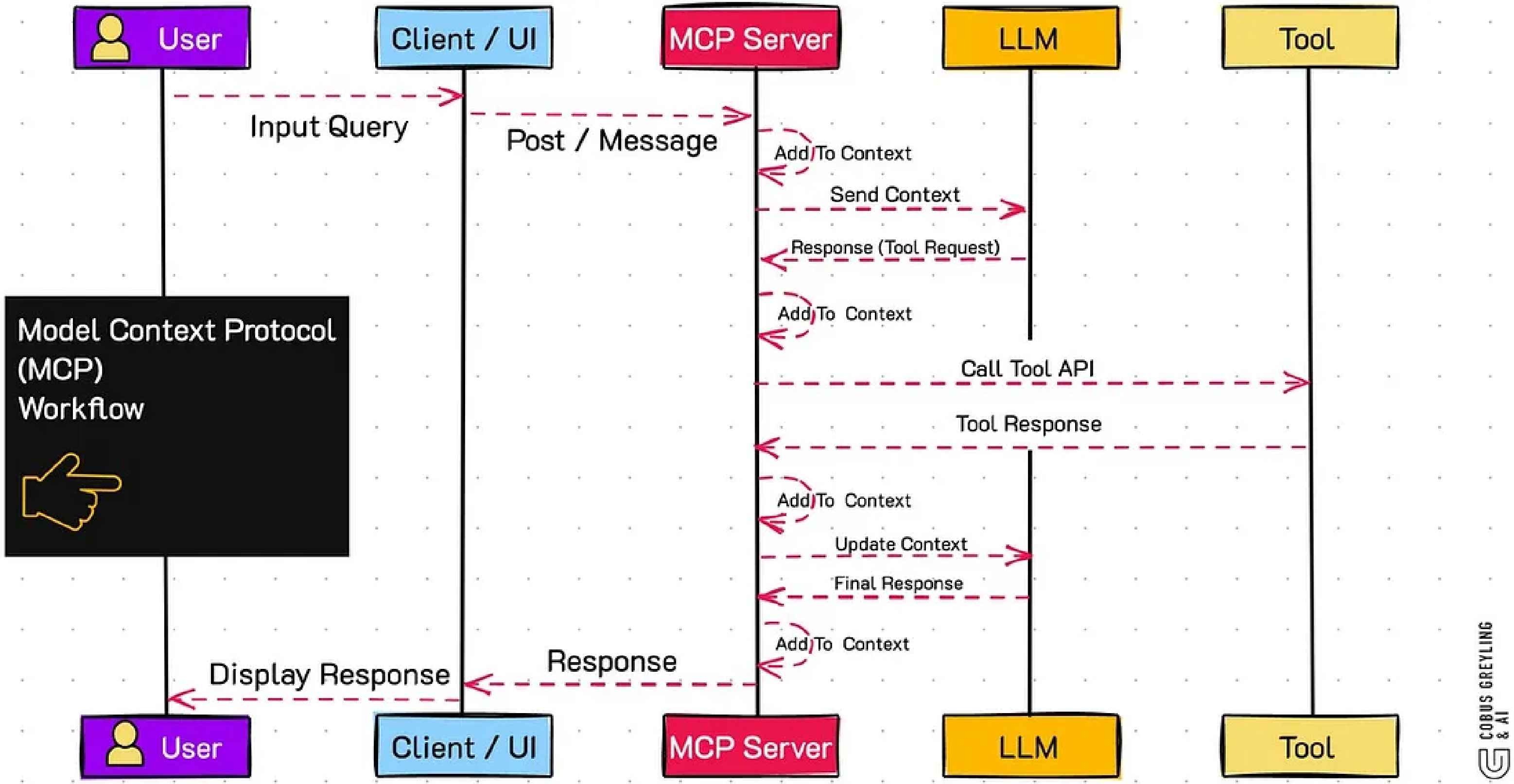
From [What is Model Context Protocol (MCP): Explained]()

MCP Architecture



From What is MCP? Model Context Protocol Explained

Agentic Workflow with MCP



From [Model Context Protocol (MCP)]()

Do We Really Need MCP?

- No but Yes.
- MCP **does not boost the capability of LLMs**.
- But it brings **standardization to development** of agentic workflow.
- **Standardization** often leads to *more active development*.

A Taste of MCP Server [1]

Sharing MCP Servers

- MCP unifies the way LLMs access tools or any kind of resources.
- Similar to python modules, **MCP servers can now be easily shared, installed, and used**.

Today Scenario

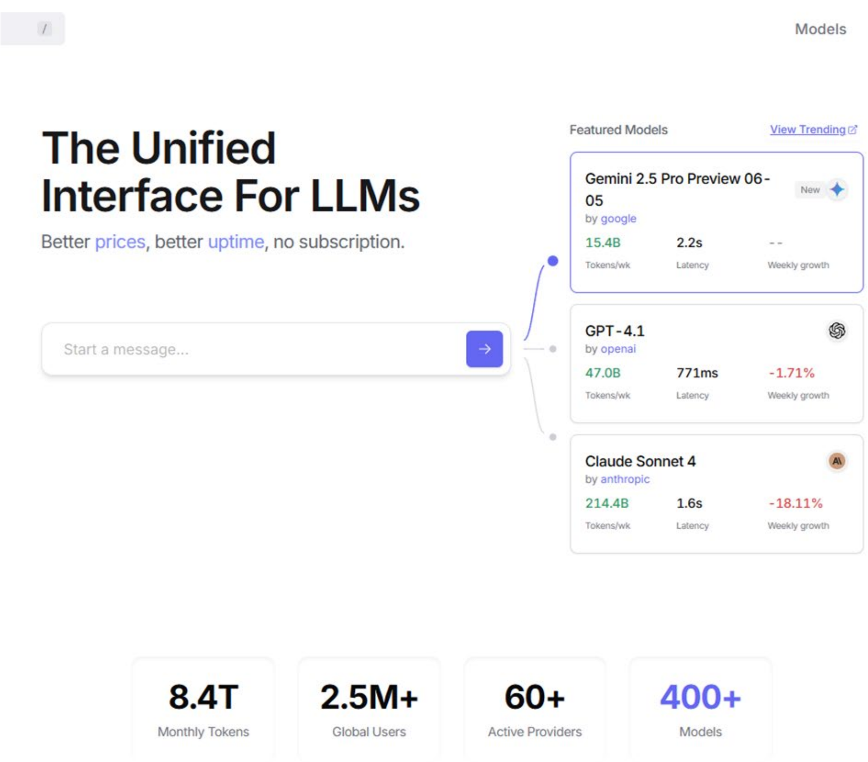
- In the first session of this workshop, we will first showcase how to use MCP servers developed by others, which can be achieved **almost no-code**.
- Learning Objective:
  - Understand the benefits that MCP brings to us.
  - Learn new technology for agentic workflow.

Technology Overview

- **MCP Host:** VS Code, an IDE developed by Microsoft.
- **MCP Client:** Cline, a VS Code Extension, open-source AI coding assistant.
- **MCP Server:** Chart Generator, a free chart generation service.

Gain Access to Free SOTA Models

OpenRouter



The Unified Interface For LLMs

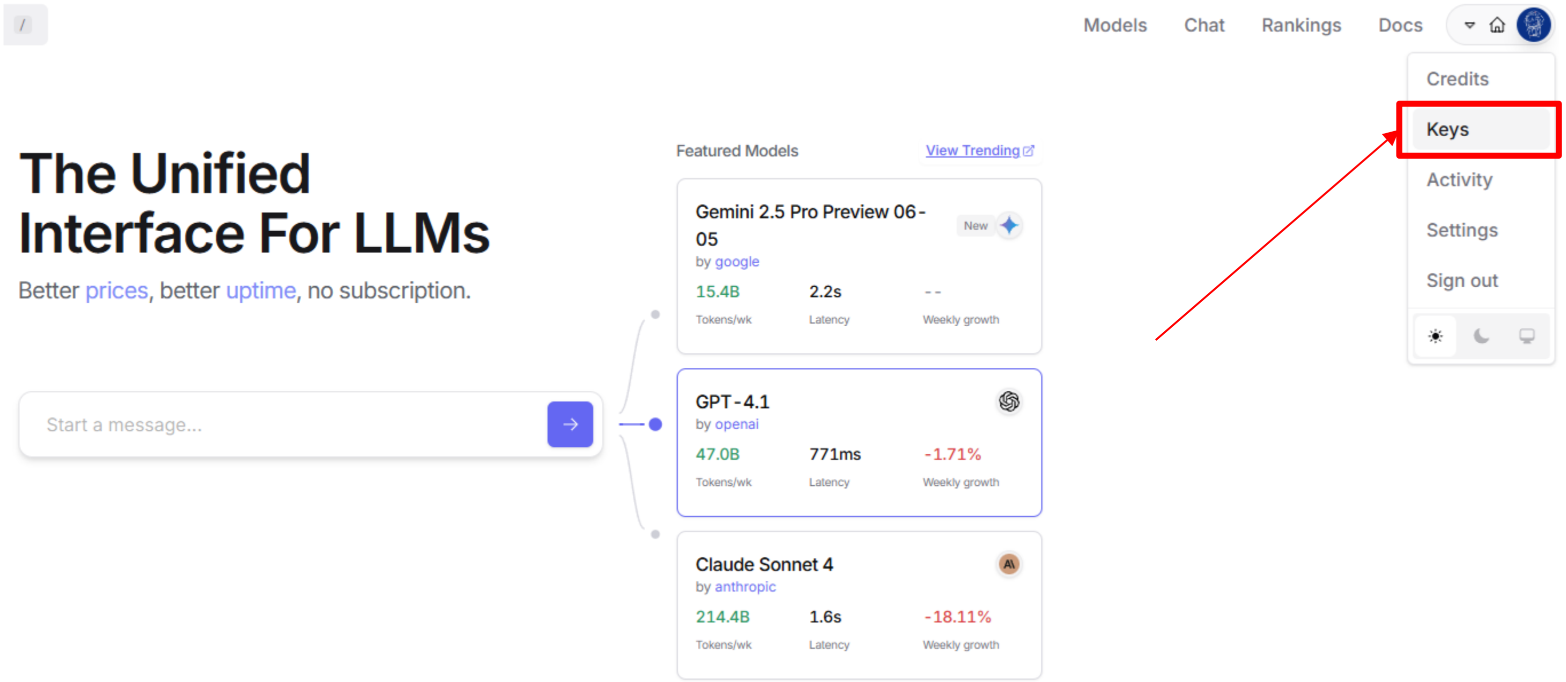
Better prices, better uptime, no subscription.

Model	Tokens/wk	Latency	Weekly growth
Gemini 2.5 Pro Preview 06-05 by google	15.4B	2.2s	--
GPT-4.1 by openai	47.0B	771ms	-1.71%
Claude Sonnet 4 by anthropic	214.4B	1.6s	-18.11%

8.4T	2.5M+	60+	400+
Monthly Tokens	Global Users	Active Providers	Models

Register an account at https://openrouter.ai/.
Gain access to more free SOTA models.

Create an API Key for Cline [1]



The Unified Interface For LLMs

Better prices, better uptime, no subscription.

Start a message...

Featured Models

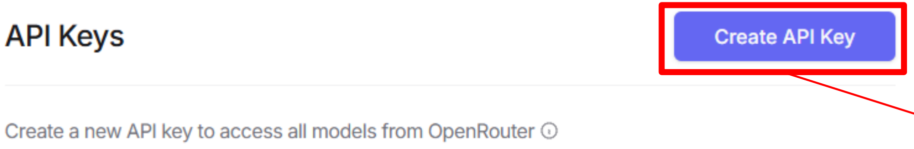
View Trending

Gemini 2.5 Pro Preview 06-05
by google
New
15.4B Tokens/wk
2.2s Latency
-- Weekly growth

GPT-4.1
by openai
47.0B Tokens/wk
771ms Latency
-1.71% Weekly growth

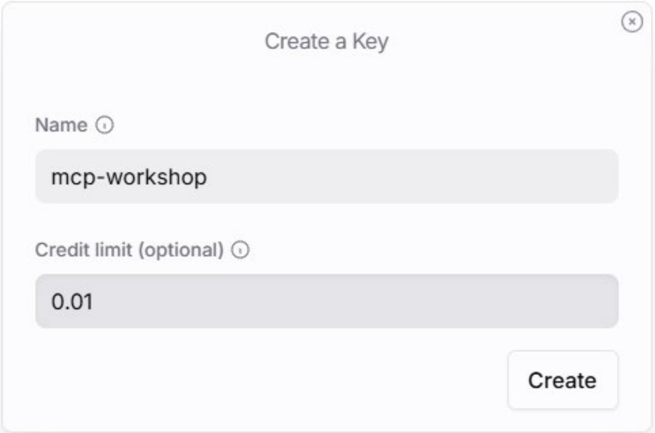
Claude Sonnet 4
by anthropic
214.4B Tokens/wk
1.6s Latency
-18.11% Weekly growth

Create an API Key for Cline [2]



API Keys

Create a new API key to access all models from OpenRouter



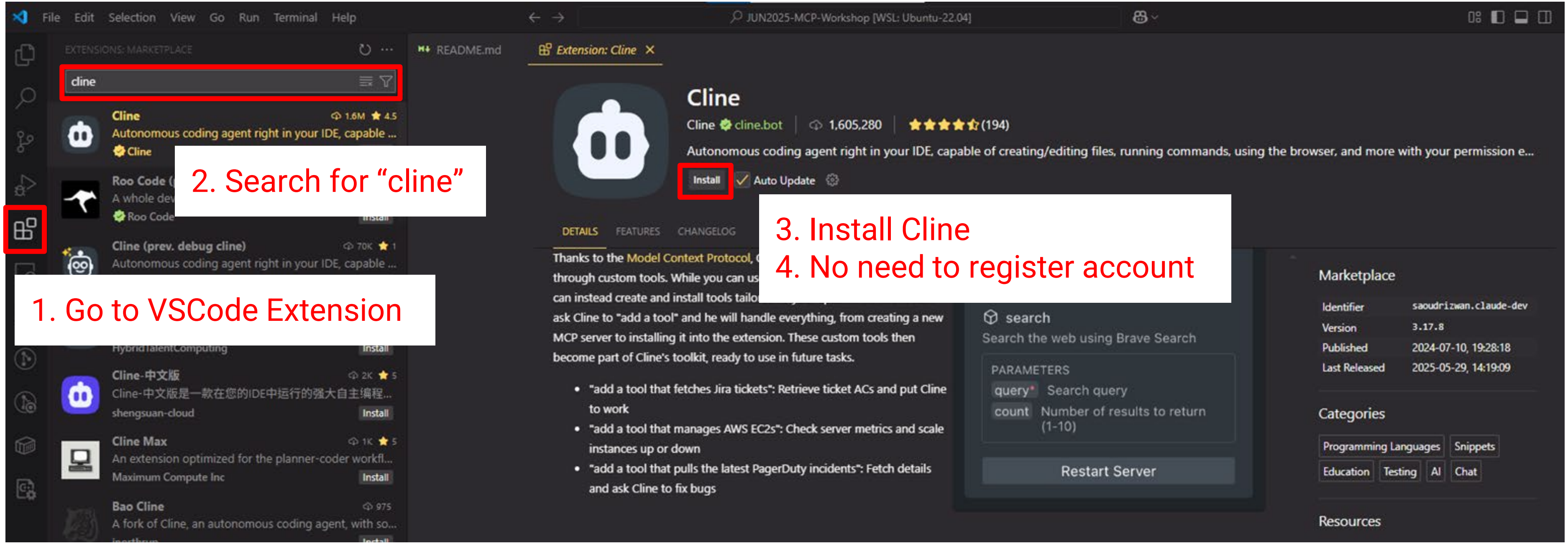
Create a Key

Name: mcp-workshop

Credit limit (optional): 0.01

You can enter any name you want :)

Cline Setup [1]



cline

Cline — Autonomous coding agent right in your IDE, capable ...

