

# 1978 called, it wants its architecture back.



small tools, big brains - powering LLMs  
with MCP

●●●○○ Idea 3G

3:08 AM

🔔 75% 🔋

[← Messages](#)

**Marcin**

[Details](#)

Po ile stoi Jen?



●●●○○ Idea 3G

3:10 AM

🕒 74% 🔋

< Messages

**Marcin**

Details

Po ile stoi Jen?

Po 3,7468 pln

# I was the LLM

Input: "Po ile stoi Jen?"

Tools: [pc] [currency exchange website] [response formatter]

Output: "Po 3,7468 pln"



I'm Adam



typescript  
kotlin mongodb  
javascript android  
zig  
go postgresql  
markdown java  
swift  
sql git

# One task, one tool

# Human (2011)

Friend: "Po ile stoi Jen?"

Adam:

- turnOnPc()
- checkConversionRateOnline()
- formatResponse()



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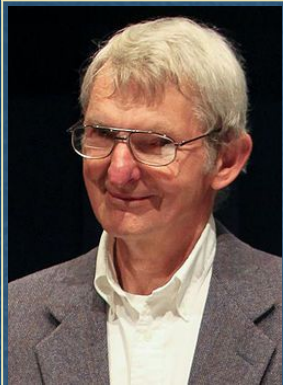
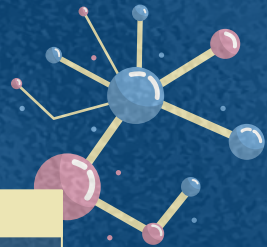
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- checkConversionRateOnline()
- formatResponse()

# MCP (2024)

User: "Convert 100 USD to EUR"

Claude orchestrates:

- fetch\_exchange\_rate()
- calculate\_conversion()
- format\_response()



"Write programs that do one thing and do it well. Write programs to work together."

**Doug McIlroy**





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Adam:

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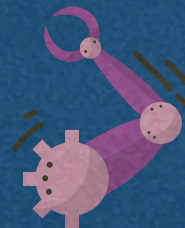
Claude orchestrates:

- fetch\_exchange\_rate()
- calculate\_conversion()
- format\_response()

# Unix (1978)

```
cat application.log | grep ERROR | awk '{print $4}' | sort | uniq -c
```

# Glossary







# Glossary

LLM

Large Language Model

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**LLM**

Large Language Model

**Token**

Basic unit of text processing



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Information available to llm  
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Single purposed scoped llm  
interaction

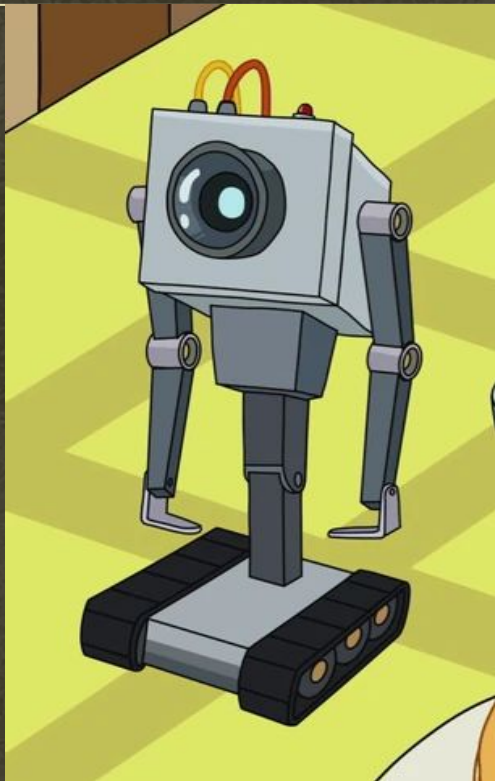
# Glossary

## LLM

Large Language Model

## Function Calling

Allows llm to call external tools



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Information available to llm within single interaction



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## Context

Information available to llm within single interaction

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Allows llm to call external tools

