

MCP in Action

➡ Building Smarter AI-Driven Applications with LLMs and Agents.

Discover  how MCP enables LLMs and agents to interact with your application logic.

➡ We'll break down the basics of LLMs and agents, introduce the MCP model, and showcase a practical demo.

Agenda :

- 01 The History That Led to MCP Pag. 4
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01

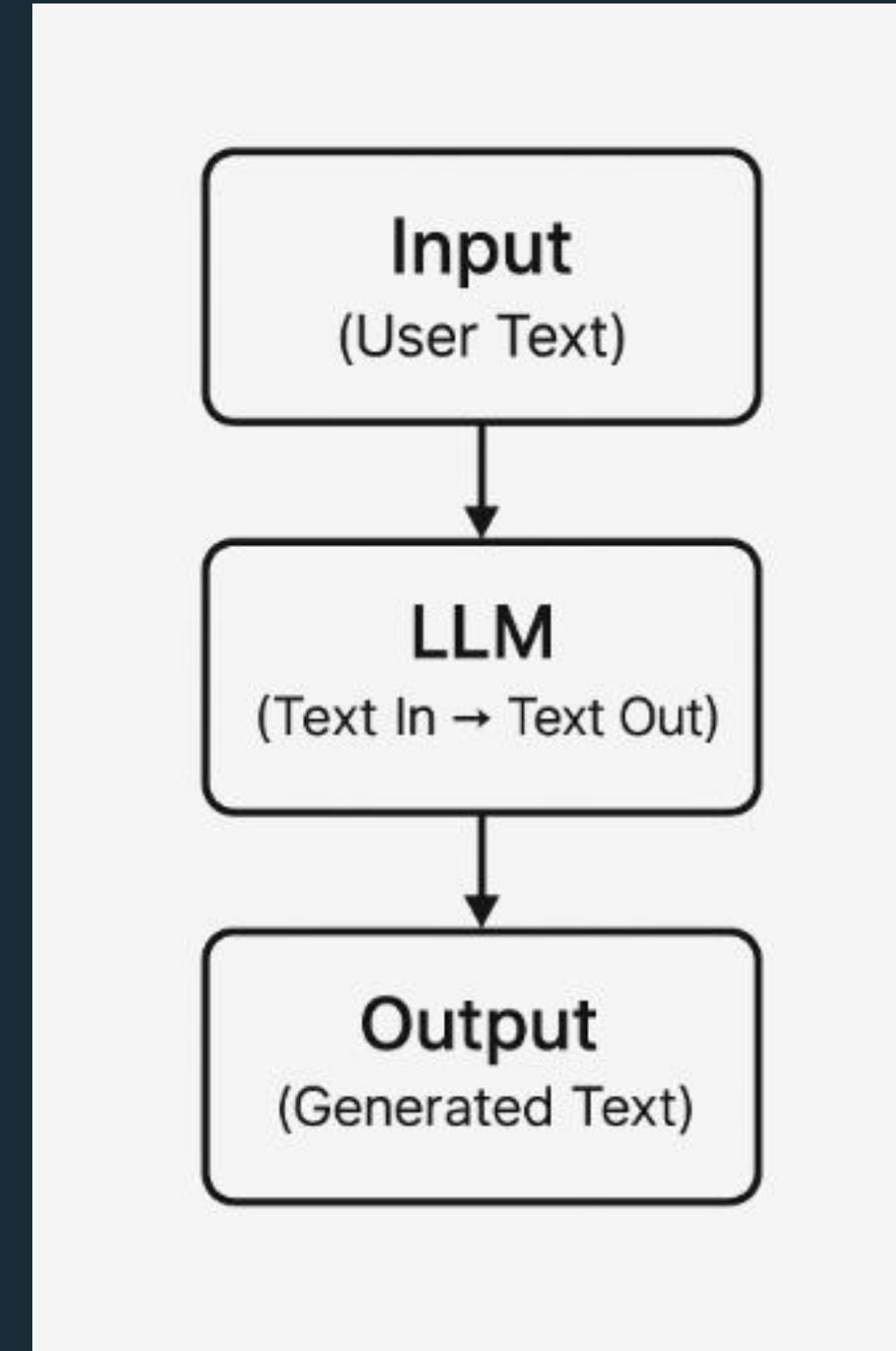
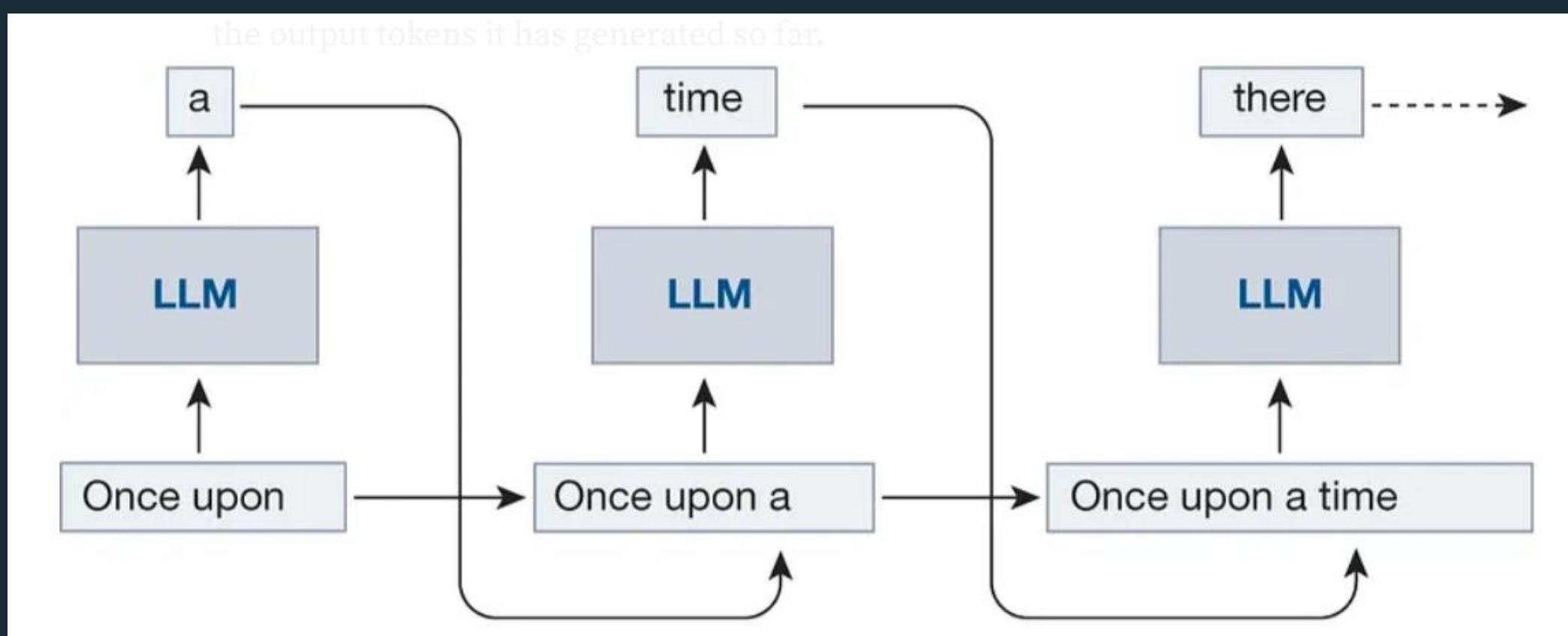