Roo Code — A whole dev...

Cline (prev. debug cline) — Autonomous coding agent right in your IDE, capable ...

Cline-中文版 — Cline-中文版是一款在您的IDE中运行的强大自主编程...

Cline Max — An extension optimized for the planner-coder workfl...

Bao Cline — A fork of Cline, an autonomous coding agent, with so...

Cline

Cline cline.bot | 1,605,280 | ★★★★☆ (194)

Autonomous coding agent right in your IDE, capable of creating/editing files, running commands, using the browser, and more with your permission e...

Thanks to the Model Context Protocol, through custom tools. While you can us can instead create and install tools tailo ask Cline to "add a tool" and he will handle everything, from creating a new MCP server to installing it into the extension. These custom tools then become part of Cline's toolkit, ready to use in future tasks.

- "add a tool that fetches Jira tickets": Retrieve ticket ACs and put Cline to work
- "add a tool that manages AWS EC2s": Check server metrics and scale instances up or down
- "add a tool that pulls the latest PagerDuty incidents": Fetch details and ask Cline to fix bugs

search — Search the web using Brave Search

query* — Search query

count — Number of results to return (1-10)

Identifier: saoudrizwan.claude-dev

Version: 3.17.8

Published: 2024-07-10, 19:28:18

Last Released: 2025-05-29, 14:19:09

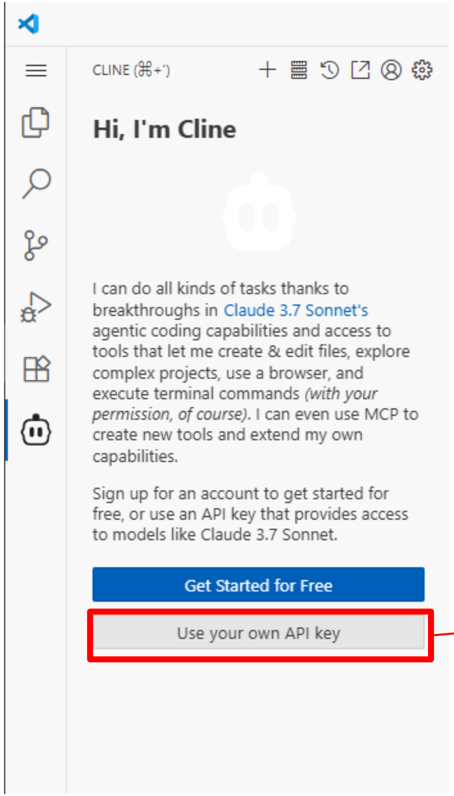
1. Go to VSCode Extension

2. Search for “cline”

3. Install Cline

4. No need to register account

Cline Setup [2]

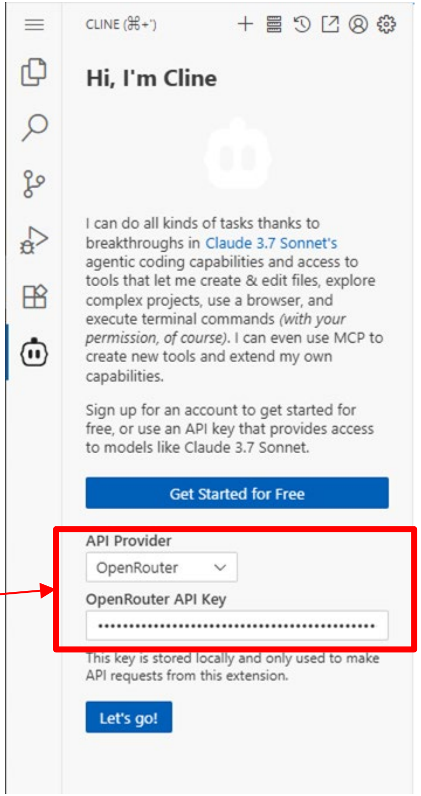


Hi, I'm Cline

I can do all kinds of tasks thanks to breakthroughs in Claude 3.7 Sonnet's agentic coding capabilities and access to tools that let me create & edit files, explore complex projects, use a browser, and execute terminal commands *(with your permission, of course)*. I can even use MCP to create new tools and extend my own capabilities.

Sign up for an account to get started for free, or use an API key that provides access to models like Claude 3.7 Sonnet.

1. Choose OpenRouter
2. Input the key you obtained



Hi, I'm Cline

I can do all kinds of tasks thanks to breakthroughs in Claude 3.7 Sonnet's agentic coding capabilities and access to tools that let me create & edit files, explore complex projects, use a browser, and execute terminal commands *(with your permission, of course)*. I can even use MCP to create new tools and extend my own capabilities.

Sign up for an account to get started for free, or use an API key that provides access to models like Claude 3.7 Sonnet.

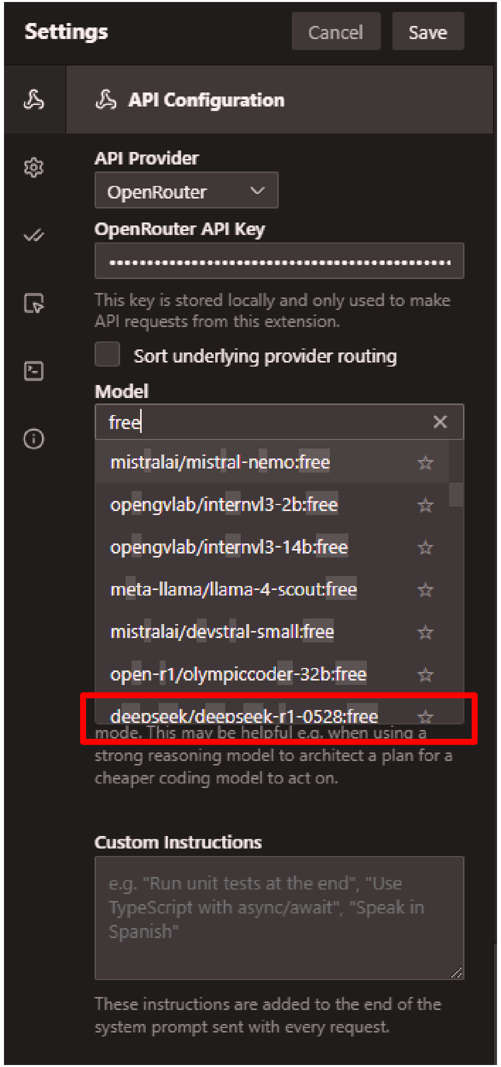
API Provider: OpenRouter

OpenRouter API Key: ••

This key is stored locally and only used to make API requests from this extension.

Cline Setup [3]

- Choose Your Own Model to Use
- Models with **free tag** can be freely used.
- Good enough to use for personal development.
- In this workshop, we recommend using
    - **deepseek/deepseek-r1:free**



API Provider
OpenRouter

OpenRouter API Key
••

This key is stored locally and only used to make API requests from this extension.

☐ Sort underlying provider routing

Model
free

- mistralai/mistral-nemo:free ☆
- opengvlab/internvl3-2b:free ☆
- opengvlab/internvl3-14b:free ☆
- meta-llama/llama-4-scout:free ☆
- mistralai/devstral-small:free ☆
- open-r1/olympiccoder-32b:free ☆
- deepseek/deepseek-r1-0528:free ☆

mode. This may be helpful e.g. when using a strong reasoning model to architect a plan for a cheaper coding model to act on.

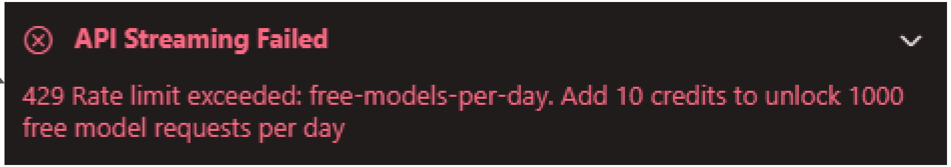
Custom Instructions
e.g. "Run unit tests at the end", "Use TypeScript with async/await", "Speak in Spanish"

These instructions are added to the end of the system prompt sent with every request.

Caution: Rate Limit of OpenRouter

- Try not to spam Cline, OpenRouter has a rate limit for free model usage.
- If you unfortunately reach this rate limit, please contact helpers for support.

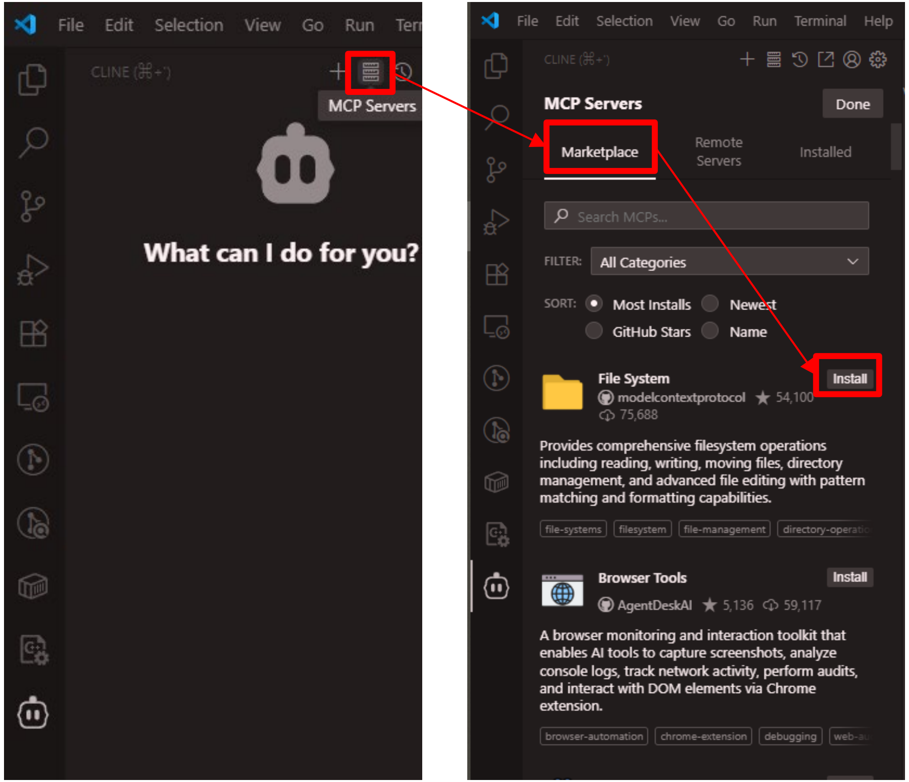
Just let us know if you see this.