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## MCP

Model Context Protocol

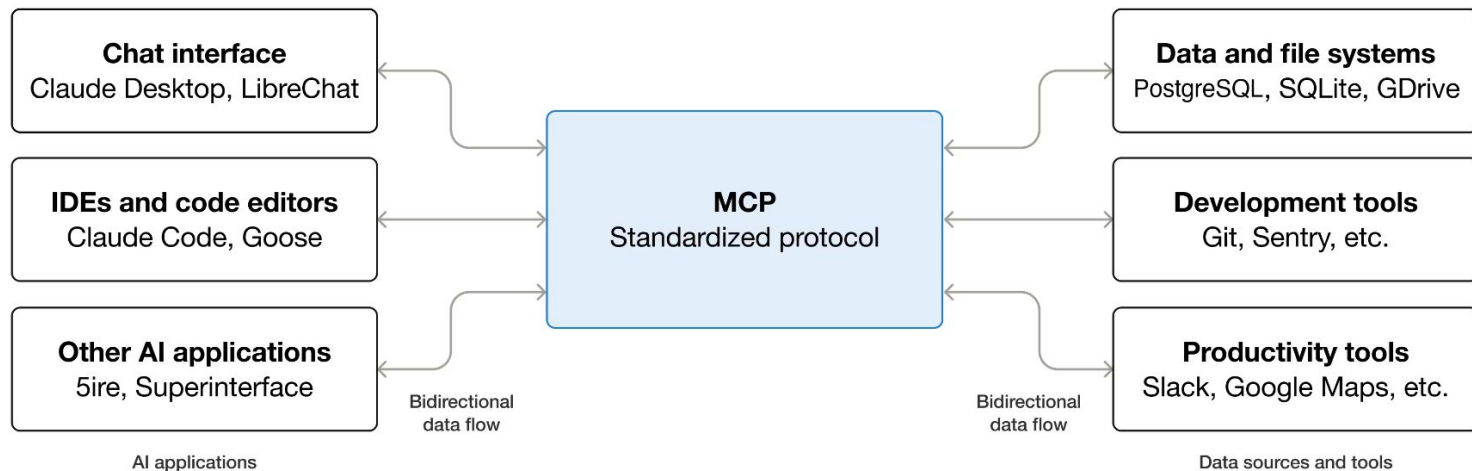
# MCP

Model Context Protocol

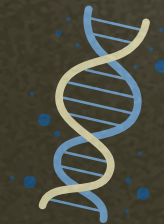




# MCP



# MCP

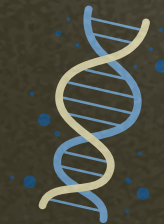


## Tools

Functions



# MCP



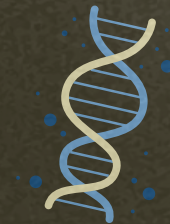
## Tools

Functions

## Resources

Files, data from db etc.