The History That Led to MCP

Early LLM Capabilities

From Static Models to Interactive AI

1. LLMs are enormous neural networks (probabilistic model) that predict the next token/word
2. LLMs were originally "text-in, text-out"
3. No way to access live data
4. No awareness of external systems
5. No way to take actions



Fine-Tuning

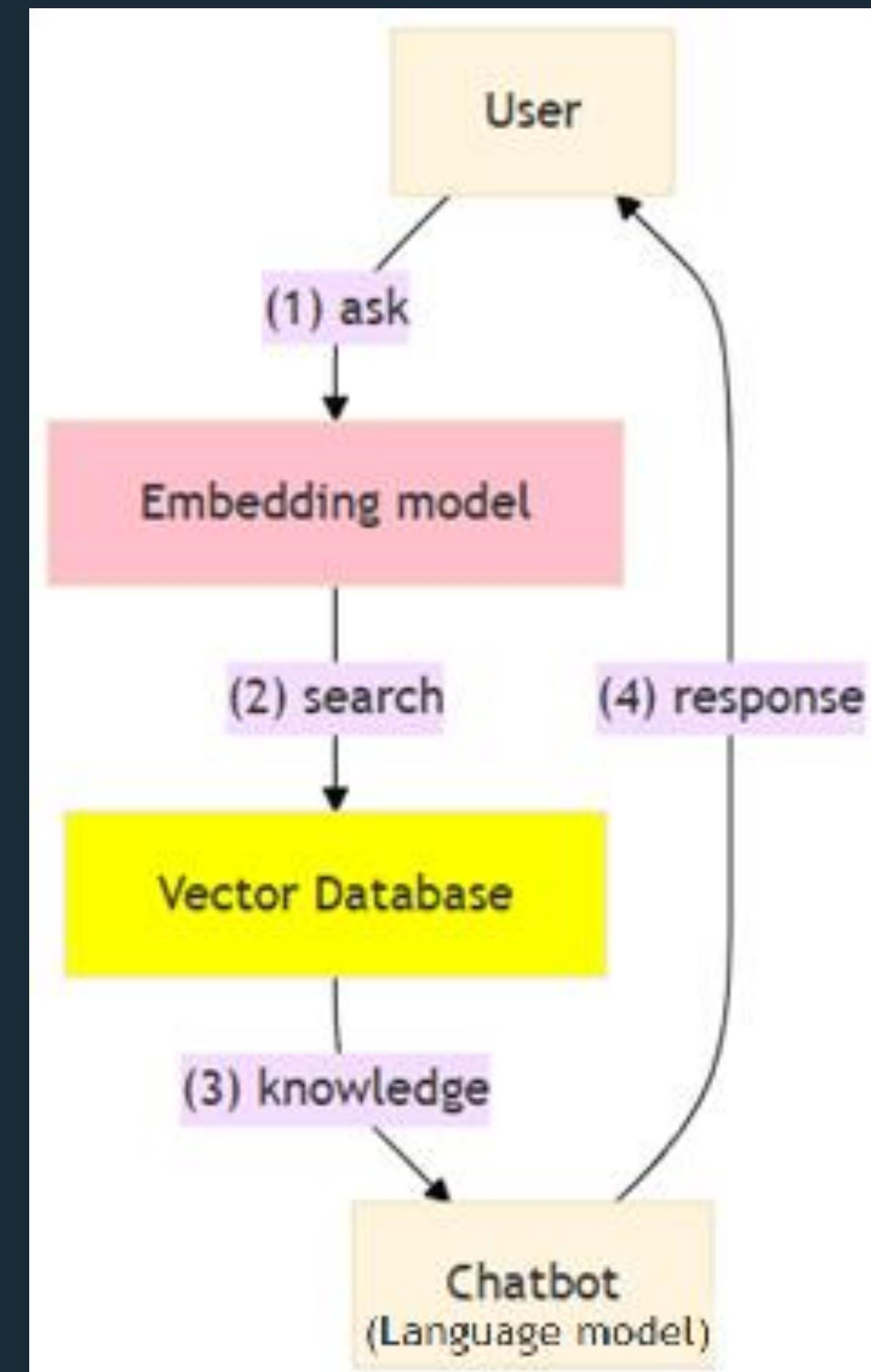
Trains the pre-trained LLM model with our specialized dataset: Helpful, but Limited

- 1. Customization via training**
- 2. Expensive, slow iteration**
- 3. Still no access to external systems**
- 4. Still no way to take actions**

