



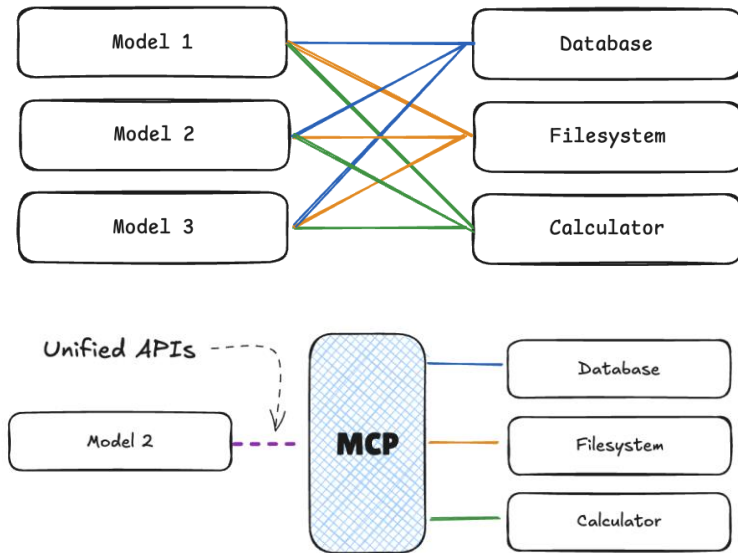
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# PowerMCP Tutorial

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*08/22/2025*

# What is MCP (Model Context Protocol)

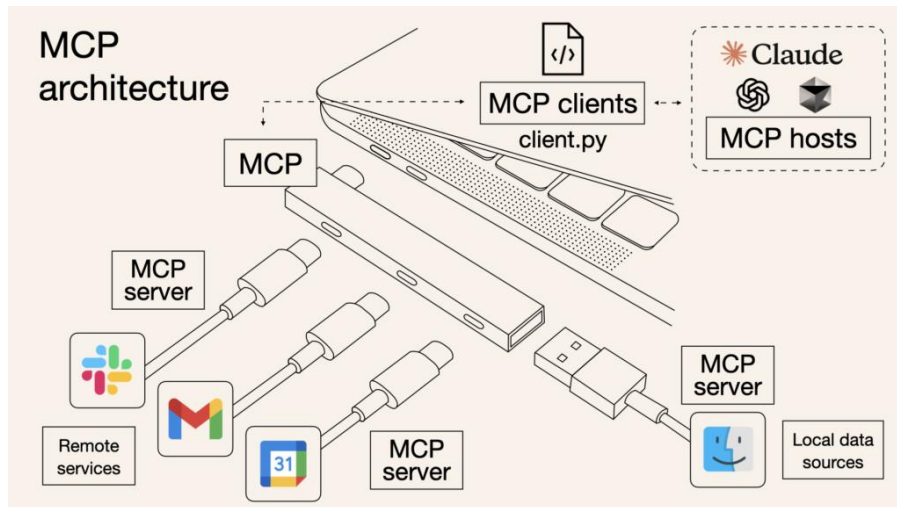
MCP is like a **universal translator** that helps AI models talk to many external tools and data sources in a standard way: making them more useful, flexible, and trustworthy.



## Some General Tutorial about MCP

[modelcontextprotocol.io](https://modelcontextprotocol.io)

[huggingface.co/learn/mcp-course](https://huggingface.co/learn/mcp-course)



[norahsakal.com/blog/mcp-vs-api-model-context-protocol-explained/](https://norahsakal.com/blog/mcp-vs-api-model-context-protocol-explained/)



# PowerMCP Demo: pandapower

*pandapower* is an open-source Python library for analyzing and simulating electric power systems

**Step 1** Download MCP Files from

<https://github.com/Power-Agent/PowerMCP>

**Step 2** Download one MCP Client

*Option 1:* Coding IDE



[Windsurf](#)



[Cursor](#)

Some AI-powered Code  
IDEs are ready to go



VS Code



Cline

VS Code needs to add  
Cline as an extension

*Option 2:* Desktop version Chatbot



Claude

This Tutorial is based on  
**Claude Desktop** Version

**Download Here:**

[claude.ai/download](https://claude.ai/download)



# PowerMCP Demo: pandapower

## **Step 3**      **Set up your Python environment to support** panda\_mcp.py

*Option 1:* pip install pandapower>=2.13.0 numpy>=1.21.0 mcp>=0.1.0

*Option 2:* ask ChatGPT “how can I set up the env for panda\_mcp.py”

## **Step 4**      **Enable local folder access for Claude**

*Follow the instruction below step-by-step:*

<https://modelcontextprotocol.io/quickstart/user>

## **Step 5**      **Set up the Configuration based on your python and** panda\_mcp.py **location**

### **Mac User**

```
"mcpServers": {  
  "pandapower": {  
    "command": "/your python path/python",  
    "args": ["/your panda_mcp path/panda_mcp.py"] }  
}
```