# MCP



## Tools

Functions

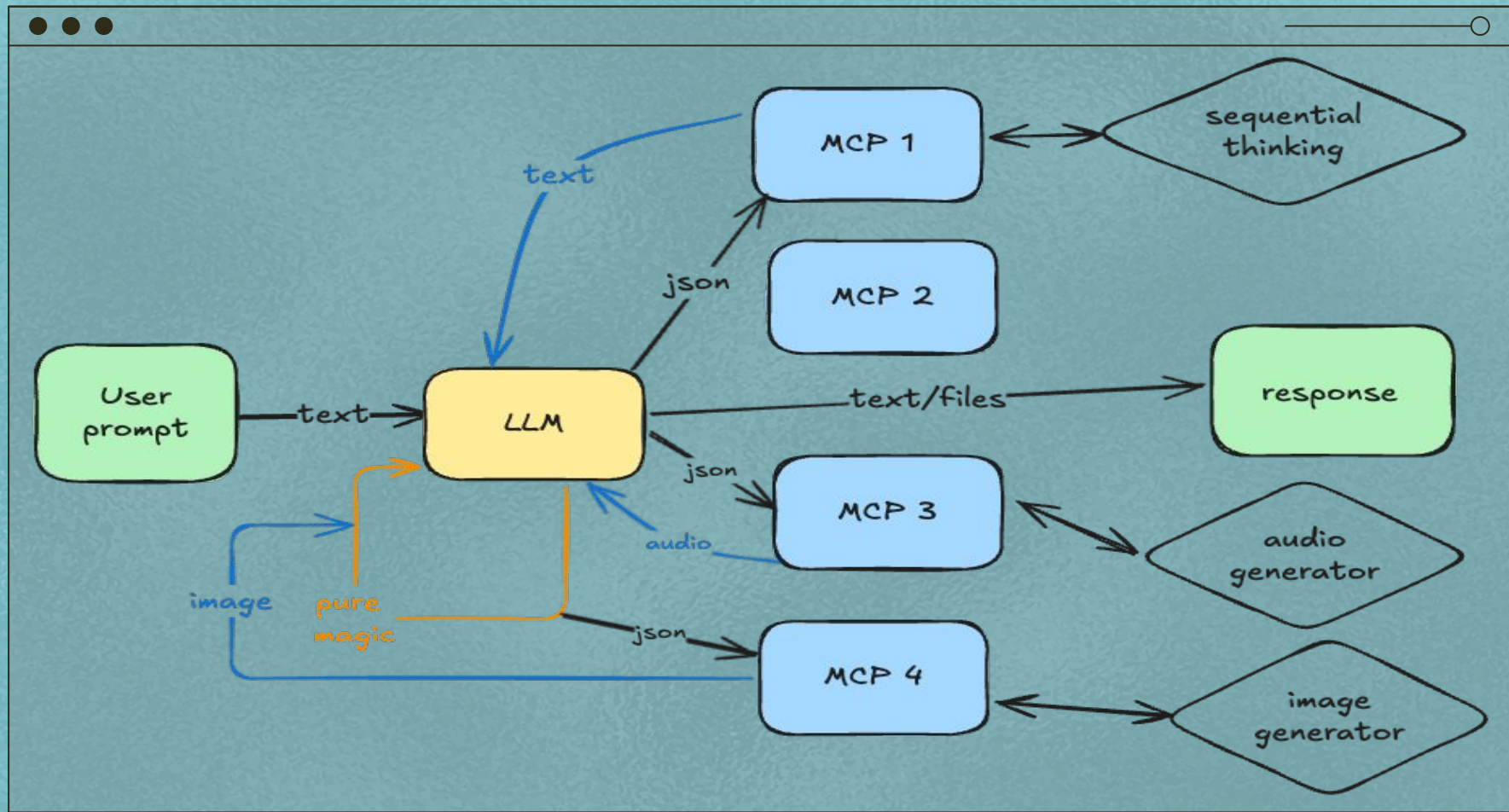
## Resources

Files, data from db etc.

## Prompts

Templates





# Let's build the thing

## Available SDKs



TypeScript



Python



Go



Kotlin



Swift



Java



C#



Ruby



Rust



PHP





# Let's build the thing

```
fun main() = runBlocking {  
    runSseMcpServerUsingKtorPlugin( port = 3000)  
}  
  
1 Usage  
  
suspend fun runSseMcpServerUsingKtorPlugin(port: Int) {  
    println("Starting sse server on port $port")  
    println("Use inspector to connect to the http://localhost:\$port/sse")  
  
    embeddedServer( factory = CIO, host = "0.0.0.0", port = port) {  
        mcp {  
            return@mcp createServer()  
        }  
    }.startSuspend(wait = true)  
}
```

# Server

```
val server = Server(  
  serverInfo = Implementation(  
    name = "smart-currency-assistant", version = "1.0.0"  
  ), options = ServerOptions(  
    capabilities = ServerCapabilities(  
      tools = ServerCapabilities.Tools(  
        listChanged = true,  
      ), prompts = ServerCapabilities.Prompts(  
        listChanged = true,  
      ), resources = ServerCapabilities.Resources(  
        listChanged = true, subscribe = false  
      ), logging = null // does nothing but mcp inspector won't work without it  
    )  
  )  
)
```