RAG

Retrieval-Augmented Generation: Giving LLMs Knowledge

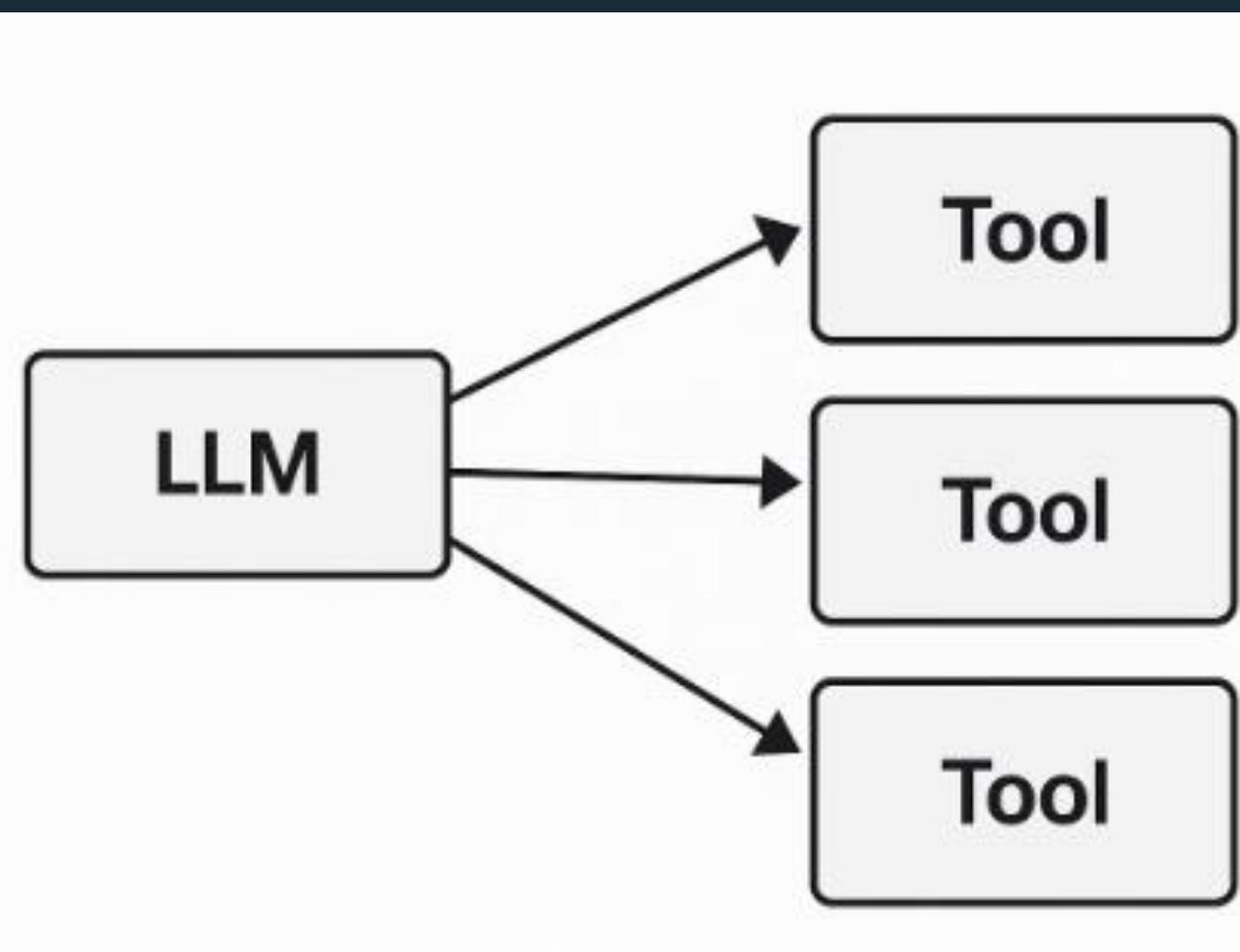
1. Adds knowledge beyond training
2. Still limited to passive retrieval
3. Read-only access
4. Still cannot act



Tool Use / Function Calling

LLMs Begin Taking Actions

1. LLMs call functions/tools via JSON schemas
2. Enabled real actions (APIs, DB calls, file ops)
3. But... every system defined tools differently
4. No standard, no permissions, no portability