API Streaming Failed

429 Rate limit exceeded: free-models-per-day. Add 10 credits to unlock 1000 free model requests per day

Install MCP from Marketplace [1]


File Edit Selection View Go Run Ter
CLINE (⌘+')
MCP Servers
What can I do for you?
File Edit Selection View Go Run Terminal Help
CLINE (⌘+')
MCP Servers
Done
Marketplace
Remote Servers
Installed
Search MCPs...
FILTER: All Categories
SORT: ● Most Installs ○ Newest ○ GitHub Stars ○ Name
File System
modelcontextprotocol ★ 54,100 75,688
Install
file-systems filesystem file-management directory-operati
Browser Tools
AgentDeskAI ★ 5,136 59,117
Install
browser-automation chrome-extension debugging web-a

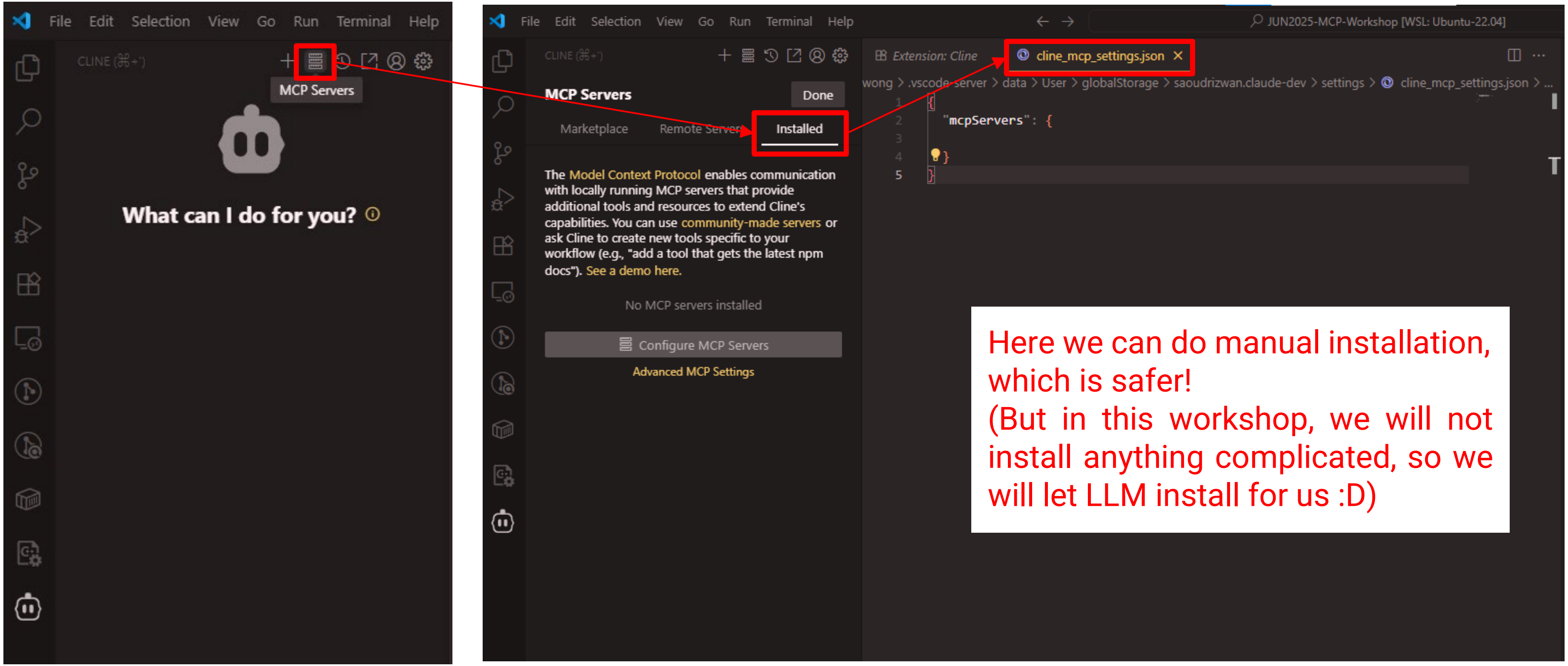
Provides comprehensive filesystem operations including reading, writing, moving files, directory management, and advanced file editing with pattern matching and formatting capabilities.

A browser monitoring and interaction toolkit that enables AI tools to capture screenshots, analyze console logs, track network activity, perform audits, and interact with DOM elements via Chrome extension.

The installation is done by LLM, so it may:

- fail, or
- install something unexpected in your environment.

Install MCP from Marketplace [2]



What can I do for you?

wong > .vscode-server > data > User > globalStorage > saoudrizwan.claude-dev > settings > cline_mcp_settings.json > ...

```
{
  "mcpServers": {

  }
}
```

MCP Servers

The Model Context Protocol enables communication with locally running MCP servers that provide additional tools and resources to extend Cline's capabilities. You can use community-made servers or ask Cline to create new tools specific to your workflow (e.g., "add a tool that gets the latest npm docs"). See a demo here.

No MCP servers installed

Here we can do manual installation, which is safer!
(But in this workshop, we will not install anything complicated, so we will let LLM install for us :D)

First Task using MCP Server

- Here our goal is to generate some visualizations using utility provided by installed MCP server.
- The steps are very simple:
  - Install MCP Server from marketplace.
  - Read its functionability.
  - Prompt the chatbot to generate what we want.

Install Chart Generator

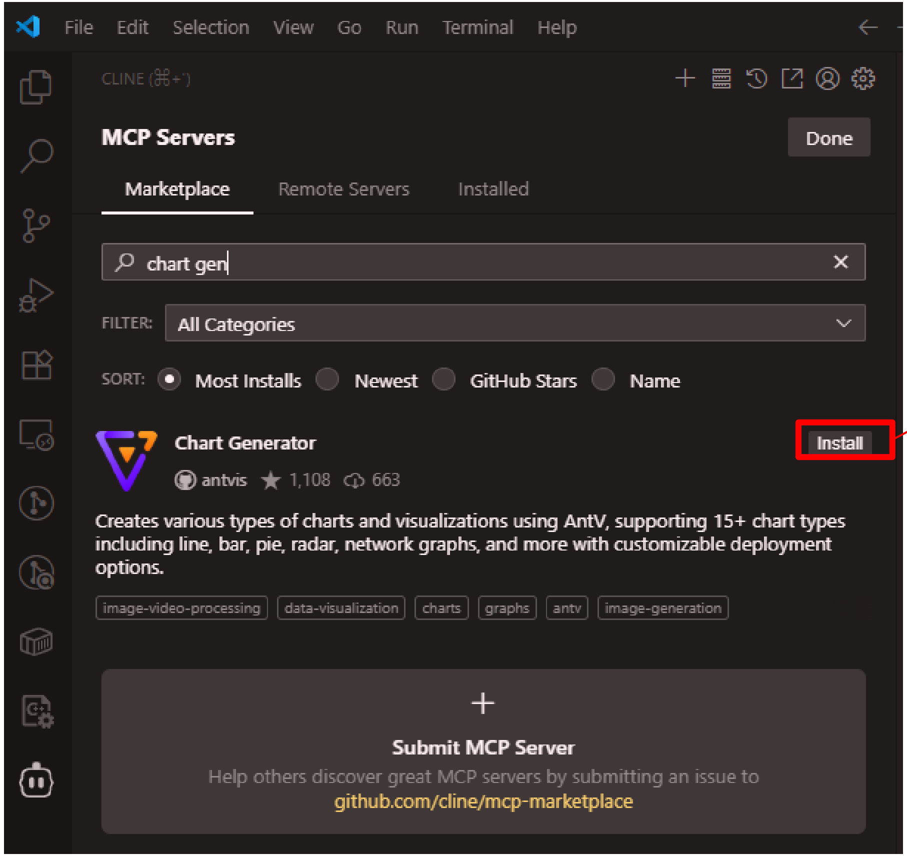


chart gen

FILTER: All Categories

SORT: ● Most Installs ○ Newest ○ GitHub Stars ○ Name

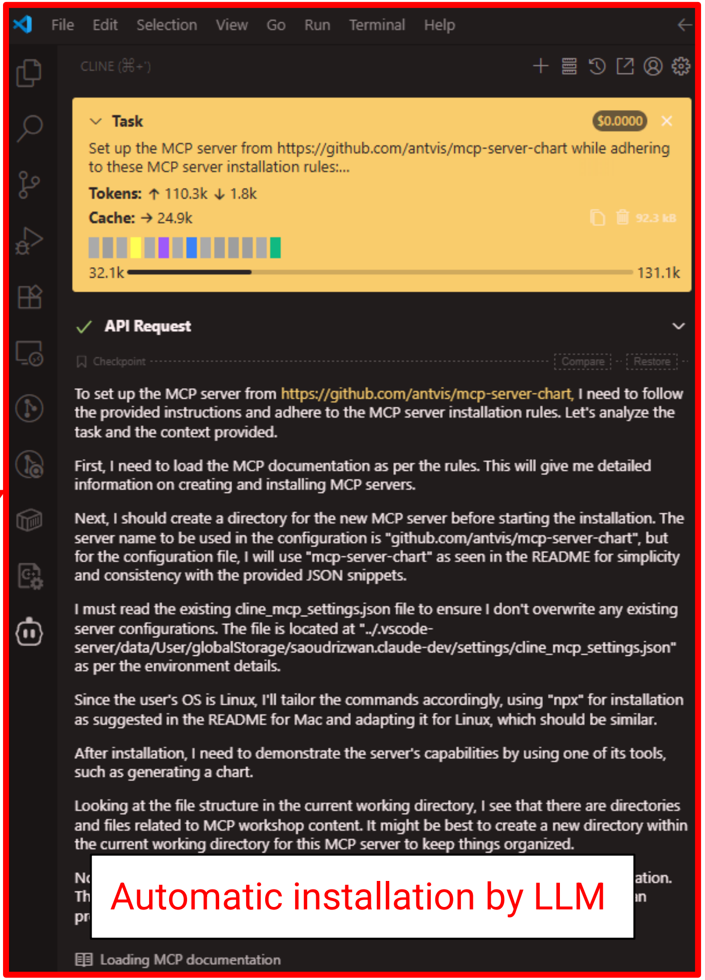
Chart Generator

antvis ★ 1,108 663

Creates various types of charts and visualizations using AntV, supporting 15+ chart types including line, bar, pie, radar, network graphs, and more with customizable deployment options.

image-video-processing | data-visualization | charts | graphs | antv | image-generation

Help others discover great MCP servers by submitting an issue to github.com/cline/mcp-marketplace



Task $0.0000

Set up the MCP server from https://github.com/antvis/mcp-server-chart while adhering to these MCP server installation rules:...

Tokens: ↑ 110.3k ↓ 1.8k

Cache: → 24.9k 92.3 kB

32.1k 131.1k

API Request

To set up the MCP server from https://github.com/antvis/mcp-server-chart, I need to follow the provided instructions and adhere to the MCP server installation rules. Let's analyze the task and the context provided.

First, I need to load the MCP documentation as per the rules. This will give me detailed information on creating and installing MCP servers.

Next, I should create a directory for the new MCP server before starting the installation. The server name to be used in the configuration is "github.com/antvis/mcp-server-chart", but for the configuration file, I will use "mcp-server-chart" as seen in the README for simplicity and consistency with the provided JSON snippets.

I must read the existing cline_mcp_settings.json file to ensure I don't overwrite any existing server configurations. The file is located at "../.vscode-server/data/User/globalStorage/saoudrizwan.claude-dev/settings/cline_mcp_settings.json" as per the environment details.

Since the user's OS is Linux, I'll tailor the commands accordingly, using "npx" for installation as suggested in the README for Mac and adapting it for Linux, which should be similar.

After installation, I need to demonstrate the server's capabilities by using one of its tools, such as generating a chart.

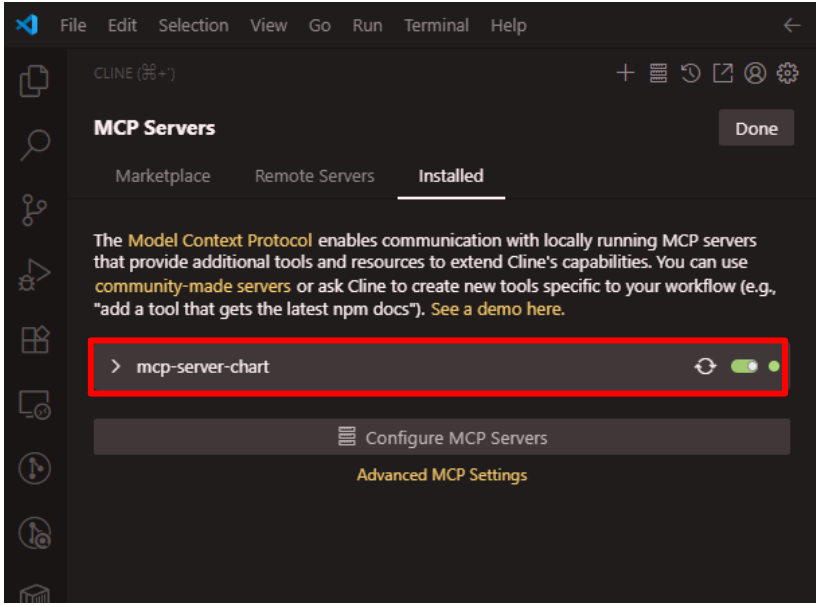
Looking at the file structure in the current working directory, I see that there are directories and files related to MCP workshop content. It might be best to create a new directory within the current working directory for this MCP server to keep things organized.

Loading MCP documentation

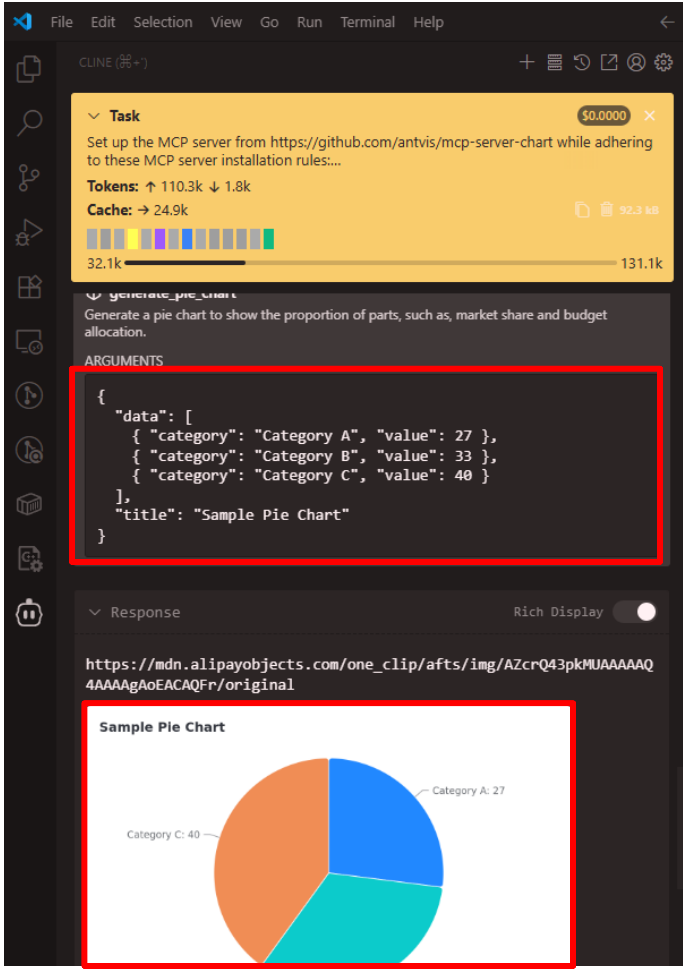
Automatic installation by LLM

After Installation

- Simple example chart by LLM
- Should be able to see from MCP Servers



The Model Context Protocol enables communication with locally running MCP servers that provide additional tools and resources to extend Cline's capabilities. You can use community-made servers or ask Cline to create new tools specific to your workflow (e.g., "add a tool that gets the latest npm docs"). See a demo here.