# Tool

```
server.addTool(  
  name = "echo", description = "Echoes back the input message", inputSchema = Tool.Input(  
    properties = buildJsonObject {  
      putJsonObject( key = "message") {  
        put("type", "string")  
        put("description", "Message to echo back")  
      }  
    }) { request ->  
    val message = request.arguments["message"]?.jsonPrimitive?.content ?: return@addTool CallToolResult(  
      content = listOf(TextContent( text = "No message provided"))  
    )  
    CallToolResult(content = listOf(TextContent( text = "Echo: $message")))  
  }  
)
```

# Inspector

MCP Inspector

x

+

←

→

↺

🌐 localhost:5173

☆

⚙️ MCP Inspector

Transport Type

STDIO

Command

src/puppeteer/dist/index.js

Arguments

Arguments (space-separated)

> Environment Variables

▶ Connect

● Connected

📁 Resources

📄 Prompts

📡 Requests

🔧 Tools

📄 Console

🔔 Ping

# Sampling

🔗 Roots

Resources

List Resources

Resource Templates

List Templates

Select a resource or template

Select a resource or template from the list to view its contents

History

No history yet

Server Notifications

No notifications yet



Demo



# I need more MCPs

## 3,048 Integrations

Connect with tools built by the community.

All

Memory

Academic Research

Browser Automation

Platform APIs

Database

Finance

Agentic Tools



**Airtable**

airtable

Airtable merges spreadsheet functionality with database power,...

Remote

73



**Linkup**

@LinkupPlatform/linkup-mcp-...

Search the web in real time to get trustworthy, source-backed answers...

Remote

2.90k



**Todoist**

todoist

Todoist is a task management tool allowing users to create to-do lists, s...

Remote

91



**Exa Search**

exa

Fast, intelligent web search and web crawling. New mcp tool: Exa-code is ...

Remote

710.65k



**Bright Data**

@luminati-io/brightdata-mcp

One MCP for the Web. Easily search, crawl, navigate, and extract websites...

Remote

635



**Publish your own**

Build and share your own integration.

[View all integrations](#)






# How not to build mcps

```

Context Usage
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️  claude-sonnet-4-5-20250929 · 81k/200k tokens (41%)
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️  🗄️ System prompt: 2.3k tokens (1.2%)
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️  🗄️ System tools: 14.3k tokens (7.2%)
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️  🗄️ MCP tools: 61.0k tokens (30.5%)
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️  🗄️ Custom agents: 631 tokens (0.3%)
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️  🗄️ Messages: 3.0k tokens (1.5%)
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️  🗄️ Free space: 119k (59.4%)
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️
🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️🗄️

```

          claude-sonnet-4-5-20250929 · 81k/200k tokens (41%)

System prompt: 2.3k tokens (1.2%)

System tools: 14.3k tokens (7.2%)

```
██████████ MCP tools: 61.0k tokens (30.5%)
```

```
Custom agents: 631 tokens (0.3%)
```

Messages: 3.0k tokens (1.5%)

```

#####  Free space: 119k (59.4%)