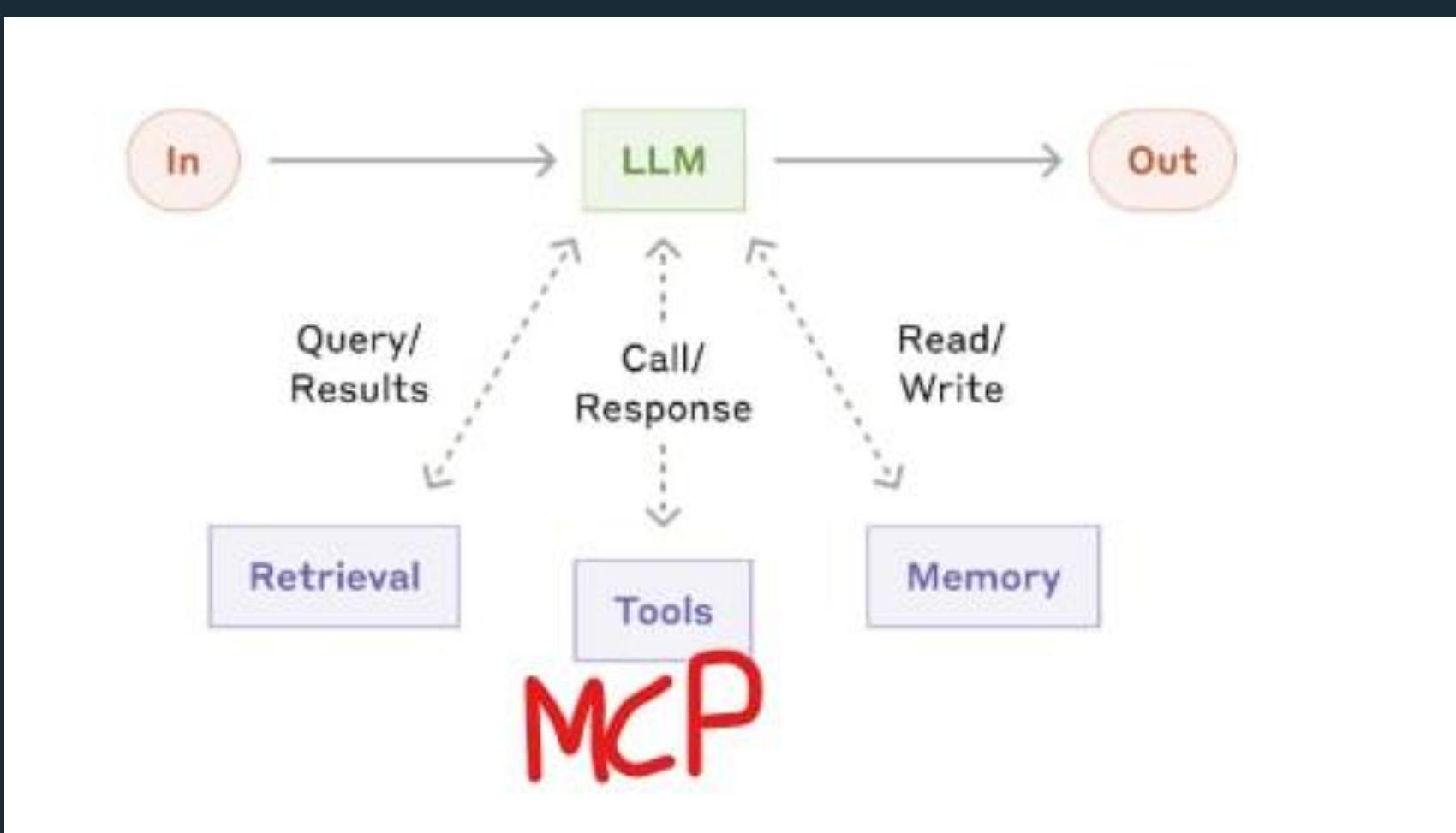


Agents

Reasoning + Tools

Systems where large language models (LLMs) dynamically direct their own processes and tool usage, maintaining control over how they accomplish tasks
<https://www.anthropic.com/engineering/building-effective-agents>

- 1. Multi-step decision-making**
- 2. Chains of tool calls**
- 3. Increased power = increased integration chaos**
- 4. Every tool → custom integration (tools lacked standards)**



The Problem

The Integration Mess

- 1. No shared protocol for tools**
- 2. No standard permissions**
- 3. Hard to build, hard to secure**
- 4. Hard to reuse tools across platforms**