Set up the MCP server from https://github.com/antvis/mcp-server-chart while adhering to these MCP server installation rules:...

Tokens: ↑ 110.3k ↓ 1.8k

Cache: → 24.9k

generate_pie_chart

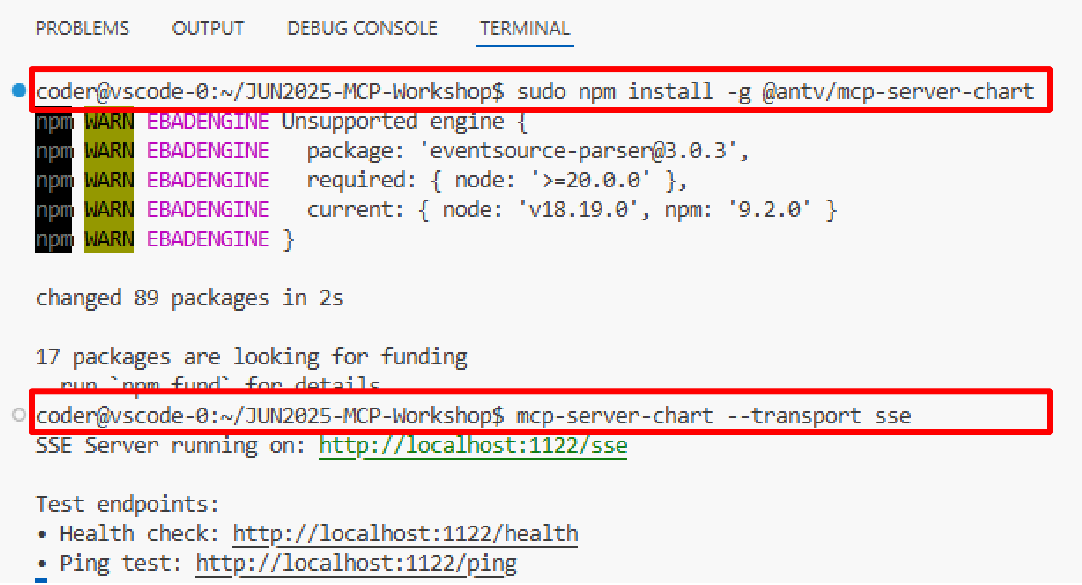
Generate a pie chart to show the proportion of parts, such as, market share and budget allocation.

```
{
  "data": [
    { "category": "Category A", "value": 27 },
    { "category": "Category B", "value": 33 },
    { "category": "Category C", "value": 40 }
  ],
  "title": "Sample Pie Chart"
}
```

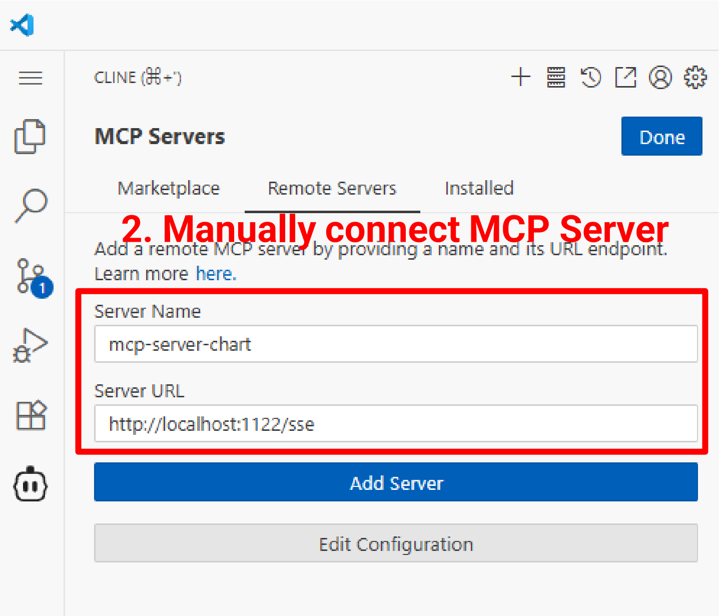
```
https://mdn.alipayobjects.com/one_clip/afts/img/AZcrQ43pkMUAAAAAQ
4AAAAgAoEACAQFr/original
```

If your Cline failed to install…

1. Install the MCP Server



```
coder@vscode-0:~/JUN2025-MCP-Workshop$ sudo npm install -g @antv/mcp-server-chart
npm WARN EBADENGINE Unsupported engine {
npm WARN EBADENGINE   package: 'eventsource-parser@3.0.3',
npm WARN EBADENGINE   required: { node: '>=20.0.0' },
npm WARN EBADENGINE   current: { node: 'v18.19.0', npm: '9.2.0' }
npm WARN EBADENGINE }

changed 89 packages in 2s

17 packages are looking for funding
  run `npm fund` for details
coder@vscode-0:~/JUN2025-MCP-Workshop$ mcp-server-chart --transport sse
SSE Server running on: http://localhost:1122/sse

Test endpoints:
• Health check: http://localhost:1122/health
• Ping test: http://localhost:1122/ping
```



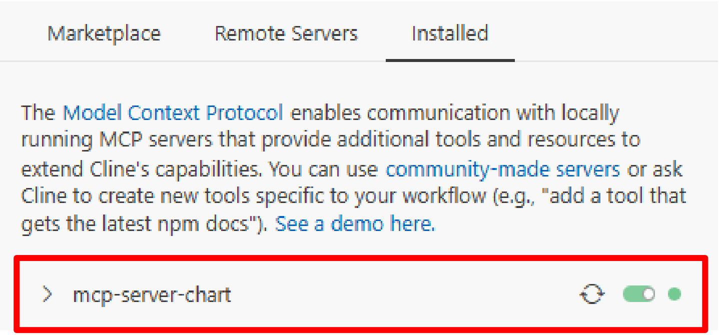
MCP Servers

2. Manually connect MCP Server

Add a remote MCP server by providing a name and its URL endpoint. Learn more here.

Server Name: mcp-server-chart

Server URL: http://localhost:1122/sse

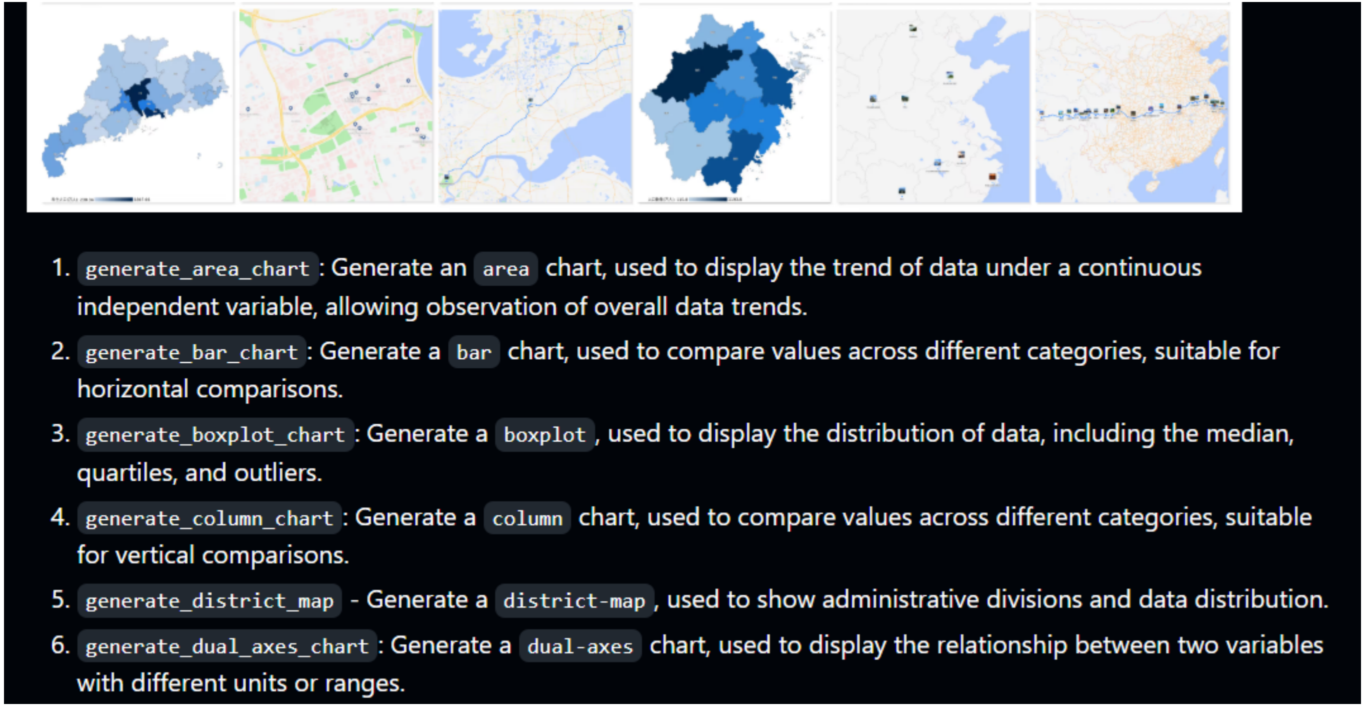


The Model Context Protocol enables communication with locally running MCP servers that provide additional tools and resources to extend Cline's capabilities. You can use community-made servers or ask Cline to create new tools specific to your workflow (e.g., "add a tool that gets the latest npm docs"). See a demo here.

› mcp-server-chart

3. Check MCP Server Status

Short Reading on its README



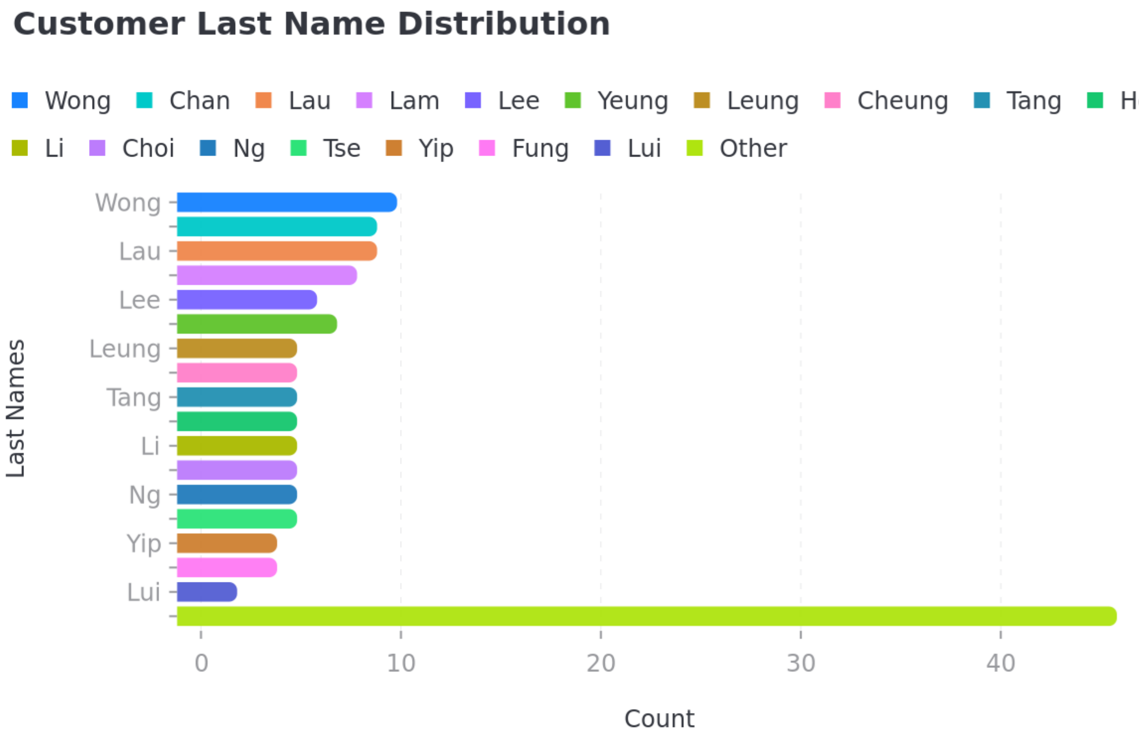
1. `generate_area_chart`: Generate an `area` chart, used to display the trend of data under a continuous independent variable, allowing observation of overall data trends.
2. `generate_bar_chart`: Generate a `bar` chart, used to compare values across different categories, suitable for horizontal comparisons.
3. `generate_boxplot_chart`: Generate a `boxplot`, used to display the distribution of data, including the median, quartiles, and outliers.
4. `generate_column_chart`: Generate a `column` chart, used to compare values across different categories, suitable for vertical comparisons.
5. `generate_district_map` - Generate a `district-map`, used to show administrative divisions and data distribution.
6. `generate_dual_axes_chart`: Generate a `dual-axes` chart, used to display the relationship between two variables with different units or ranges.