```

# How not to build mcps

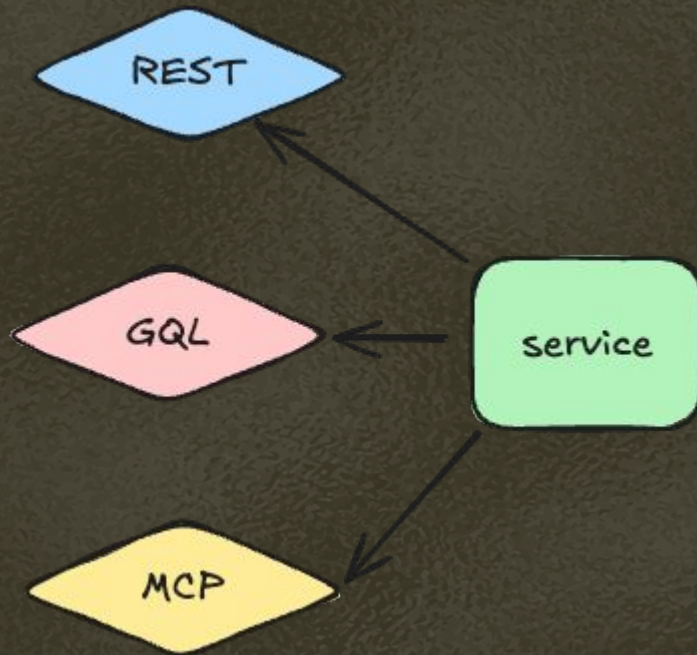
```
L mcp__miottid-todoist-mcp__add-project (miottid-todoist-mcp): 744 tokens
L mcp__miottid-todoist-mcp__get-projects (miottid-todoist-mcp): 585 tokens
L mcp__miottid-todoist-mcp__get-project (miottid-todoist-mcp): 601 tokens
L mcp__miottid-todoist-mcp__update-project (miottid-todoist-mcp): 734 tokens
L mcp__miottid-todoist-mcp__delete-project (miottid-todoist-mcp): 601 tokens
L mcp__miottid-todoist-mcp__get-project-collaborators 608 tokens
(miottid-todoist-mcp):
L mcp__miottid-todoist-mcp__add-task (miottid-todoist-mcp): 999 tokens
L mcp__miottid-todoist-mcp__quick-add-task (miottid-todoist-mcp): 706 tokens
L mcp__miottid-todoist-mcp__get-task (miottid-todoist-mcp): 606 tokens
L mcp__miottid-todoist-mcp__get-tasks (miottid-todoist-mcp): 594 tokens
L mcp__miottid-todoist-mcp__get-tasks-completed-by-completion-date 836 tokens
(miottid-todoist-mcp):
L mcp__miottid-todoist-mcp__get-tasks-completed-by-due-date 841 tokens
(miottid-todoist-mcp):
L mcp__miottid-todoist-mcp__get-productivity-stats 643 tokens
(miottid-todoist-mcp):
L mcp__miottid-todoist-mcp__update-task (miottid-todoist-mcp): 981 tokens
L mcp__miottid-todoist-mcp__close-task (miottid-todoist-mcp): 404 tokens
```



