MCP Agents

Model Context Protocol

JaxJUG May 2025

JaxNode next month!

About me

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- JaxNode user group
- Web and Mobile Developer
- JS, TS, React, C#, Swift, Obj-C, Kotlin, Java and SQL
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PRAGMATIC WORKS

What is the Model Context Protocol

MCP Agents

- The Model Context Protocol was defined by Anthropic in November of last year
- It defines a standard for AI agents
- This can be implemented in any platform and programming language
- MCPs can be called by Generative AI for additional context

What is an Agent

- The idea of agents is not new
- An Agent is a program that can do work for you autonomously
- Their are many frameworks for building agents
- MCPs are programs that connect generative AI assistants to the systems where the data lives

Who is using MCPs

- Originally developed by Anthropic
- MCPs can be registered and used in Claude Desktop
- Can also be used with Windsurf and Cursor AI IDEs
- Recently added to VS Code
- Warp terminal just added support

Why do we need MCPs

Context is all you need

- Models are only as good as the context supplied
- Most frontier models only trained to a certain date
- Recent changes allow for prompts to search the internet
- Most frontier models allow for tool calling

Tool calling

Most LLMs support this feature

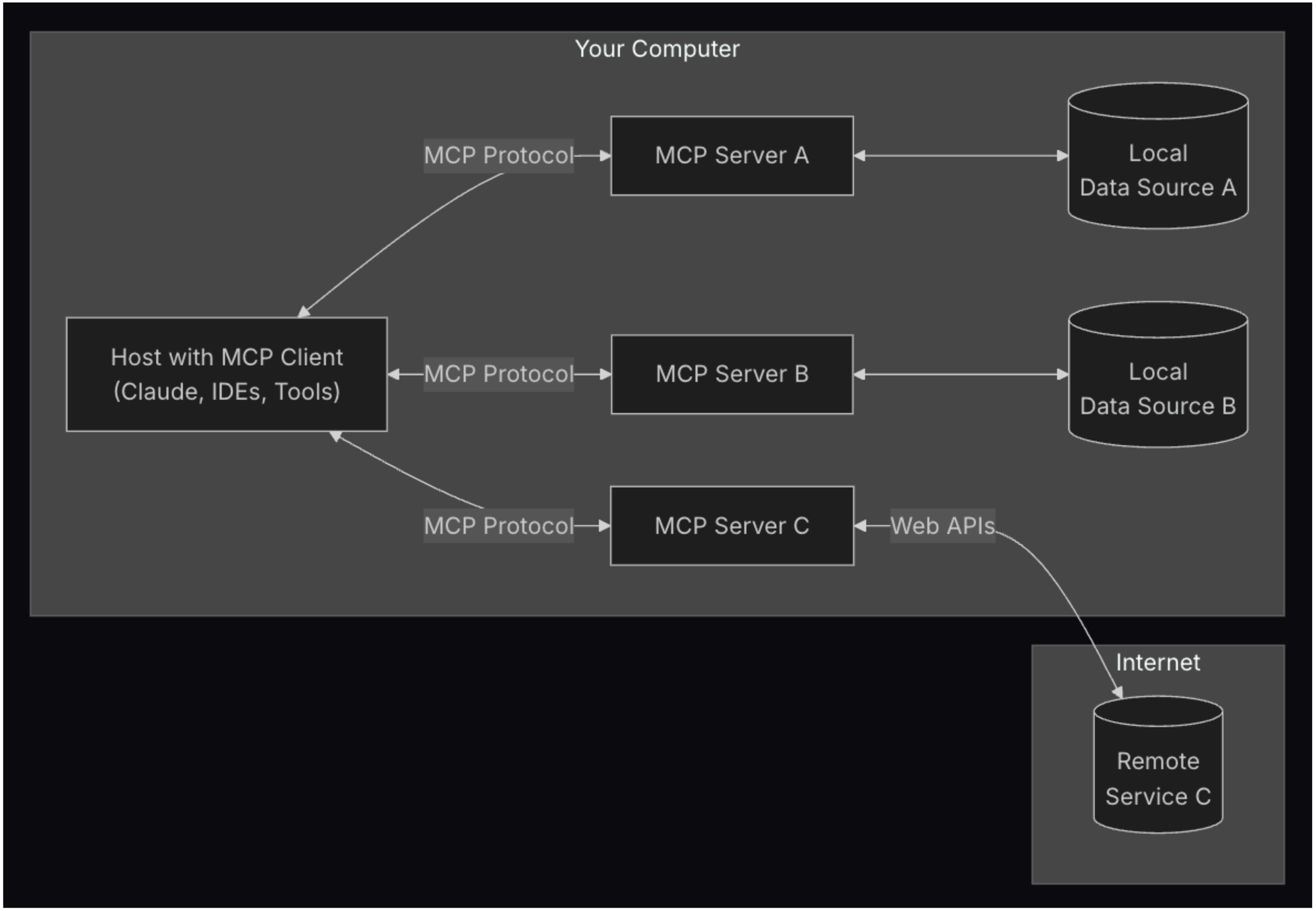
- OpenAI was the first to do this with OpenAPI schema
- Anthropic
- Llama 3.2+
- Cohere
- Mistral AI
- OpenAI has announced support for MCP