### **Windows User**

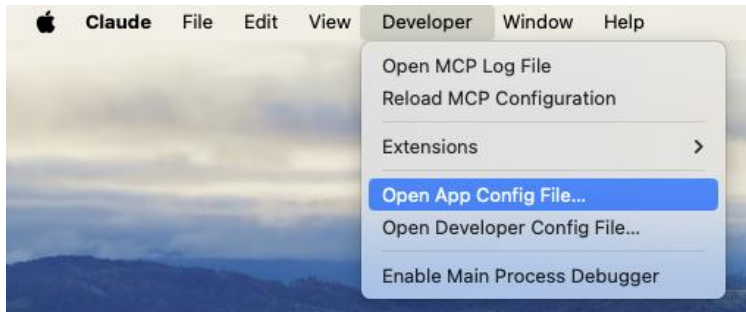
```
"mcpServers": {  
  "pandapower": {  
    "command": "cmd",  
    "args": ["/c",  
      "D:\\your python path\\python.exe",  
      "C:\\ your panda_mcp path \\panda_mcp.py"] }  
}
```



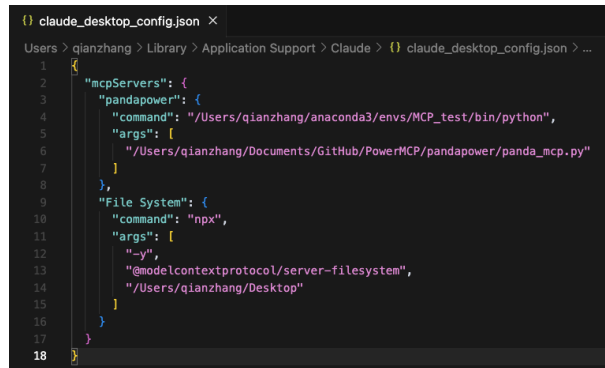
# PowerMCP Demo: pandapower

## Step 6 Copy the Configuration to Claude's Developer Settings

<https://modelcontextprotocol.io/quickstart/user>



Developer => Open App Config File...



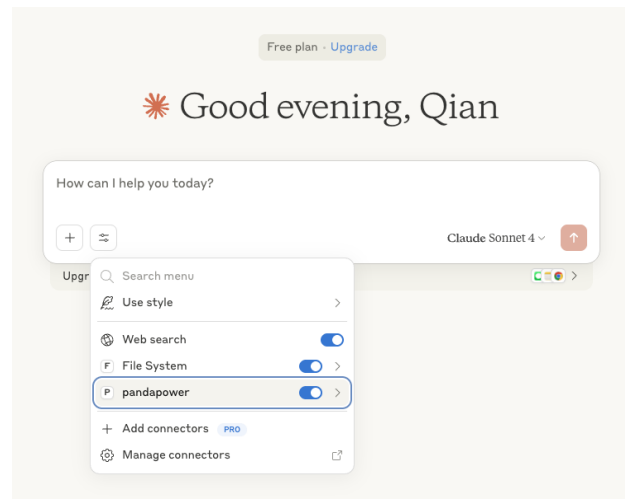
Add the configuration in Step 5 to the file

## Step 7 Restart Claude or Reload MCP Configuration



# PowerMCP Demo: pandapower

## Step 7 Check Your MCP in Claude



## Step 8 Enjoy your Chat with Claude

Contingency Analysis of Test Case

Q

Can you run the contingency analysis of "test\_case.json" on my desktop

I'll help you run a contingency analysis on the "test\_case.json" file. Let me first check what directories are available and locate your file.

L

list\_allowed\_directories

L

list\_directory

Great! I found the "test\_case.json" file on your desktop. Now let me load the network file and run the contingency analysis.

L

load\_network

Perfect! The network has been successfully loaded. It contains 7 buses, 4 lines, and 1 transformer. Now let me run the contingency analysis.

R

run\_contingency\_analysis

Excellent! The N-1 contingency analysis has been completed successfully. Here's a summary of the results:

Contingency Analysis Results for test\_case.json

Network Overview:

7 buses

4 lines

1 transformer

N-1 Contingency Analysis Results:

The analysis tested the outage of each network element individually:

1. Line 0 Outage: Converged, no violations

2. Line 1 Outage: Converged, no violations

3. Line 2 Outage: Converged, no violations

4. Line 3 Outage: Converged, no violations

5. Transformer 0 Outage: Converged, no violations

Key Findings:

All contingency scenarios converged successfully

No voltage violations detected in any scenario

No line loading violations detected in any scenario

The network appears to be robust and can handle any single element outage (N-1 criterion)

This indicates that your test case network is well-designed and meets the N-1 reliability criteria, meaning it can continue operating safely even if any single transmission element fails.

Would you like me to run an N-2 contingency analysis as well, or provide more detailed information about any specific aspect of the results?

Reply to Claude...

Claude Sonnet 4

The crest of the University of Cambridge, featuring a shield with a cross and four lions, topped with a book.

- **Try More PowerAgent Demos**



[power-agent.github.io](https://power-agent.github.io)

- **Academic Paper** ([link](#))

*Qian Zhang and Le Xie, "PowerAgent: A Road Map Toward Agentic Intelligence in Power Systems: Foundation Model, Model Context Protocol, and Workflow," in IEEE Power and Energy Magazine, vol. 23, no. 5, pp. 93-101, Sept.-Oct. 2025*

- **Join our Slack Community to Connect and Collaborate**



[link](#)

- **Special Thanks**



**PAI**

Power and AI Initiative  
at Harvard SEAS