# How not to build MCPs

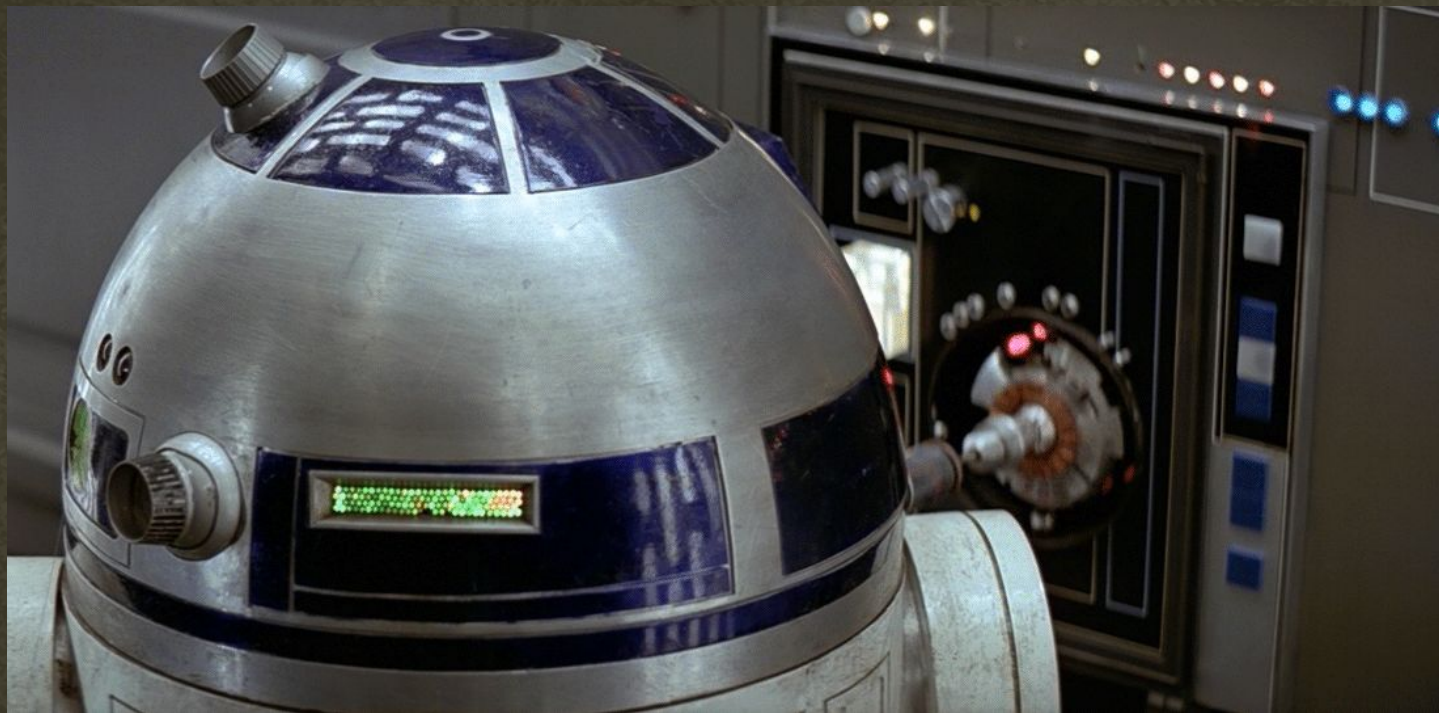


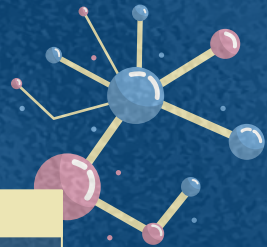
# How to build MCPs





# How to build mcps





LLM is a f#####g tool,  
save the context at all  
times.

Some random dude





# How to build mcps

```
calculate (githejie-mcp-server-calculator)
```

**Tool name:** calculate

**Full name:** mcp\_\_githejie-mcp-server-calculator\_\_calculate

**Description:**

Calculates/evaluates the given expression.

**Parameters:**

- expression (required): string

# S in MCP stands for security

```
● githejie-mcp-server-calculator - calculate (MCP)(expression: "386.95 / 3")
```

## Tool use

```
githejie-mcp-server-calculator - calculate(expression: "365.35 / 3") (MCP)  
Calculates/evaluates the given expression.
```

Do you want to proceed?

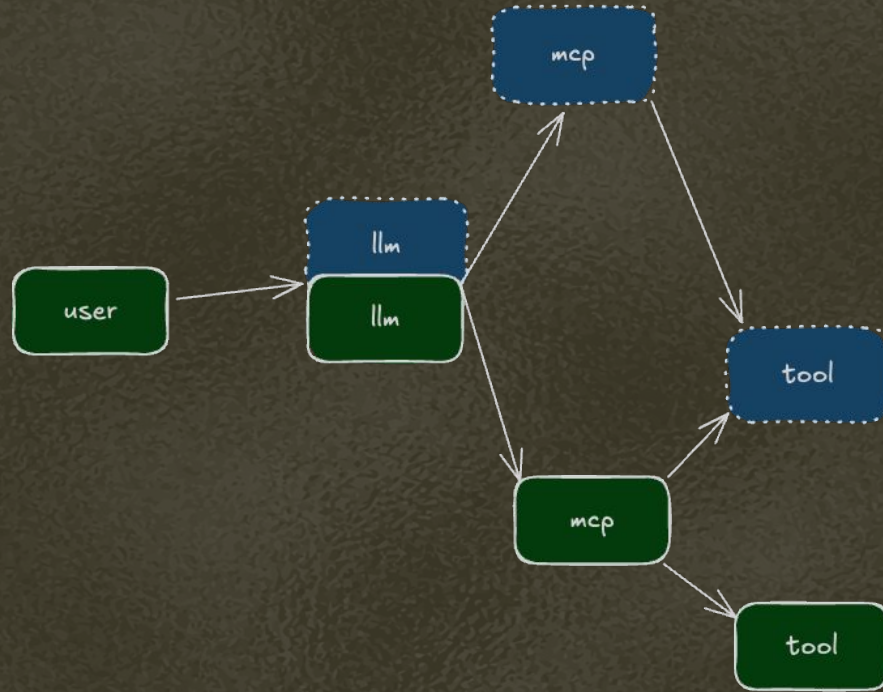
- 1. Yes
- 2. Yes, and don't ask again for githejie-mcp-server-calculator - calculate commands in </Users/asvid/repo/mcp-test>
- 3. No, and tell Claude what to do differently (esc)