From [GitHub]

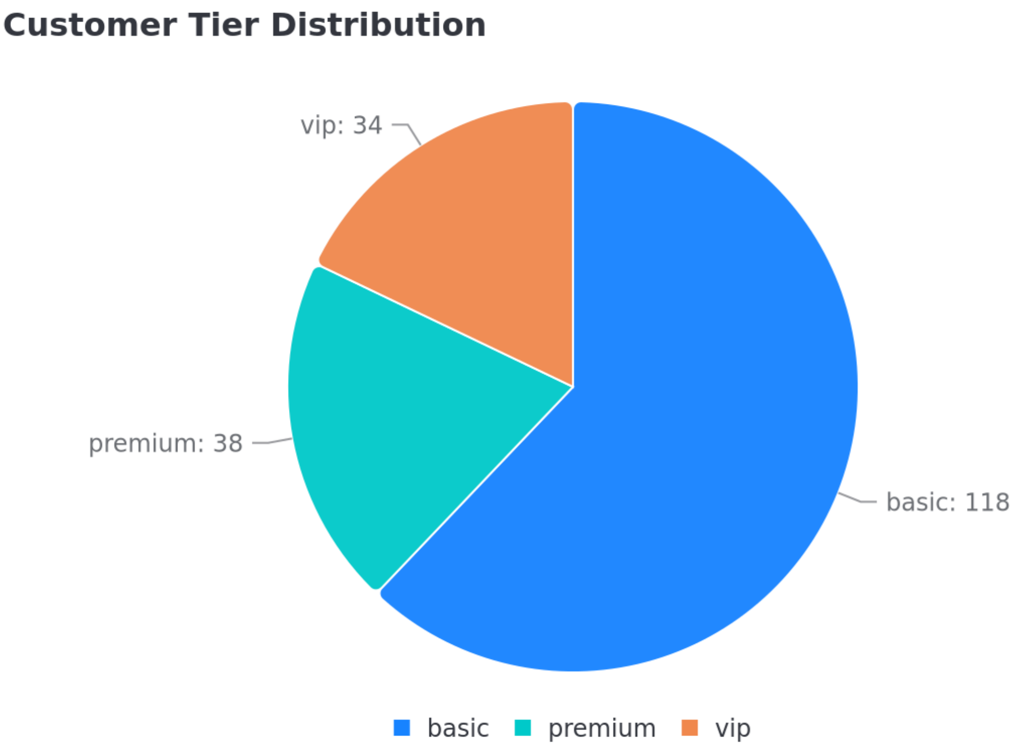
Interact with Chatbot (have access to MCP servers)

- Now we do some visualizations on **data/customers.csv** from last workshop:
  - Generate a bar chart to show distribution of last name of customers.
  - Generate a pie chart to show the distribution of customer tier.
  - Generate a line chart to show number of new customers over time.
- During the interactions, try to read the work done by Cline, and get a sense of how the LLM interacts with MCP servers.
- Also please feel free to change the model if it keep failing.

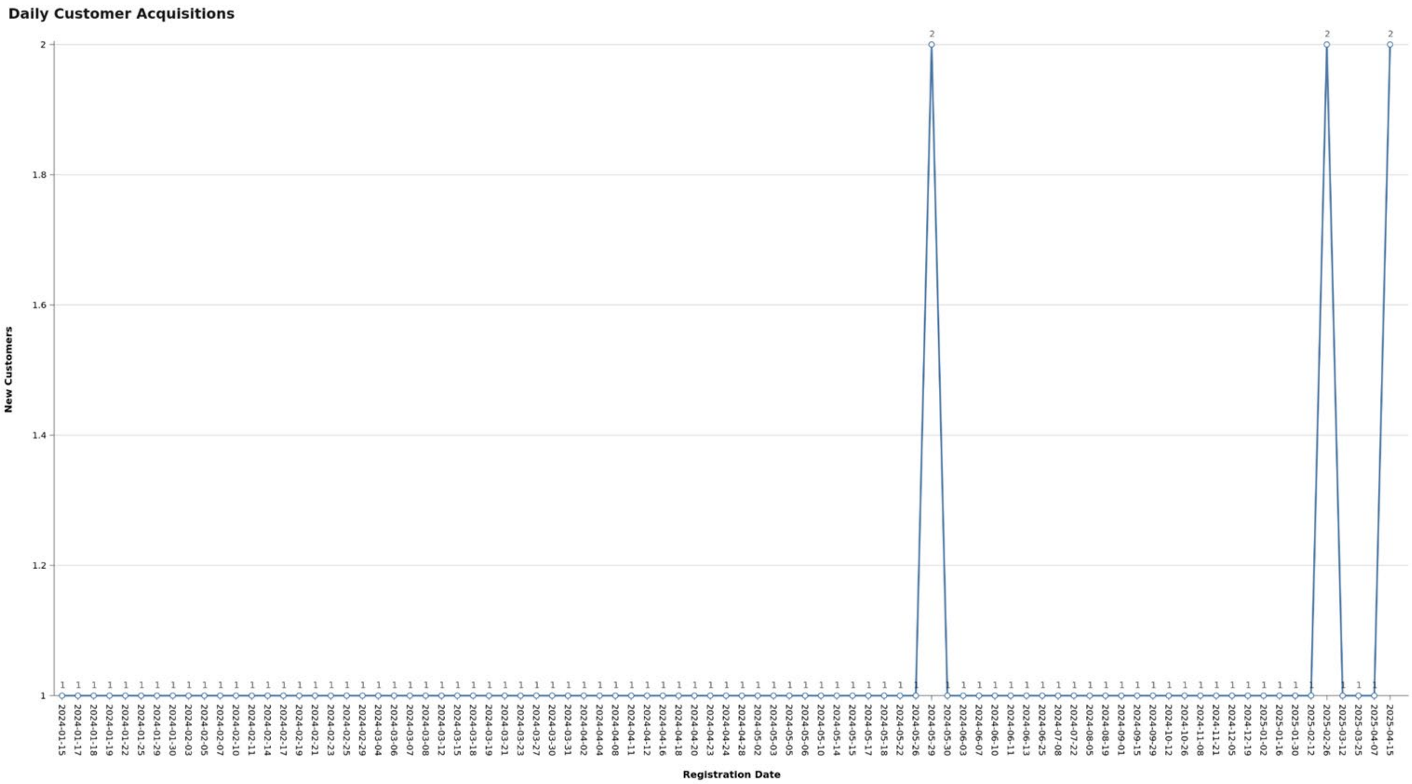
Visualization by MCP [1]



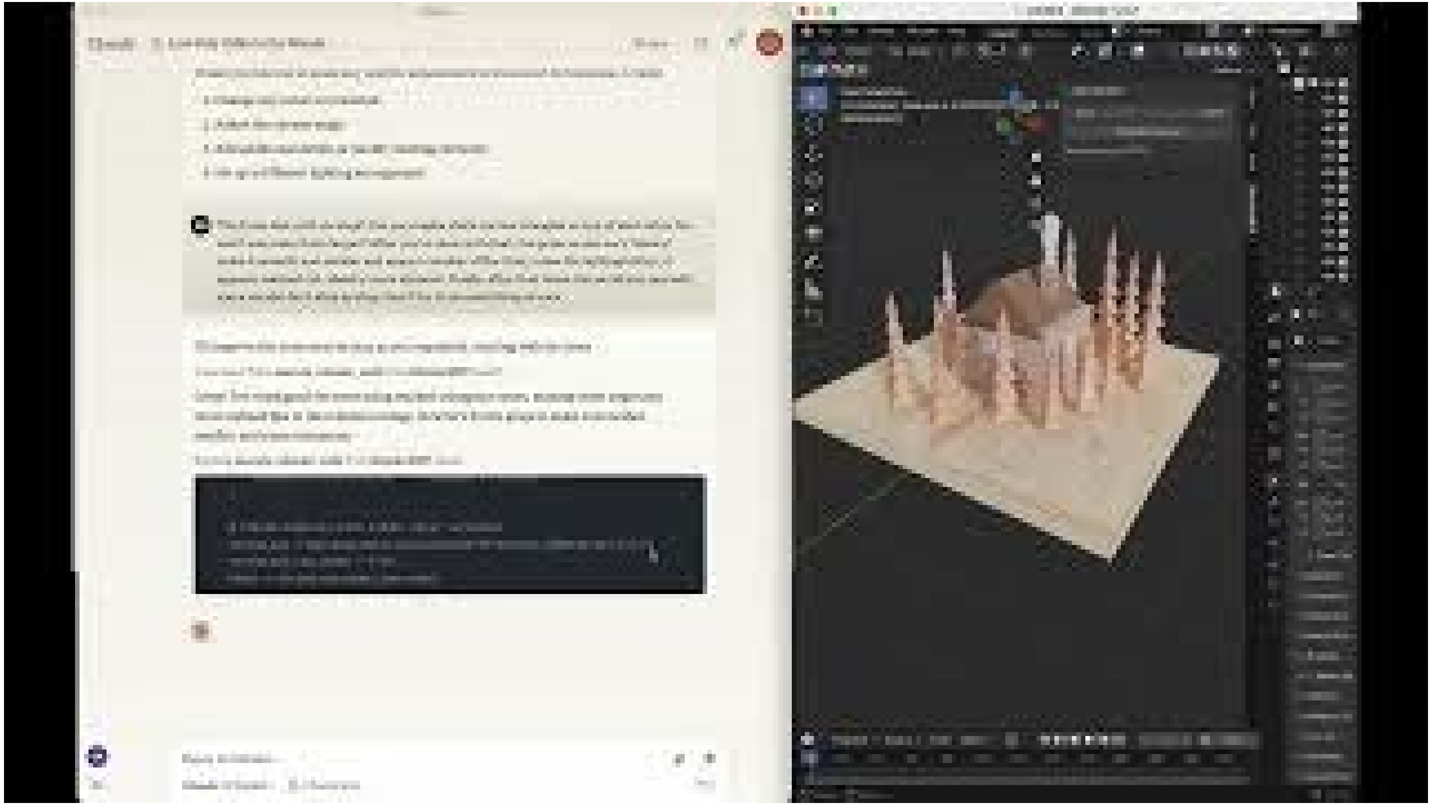
Visualization by MCP [2]



Visualization by MCP [3]



Extra: A Cool Example Use of MCP: Blender

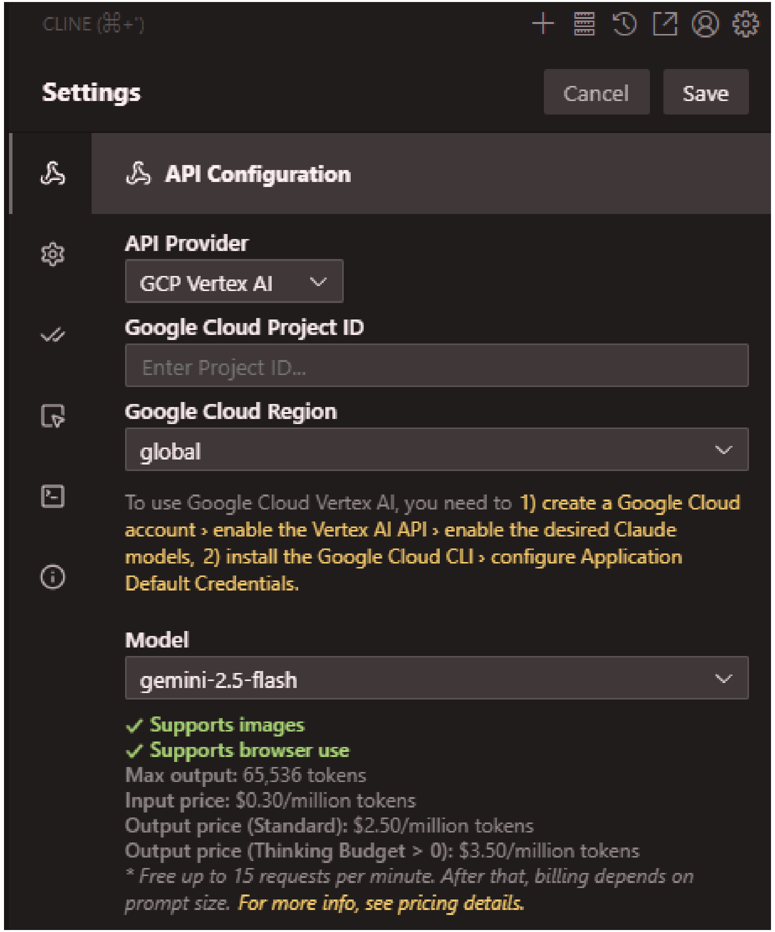


Should be fun.
Try at home if you are interested!

A Taste of MCP Server [2]

Switching to GCP Vertex AI

- As mentioned, OpenRouter has a rate limit for free usage.
- We, therefore, will switch to GCP Vertex AI for the later parts of the workshop.
- Please use the following parameters:
  - **Google Cloud Region: global**
  - **Model: gemini-2.5-flash**



API Provider
GCP Vertex AI

Google Cloud Project ID
Enter Project ID...

Google Cloud Region
global

To use Google Cloud Vertex AI, you need to 1) create a Google Cloud account › enable the Vertex AI API › enable the desired Claude models, 2) install the Google Cloud CLI › configure Application Default Credentials.

Model
gemini-2.5-flash

✓ Supports images
✓ Supports browser use
Max output: 65,536 tokens
Input price: $0.30/million tokens
Output price (Standard): $2.50/million tokens
Output price (Thinking Budget > 0): $3.50/million tokens
** Free up to 15 requests per minute. After that, billing depends on prompt size. For more info, see pricing details.*

Diving into MCP Server

- In the second session of this workshop, we will dive into details of how can we write our own MCP Server.
- Choice of MCP Framework: FastMCP
    - Avoid boilerplate code and complex details.
    - Pythonic.
    - Focus on building tools.