02 Why MCP

Why MCP Exists

Model Context Protocol: A Standard for Agent–Tool Interaction

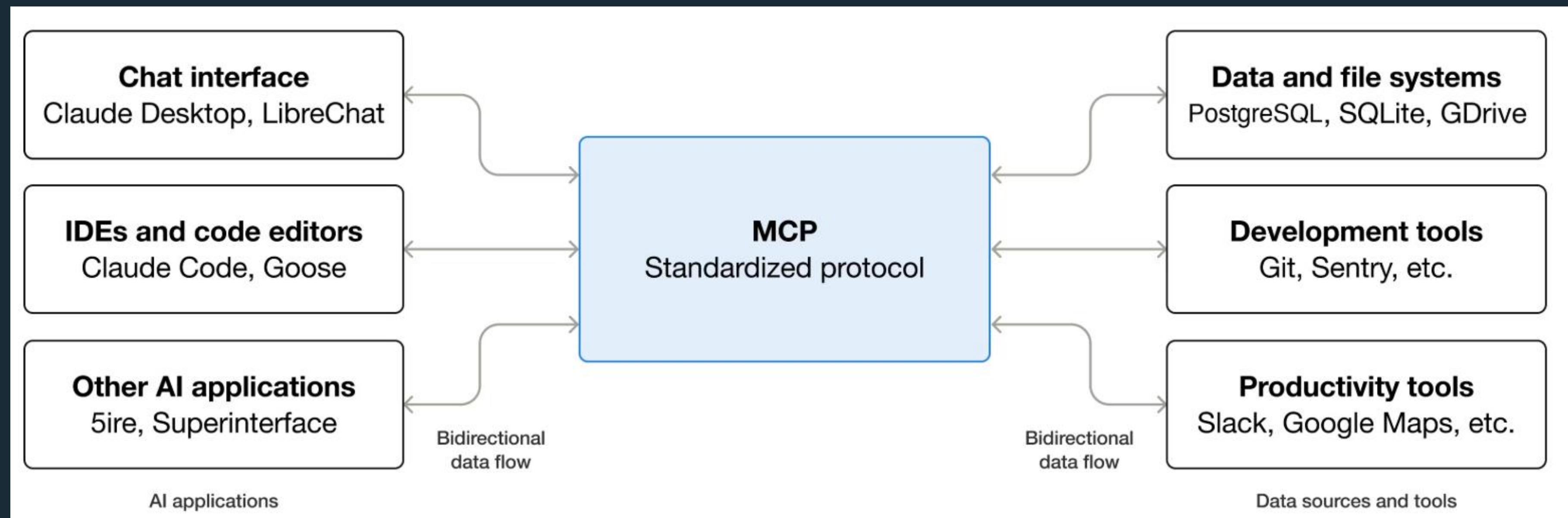
Created by Anthropic: <https://www.anthropic.com/news/model-context-protocol>

- 1. Uniform protocol for tools**
- 2. Strong permission + security model**
- 3. Works locally or remotely**
- 4. Clear access control**
- 5. Designed for LLMs and agents**
- 6. Portable integrations (one server, many clients)**

MCP Architecture

The MCP Model

1. Servers expose tools, resources, prompts
2. Clients (LLMs/Agents) interact over a shared protocol



MCP in Practice

How MCP Changes Development

- 1. Build once → use across platforms**
- 2. Safe control of system resources**
- 3. Makes apps "AI-ready"**

03  Demo

Demo 1

Using an Existing Node.js MCP Server

- 1. Walkthrough Clude Desktop**
- 2. MCP Server config JSON file**
- 3. Import AirBnb MCP server**
 - All available MCP servers: <https://github.com/modelcontextprotocol/servers>
 - AirBnb MCP server: <https://github.com/openbnb-org/mcp-server-airbnb>

Demo 2

Create a simple .NET MCP server that shows the local machine time

- 1. Code walkthrough**
- 2. Install Microsoft.Extensions.AI.Templates template : <https://learn.microsoft.com/en-us/dotnet/ai/quickstarts/build-mcp-server>**
- 3. Show the template in the Visual Studio**
- 4. MCP Server config JSON file – dotnet command**
- 5. Import LocalTime MCP server**