# S in MCP stands for security

```
  ,  
  "miottid-todoist-mcp": {  
    "type": "http",  
    "url": "https://server.smithery.ai/@miottid/todoist-mcp/mcp?api_key=0026207e-4950-45e7-8",  
  },  
  "smithery-ai-github": {  
    "type": "http",  
    "url": "https://server.smithery.ai/@smithery-ai/github/mcp?api_key=0026207e-4950-45e7-8",  
  },  
}
```

# S in MCP stands for security







# S in MCP stands for security

## Details

Quality Score 

 57/100

Monthly Tool Calls

 1,345

Deployed from

 main  d00b146

Local

Yes


Published

2/11/2025

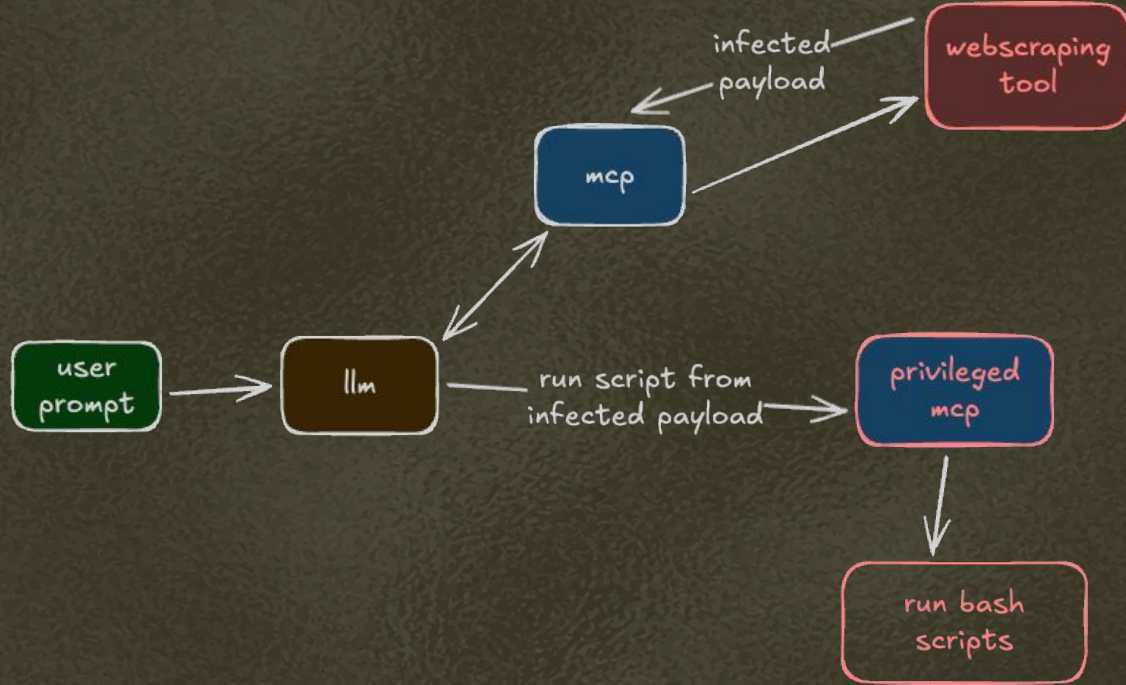
Source Code

 miottid/todoist-mcp

Homepage

 [www.todoist.com](https://www.todoist.com)