Communication between MCP Server and Client

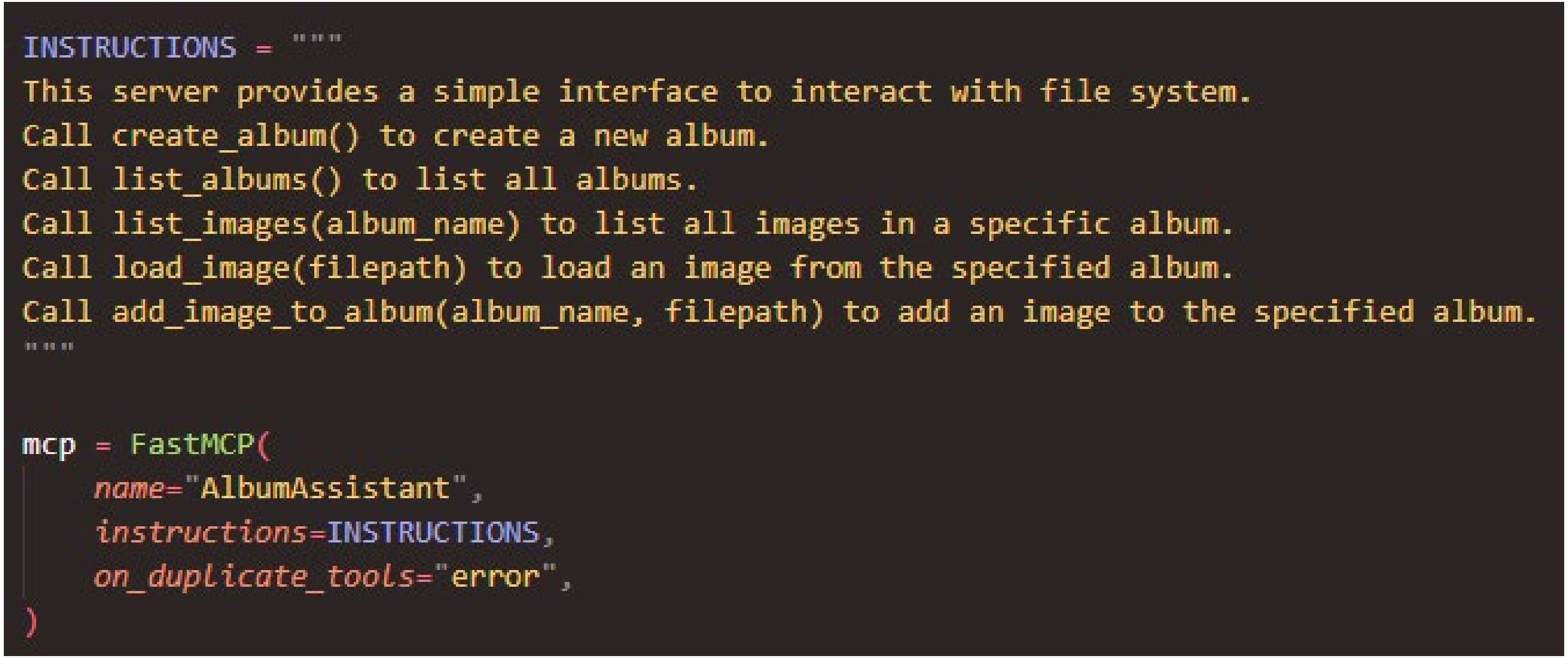
Transport	Summary	Limitation
Standard input/output	Print information on console.	Require MCP server and host to be on the same machine.
SSE (Server-sent Events)	Send information via HTTP connection.	Require long-lived, highly available connection. No resumable streams.
Streamable HTTP	Send information via HTTP connection.	Unknown since it is too new (first release in March 2025).

Note: Today we will be using SSE, since Cline does not support MCP server with streamable HTTP yet. But we should expect SSE to be slowly fade out and be replaced by streamable HTTP.

Today Scenario

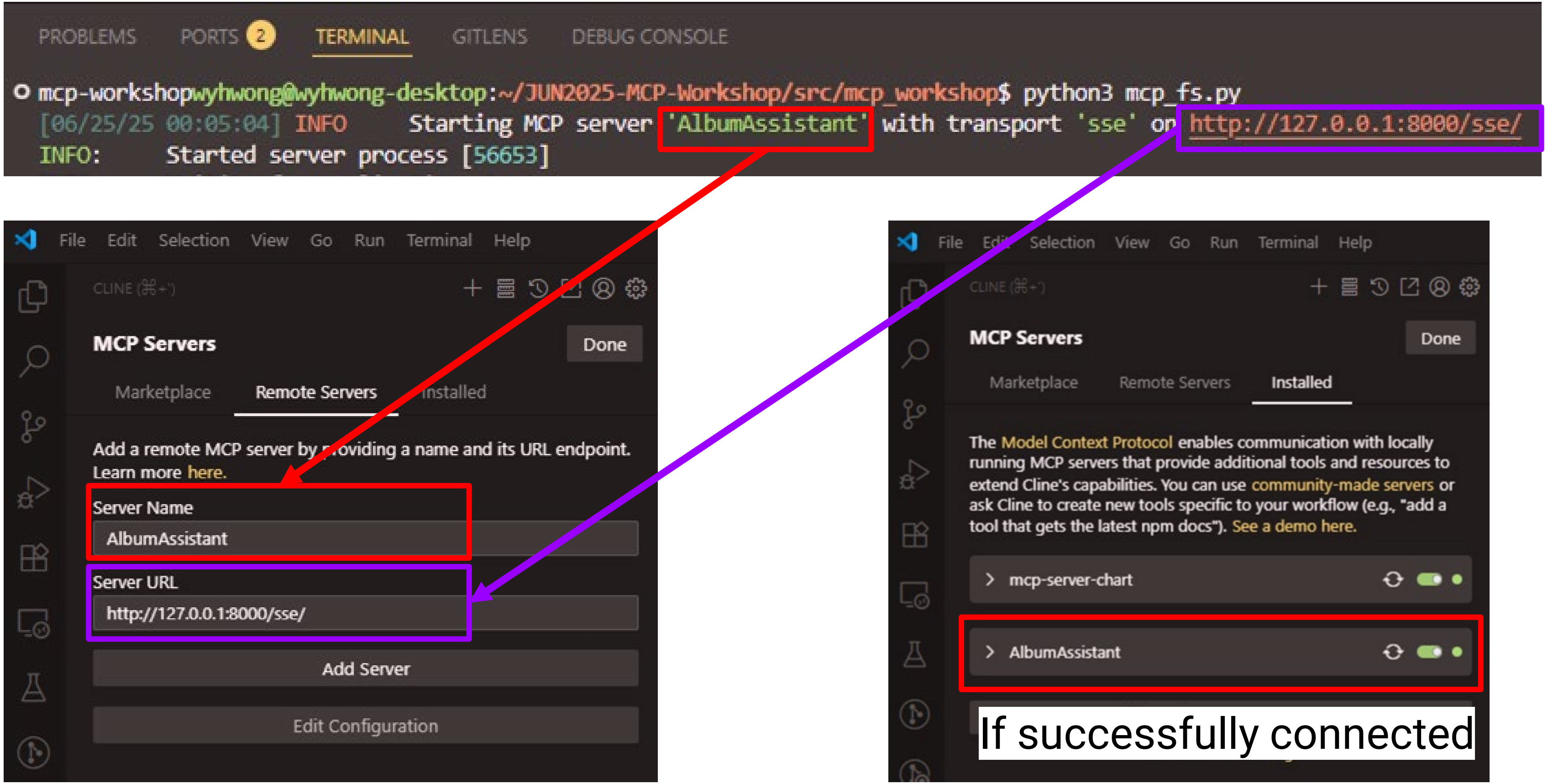
- In the second part of this workshop, we will set up our own MCP server, and use it to interact with some image data prepared in the repository.
- Learning objective:
    - Learn to connect self-written MCP server to Cline.
    - Explore LLM with extended capability.

Content of MCP Server



```
INSTRUCTIONS = """
This server provides a simple interface to interact with file system.
Call create_album() to create a new album.
Call list_albums() to list all albums.
Call list_images(album_name) to list all images in a specific album.
Call load_image(filepath) to load an image from the specified album.
Call add_image_to_album(album_name, filepath) to add an image to the specified album.
"""


mcp = FastMCP(
    name="AlbumAssistant",
    instructions=INSTRUCTIONS,
    on_duplicate_tools="error",
)
```

Start and Add MCP Server



```
○ mcp-workshopwyhwong@wyhwong-desktop:~/JUN2025-MCP-Workshop/src/mcp_workshop$ python3 mcp_fs.py
  [06/25/25 00:05:04] INFO     Starting MCP server 'AlbumAssistant' with transport 'sse' on http://127.0.0.1:8000/sse/
  INFO:     Started server process [56653]
```

Add a remote MCP server by providing a name and its URL endpoint. Learn more here.

Server Name: AlbumAssistant

Server URL: http://127.0.0.1:8000/sse/

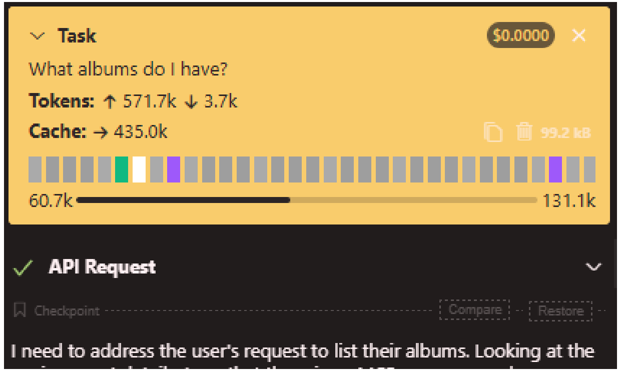
The Model Context Protocol enables communication with locally running MCP servers that provide additional tools and resources to extend Cline's capabilities. You can use community-made servers or ask Cline to create new tools specific to your workflow (e.g., "add a tool that gets the latest npm docs"). See a demo here.

- mcp-server-chart
- AlbumAssistant

If successfully connected

Interact with Cline [1]

- The storage is initialized just now, we should not see any album exist.
- We have prepared some image data at data/image_data.zip.
- In the following task, we will let LLM to handle the photos and put them in various albums.



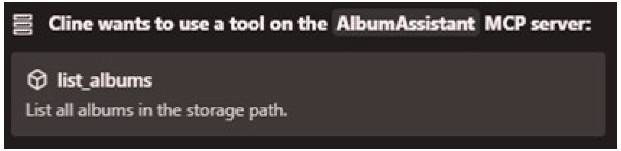
What albums do I have?

Tokens: ↑ 571.7k ↓ 3.7k

Cache: → 435.0k

I need to address the user's request to list their albums. Looking at the

. . .

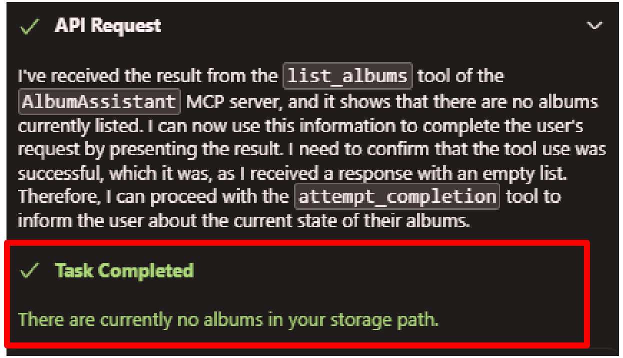


Cline wants to use a tool on the AlbumAssistant MCP server:

list_albums

List all albums in the storage path.

. . .



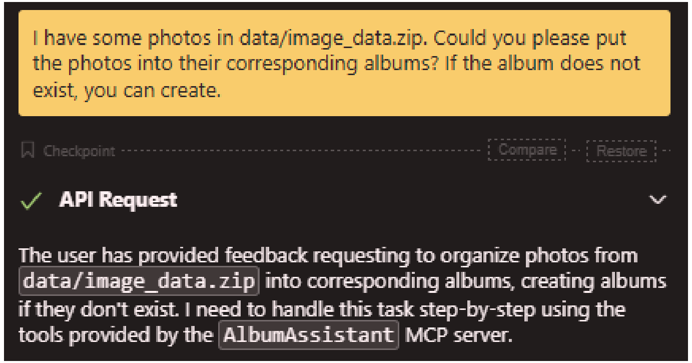
I've received the result from the `list_albums` tool of the `AlbumAssistant` MCP server, and it shows that there are no albums currently listed. I can now use this information to complete the user's request by presenting the result. I need to confirm that the tool use was successful, which it was, as I received a response with an empty list. Therefore, I can proceed with the `attempt_completion` tool to inform the user about the current state of their albums.

Task Completed

There are currently no albums in your storage path.

Interact with Cline [2]

- Here we specify the data path and ask Cline to handle them, and create albums if needed.
- Cline should be able to:
  - Unzip image data.
  - Create albums for unzipped photos.

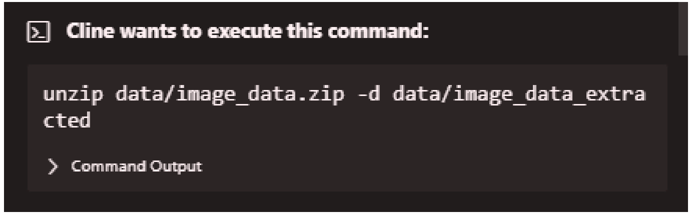


I have some photos in data/image_data.zip. Could you please put the photos into their corresponding albums? If the album does not exist, you can create.

API Request

The user has provided feedback requesting to organize photos from `data/image_data.zip` into corresponding albums, creating albums if they don't exist. I need to handle this task step-by-step using the tools provided by the `AlbumAssistant` MCP server.

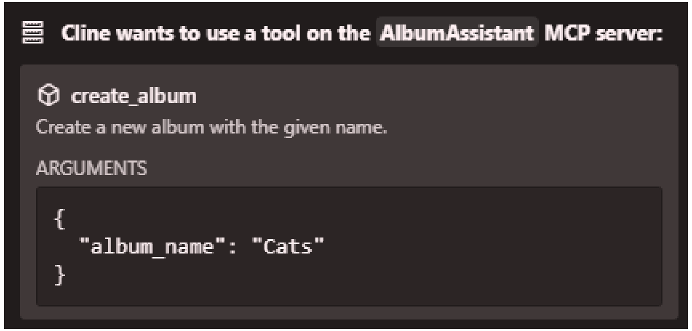
...



Cline wants to execute this command:

```
unzip data/image_data.zip -d data/image_data_extra
cted
```

...



Cline wants to use a tool on the `AlbumAssistant` MCP server:

create_album

Create a new album with the given name.