Advantage of MCP

- Today’s integrations require custom connectors
- MCP make developing tools more efficient
- MCP lets developers integrate once, then connect seamlessly to multiple data sources
- Maintains end-to-end context and security across interactions

MCP Core Architecture

- Client Server model
- AI Applications can connect to MCP servers over JSON-RPC endpoints with Server Sent Events
- AI Applications can connect to MCP servers over STDIO
- All requests are stateless


Your Computer
MCP Protocol
MCP Server A
Local
Data Source A
Host with MCP Client
(Claude, IDEs, Tools)
MCP Protocol
MCP Server B
Local
Data Source B
MCP Protocol
MCP Server C
Web APIs
Internet
Remote
Service C

Agent Frameworks

- MCP-agent is a light weight Python framework
- PydanticAI Demonstrates MCP integration in programmatic and coding agents via a unified interface
- Cloudflare Agents leverages MCP to connect AI models with rule management
- LangChain and LangGraph
- Anthropic provides .NET SDK for rapid MCP integration

Future Directions

- ACP (Agent Communication Protocol)
- A2A (Agent-to-Agent Protocol) Google
- ANP (Agent Network Protocol)
- Standardization and Governance coming
- Decentralized Marketplaces
- Https://mcp.so
- https://glama.ai

MCP Language support

- TypeScript SDK
- Python-sdk
- Java-sdk
- Kotlin-sdk
- Csharp-sdk

```
import { McpServer, ResourceTemplate } from "@modelcontextprotocol/sdk/server/mcp.js";
import { StdioServerTransport } from "@modelcontextprotocol/sdk/server/stdio.js";
import { z } from "zod";

// Create an MCP server
const server = new McpServer({
  name: "Demo",
  version: "1.0.0"
});

// Add an addition tool
server.tool("add",
  { a: z.number(), b: z.number() },
  async ({ a, b }) => ({
    content: [{ type: "text", text: String(a + b) }]
  })
);

// Add a dynamic greeting resource
server.resource(
  "greeting",
  new ResourceTemplate("greeting://{name}", { list: undefined }),
  async (uri, { name }) => ({
    contents: [{
      uri: uri.href,
      text: `Hello, ${name}!`
    }]
  })
);

// Start receiving messages on stdin and sending messages on stdout
const transport = new StdioServerTransport();
await server.connect(transport);
```

MCP Defining parts

- Server
- Resources
- Tools
- Prompts

Testing MCP

- MCP Inspector
- If server based you can use a tool like cURL

Demo

Questions

Resources

- https://modelcontextprotocol.io/introduction
- https://github.com/modelcontextprotocol/typescript-sdk?tab=readme-ov-file#tools
- https://mcp.so/
- Code Examples: https://github.com/davidfekke/jaxjugmcp