# S in MCP stands for security





# R in MCP stands for reliability

Quality Score ⓘ

🏆 79/100

Monthly Tool Calls

↕ 249

Uptime ⓘ

87.95%

Local

🌐 No

Published

11/19/2025

# R in MCP stands for reliability

## ⓘ Details

Quality Score ⓘ

🟢 83/100

Monthly Tool Calls

↗ 3,375

Uptime ⓘ

83.91%

Local

🌐 No

Published

11/26/2025

Homepage

🔗 gmail.com



# S in MCP stands for standards

Tools 20

< 1 / 4 >

## GMAIL\_ADD\_LABEL\_TO\_EMAIL

Adds and/or removes specified gmail labels for a message; ensure message `id` and all label `ids` are valid (use 'listlabels' for custom label ids).

## GMAIL\_CREATE\_EMAIL\_DRAFT

Creates a gmail email draft, supporting to/cc/bcc, subject, plain/html body (ensure `is_html=true` for html), attachments, and threading.

## GMAIL\_CREATE\_LABEL

Creates a new label with a unique name in the specified user's gmail account.

## GMAIL\_DELETE\_DRAFT

Permanently deletes a specific gmail draft using its `id`; ensure the draft exists and the user has necessary permissions for the given `user_id`.

## GMAIL\_DELETE\_MESSAGE

Permanently deletes a specific email message by its `id` from a gmail mailbox; for `user_id`, use 'me' for the authenticated user or an email address to which the authenticated user has delegated access.

Tools 4

## fun1

Divides the first number by the second

## fun2

Multiplies two numbers together

## fun3

Subtracts the second number from the first

## fun4

Adds two numbers together

# S in MCP stands for standards

## Tools 4

### add

두 숫자의 합을 반환합니다.

### multiply

두 숫자의 곱을 반환합니다.

### subtract

두 숫자의 차를 반환합니다.

### divide

두 숫자의 나눗셈 결과를 반환합니다.



# Alternatives



# Alternatives

## Scripts

If you can run script, so can  
LLM





# Alternatives

## Scripts

If you can run script, so can  
LLM



## CLI

Scripts but wrapped in a  
single tool

# Alternatives

## Scripts

If you can run script, so can  
LLM

## Skills

Progressive Disclosure for  
saving context

## CLI

Scripts but wrapped in a  
single tool





	<b>MCP</b>	<b>CLI</b>	<b>Scripts</b>	<b>Skills</b>
<b>Agent Invoked</b>	Yes	No	No	Yes
<b>Context Window Consumption</b>	High	Medium (Depends)	Low (w/incr)	Low (w/incr)
<b>Customizable</b>	No (unless you own)	Yes	Yes	Yes
<b>Portability</b>	Low	Medium	High	High
<b>Composability</b>	Yes (MCP Prompts)	Yes but requires local prompts	Yes but requires local prompts	Yes but requires local prompts
<b>Simplicity</b>	High	Medium	Medium	Medium
<b>Engineering Investment</b>	Low if external, Medium if custom	Medium	Medium	Low if external, Medium if custom
<b>Feature Set</b>	Tools, Resources, Prompts, Elicitation, Completion, Sampling, Logging, Auth. etc	Whatever you build	Whatever you build	Whatever you build

# One task, one tool - right tool

# Human (2011)

Friend: "Po ile stoi Jen?"

Adam:

- turnOnPc()
- checkConversionRateOnline()
- formatResponse()

# MCP (2024)

User: "Convert 100 USD to EUR"

Claude orchestrates:

- fetch\_exchange\_rate()
- calculate\_conversion()
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# Unix (1978)

```
cat application.log | grep ERROR | awk '{print $4}' | sort | uniq -c
```



What part of MCP did you not understand?