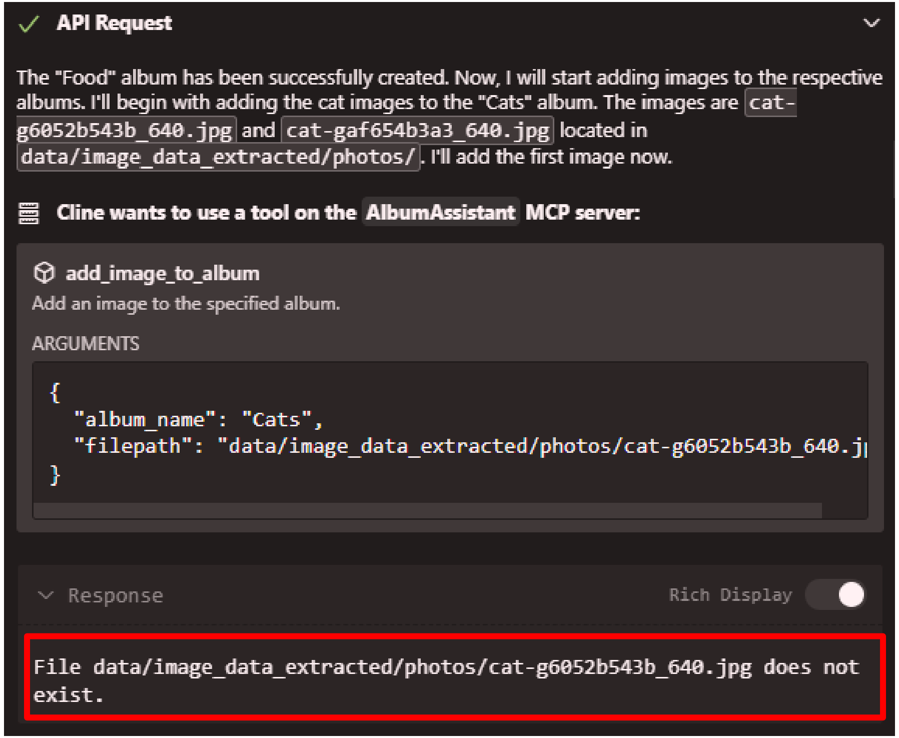
ARGUMENTS

```
{
  "album_name": "Cats"
}
```

Interact with Cline [3]

- When Cline try to put photos into album, we expect it to fail because of the provided path.

- **Solution: Ask Cline to provide absolute path.**



The "Food" album has been successfully created. Now, I will start adding images to the respective albums. I'll begin with adding the cat images to the "Cats" album. The images are `cat-g6052b543b_640.jpg` and `cat-gaf654b3a3_640.jpg` located in `data/image_data_extracted/photos/`. I'll add the first image now.

Cline wants to use a tool on the `AlbumAssistant` MCP server:

add_image_to_album

Add an image to the specified album.

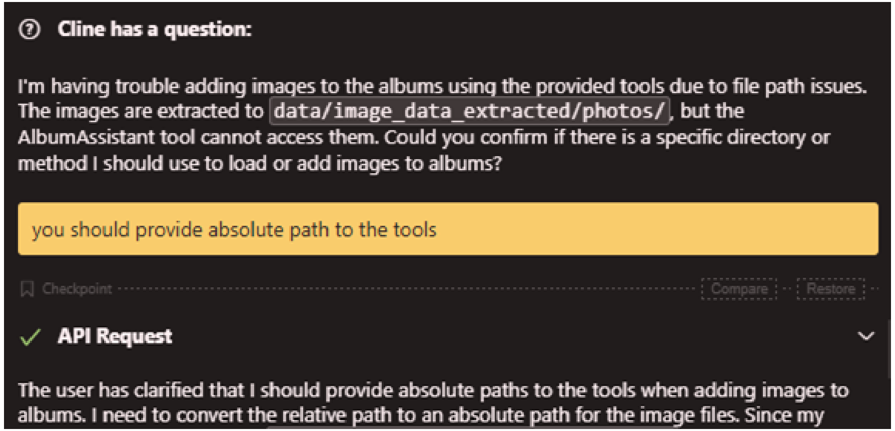
ARGUMENTS

```
{
  "album_name": "Cats",
  "filepath": "data/image_data_extracted/photos/cat-g6052b543b_640.j
}
```

```
File data/image_data_extracted/photos/cat-g6052b543b_640.jpg does not
exist.
```

Interact with Cline [4]

- After instructing Cline to provide absolute path, the photos should be moved into the folder successfully.



Cline has a question:

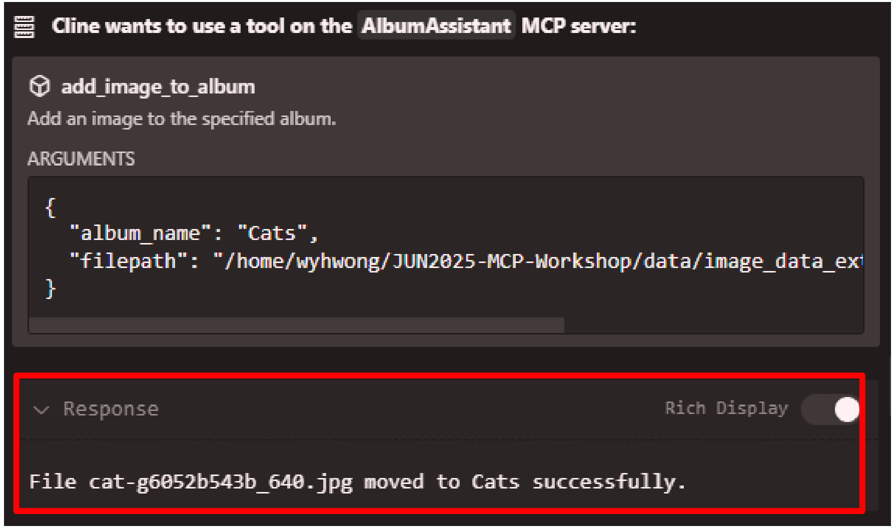
I'm having trouble adding images to the albums using the provided tools due to file path issues. The images are extracted to `data/image_data_extracted/photos/`, but the AlbumAssistant tool cannot access them. Could you confirm if there is a specific directory or method I should use to load or add images to albums?

you should provide absolute path to the tools

API Request

The user has clarified that I should provide absolute paths to the tools when adding images to albums. I need to convert the relative path to an absolute path for the image files. Since my

. . .



Cline wants to use a tool on the AlbumAssistant MCP server:

add_image_to_album

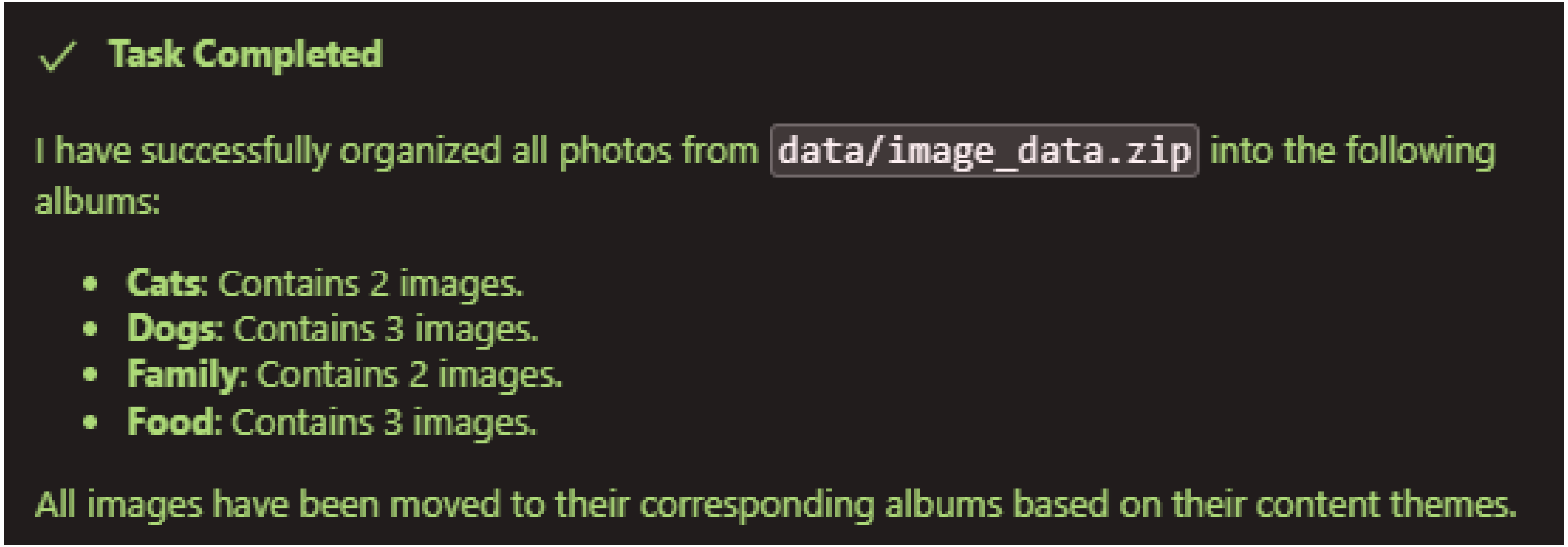
Add an image to the specified album.

ARGUMENTS

```
{
  "album_name": "Cats",
  "filepath": "/home/wyhwong/JUN2025-MCP-Workshop/data/image_data_ext
}
```

```
File cat-g6052b543b_640.jpg moved to Cats successfully.
```

After Cline handled all image data



✓ **Task Completed**

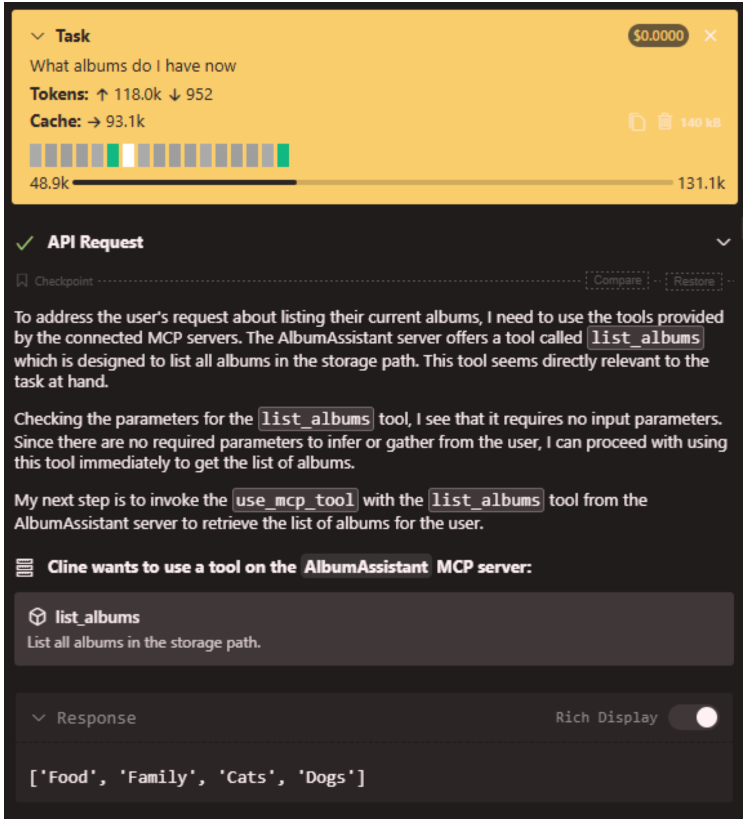
I have successfully organized all photos from `data/image_data.zip` into the following albums:

- **Cats:** Contains 2 images.
- **Dogs:** Contains 3 images.
- **Family:** Contains 2 images.
- **Food:** Contains 3 images.

All images have been moved to their corresponding albums based on their content themes.

Let’s check what do we have now [1]

- Now there should be 4 albums:
  - Food
  - Family
  - Cats
  - Dogs



What albums do I have now

Tokens: ↑ 118.0k ↓ 952

Cache: → 93.1k

API Request

To address the user's request about listing their current albums, I need to use the tools provided by the connected MCP servers. The AlbumAssistant server offers a tool called `list_albums` which is designed to list all albums in the storage path. This tool seems directly relevant to the task at hand.

Checking the parameters for the `list_albums` tool, I see that it requires no input parameters. Since there are no required parameters to infer or gather from the user, I can proceed with using this tool immediately to get the list of albums.

My next step is to invoke the `use_mcp_tool` with the `list_albums` tool from the AlbumAssistant server to retrieve the list of albums for the user.

Cline wants to use a tool on the `AlbumAssistant` MCP server:

list_albums

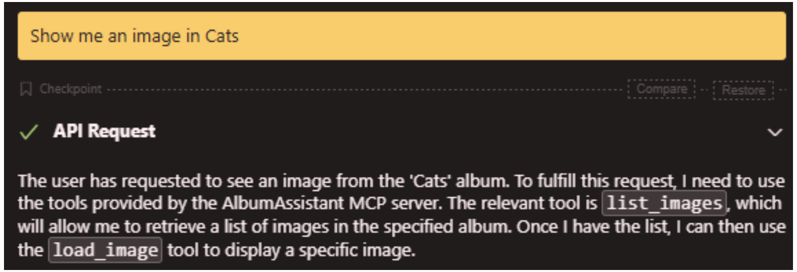
List all albums in the storage path.

Response — Rich Display

```
['Food', 'Family', 'Cats', 'Dogs']
```

Let’s check what do we have now [2]

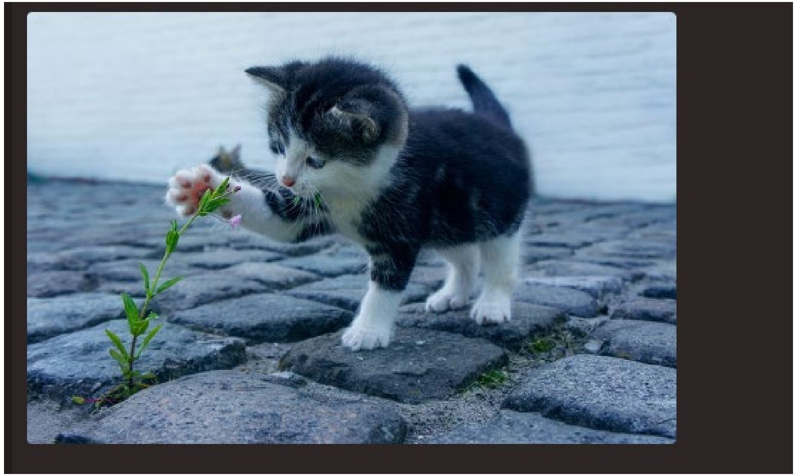
- Now we finally see a cute cat in the album!



Show me an image in Cats

The user has requested to see an image from the 'Cats' album. To fulfill this request, I need to use the tools provided by the AlbumAssistant MCP server. The relevant tool is `list_images`, which will allow me to retrieve a list of images in the specified album. Once I have the list, I can then use the `load_image` tool to display a specific image.

...