Demo 3

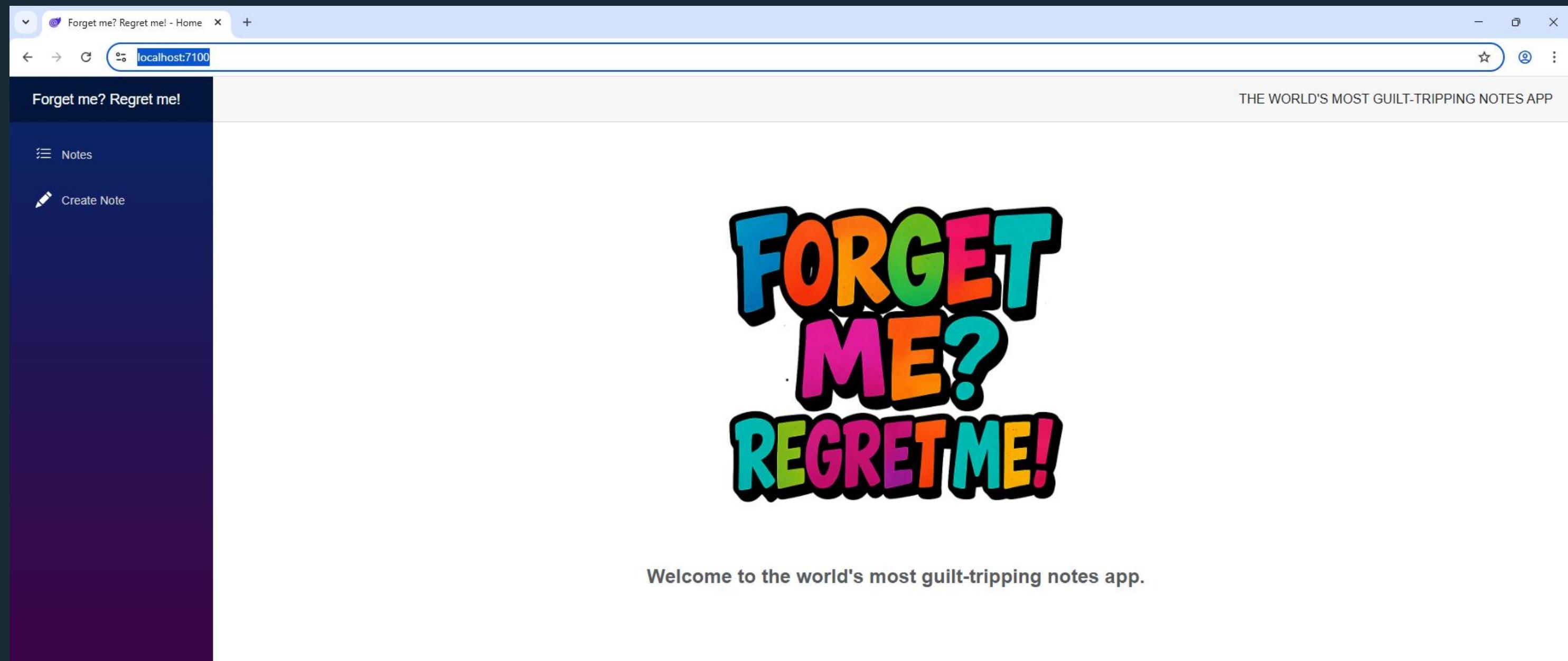
Create a simple .NET MCP server that manipulates the files on the local machine time

- 1. Code walkthrough**
- 2. Import LocalFile MCP server**

Demo 4

Create a .NET MCP server that uses our application

1. Application walkthrough
2. Code walkthrough
3. Import LocalFile MCP server
4. Import one more MCP server and see how these 2 are working together



Resources

1. Official MCP documentation: <https://modelcontextprotocol.io/docs/getting-started/intro>
2. MCP Implementation: <https://github.com/modelcontextprotocol>
3. MCP Servers: <https://github.com/modelcontextprotocol/servers> or <https://mcp.so/servers>
4. MCP Clients: <https://modelcontextprotocol.io/clients> or <https://mcp.so/clients>
5. MCP Csharp SDK: <https://github.com/modelcontextprotocol/csharp-sdk>
6. Microsoft MCP for beginners: <https://github.com/microsoft/mcp-for-beginners>

Thank you!