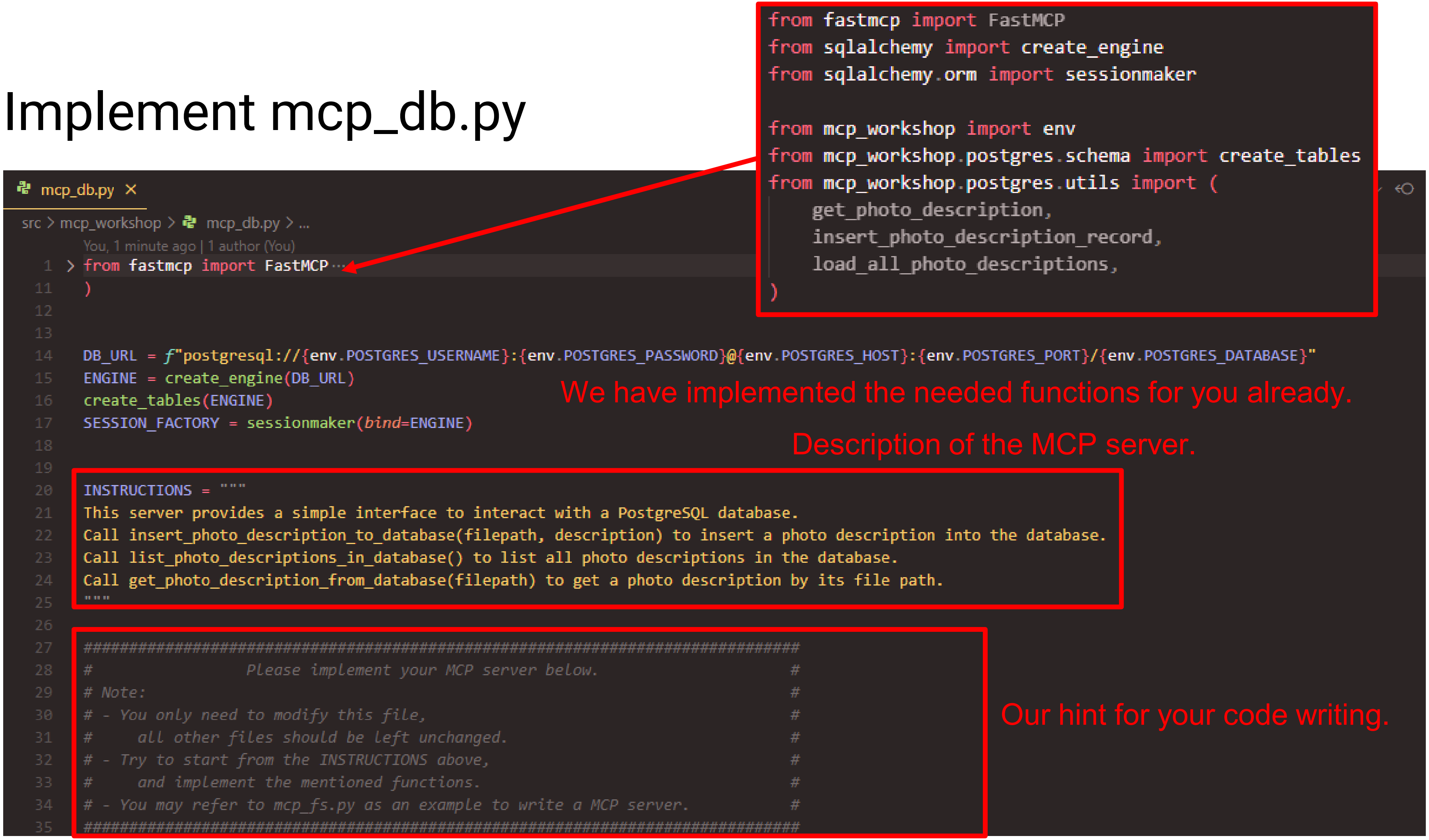


A Taste of MCP Server [3]

Today Scenario

- In the last part of this workshop, we will write our own MCP server, and again use it to interact with some image data prepared in the repository.
- Learning objective:
  - Learn to set up a MCP server.
  - Write some code.

Implement mcp_db.py


mcp_db.py ×
src > mcp_workshop > mcp_db.py > ...
You, 1 minute ago | 1 author (You)

```python
from fastmcp import FastMCP
from sqlalchemy import create_engine
from sqlalchemy.orm import sessionmaker

from mcp_workshop import env
from mcp_workshop.postgres.schema import create_tables
from mcp_workshop.postgres.utils import (
    get_photo_description,
    insert_photo_description_record,
    load_all_photo_descriptions,
)
```

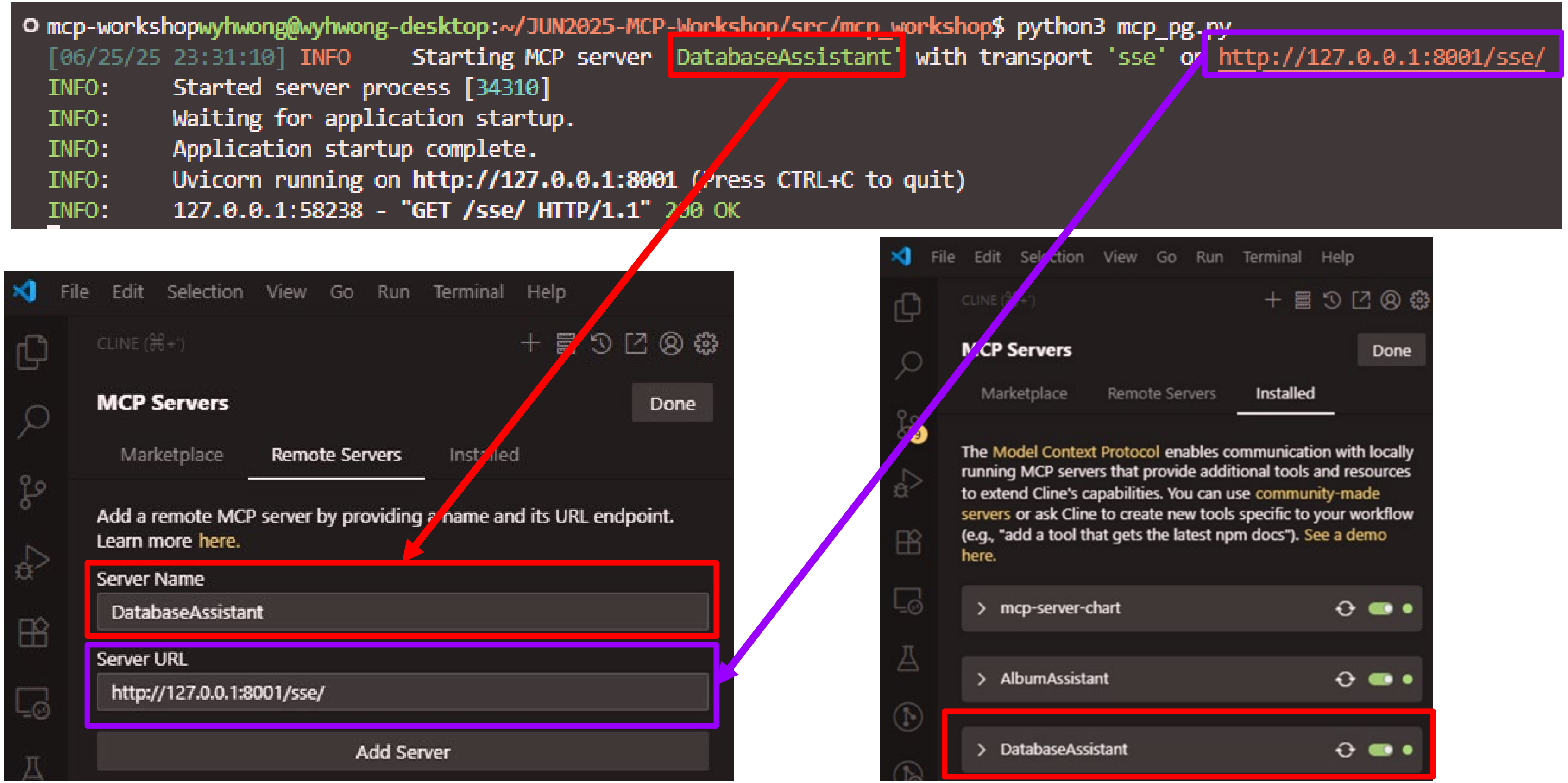
```python
from fastmcp import FastMCP···
)


DB_URL = f"postgresql://{env.POSTGRES_USERNAME}:{env.POSTGRES_PASSWORD}@{env.POSTGRES_HOST}:{env.POSTGRES_PORT}/{env.POSTGRES_DATABASE}"
ENGINE = create_engine(DB_URL)
create_tables(ENGINE)
SESSION_FACTORY = sessionmaker(bind=ENGINE)


INSTRUCTIONS = """
This server provides a simple interface to interact with a PostgreSQL database.
Call insert_photo_description_to_database(filepath, description) to insert a photo description into the database.
Call list_photo_descriptions_in_database() to list all photo descriptions in the database.
Call get_photo_description_from_database(filepath) to get a photo description by its file path.
"""

################################################################################
#                 Please implement your MCP server below.                      #
# Note:                                                                        #
# - You only need to modify this file,                                         #
#     all other files should be left unchanged.                                #
# - Try to start from the INSTRUCTIONS above,                                  #
#     and implement the mentioned functions.                                   #
# - You may refer to mcp_fs.py as an example to write a MCP server.            #
################################################################################
```

We have implemented the needed functions for you already.

Description of the MCP server.

Our hint for your code writing.

After Implementation



```
○ mcp-workshopwyhwong@wyhwong-desktop:~/JUN2025-MCP-Workshop/src/mcp_workshop$ python3 mcp_pg.py
  [06/25/25 23:31:10] INFO     Starting MCP server 'DatabaseAssistant' with transport 'sse' on http://127.0.0.1:8001/sse/
  INFO:     Started server process [34310]
  INFO:     Waiting for application startup.
  INFO:     Application startup complete.
  INFO:     Uvicorn running on http://127.0.0.1:8001 (Press CTRL+C to quit)
  INFO:     127.0.0.1:58238 - "GET /sse/ HTTP/1.1" 200 OK
```

MCP Servers

Add a remote MCP server by providing a name and its URL endpoint. Learn more here.

Server Name: DatabaseAssistant

Server URL: http://127.0.0.1:8001/sse/

MCP Servers

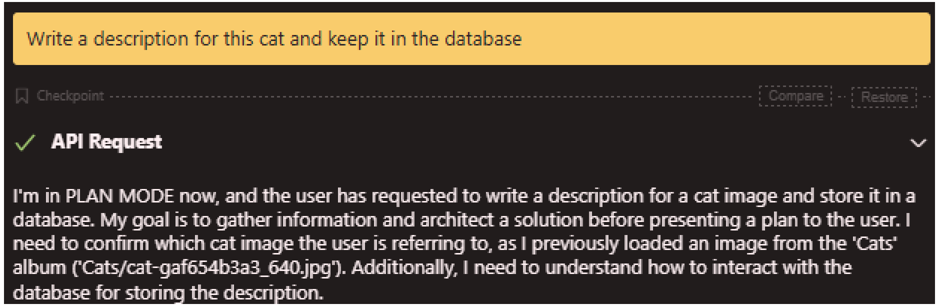
The Model Context Protocol enables communication with locally running MCP servers that provide additional tools and resources to extend Cline's capabilities. You can use community-made servers or ask Cline to create new tools specific to your workflow (e.g., "add a tool that gets the latest npm docs"). See a demo here.

- mcp-server-chart
- AlbumAssistant
- DatabaseAssistant

Interact with MCP Server

- Now we can let Cline complete tasks like writing description for the cat photo we just saw.

- And keep the description in our PostgreSQL database through MCP server.

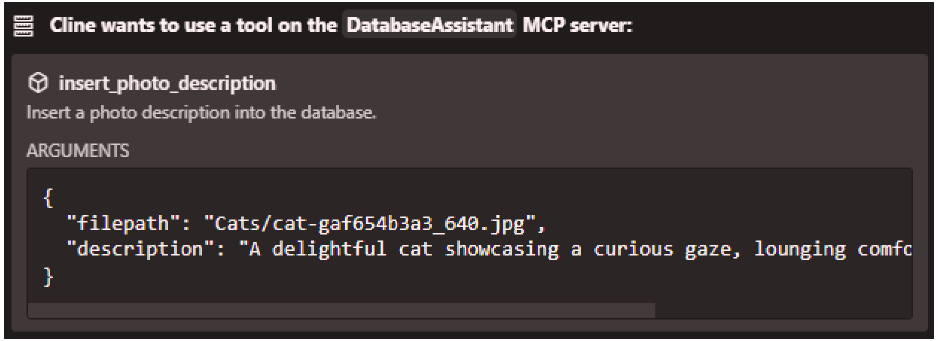


Write a description for this cat and keep it in the database

✓ **API Request**

I'm in PLAN MODE now, and the user has requested to write a description for a cat image and store it in a database. My goal is to gather information and architect a solution before presenting a plan to the user. I need to confirm which cat image the user is referring to, as I previously loaded an image from the 'Cats' album ('Cats/cat-gaf654b3a3_640.jpg'). Additionally, I need to understand how to interact with the database for storing the description.

. . .



Cline wants to use a tool on the DatabaseAssistant MCP server:

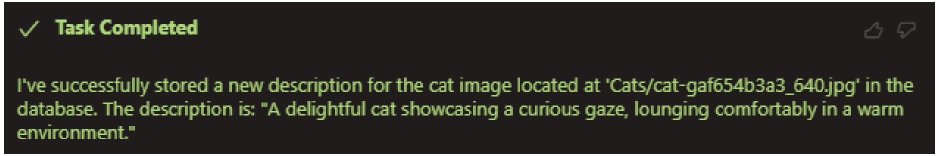
insert_photo_description

Insert a photo description into the database.

ARGUMENTS

```
{
  "filepath": "Cats/cat-gaf654b3a3_640.jpg",
  "description": "A delightful cat showcasing a curious gaze, lounging comfc
}
```

. . .



✓ **Task Completed**

I've successfully stored a new description for the cat image located at 'Cats/cat-gaf654b3a3_640.jpg' in the database. The description is: "A delightful cat showcasing a curious gaze, lounging comfortably in a warm environment."

~ END ~

Q & A