



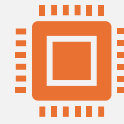
Intro to Model Context Protocol(MCP) in .Net

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Introduction



Technical Architect @ Harman, A
Samsung Company



Area of Expertise : Building Cloud
Native applications



Area of Interest : AI/ML, LLMs, SDV



Location: Bangalore, India



Agenda



What is Model Context Protocol(MCP) ?

Why do we need MCP?

Architecture of MCP?

How MCP works ?

Building MCP server in C#

What is Model Context Protocol (MCP) ?



A protocol defined by Anthropic
in Nov 2024



MCP is a standard protocol for
connecting applications to Large
Language Models (LLMs).

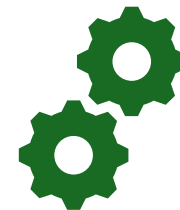


Think of it as a universal
connector for AI applications.

Why MCP ?



Standardization: Provides a consistent way to connect AI models to data sources.



Integration: Enhances LLM capabilities by integrating with various tools and data.



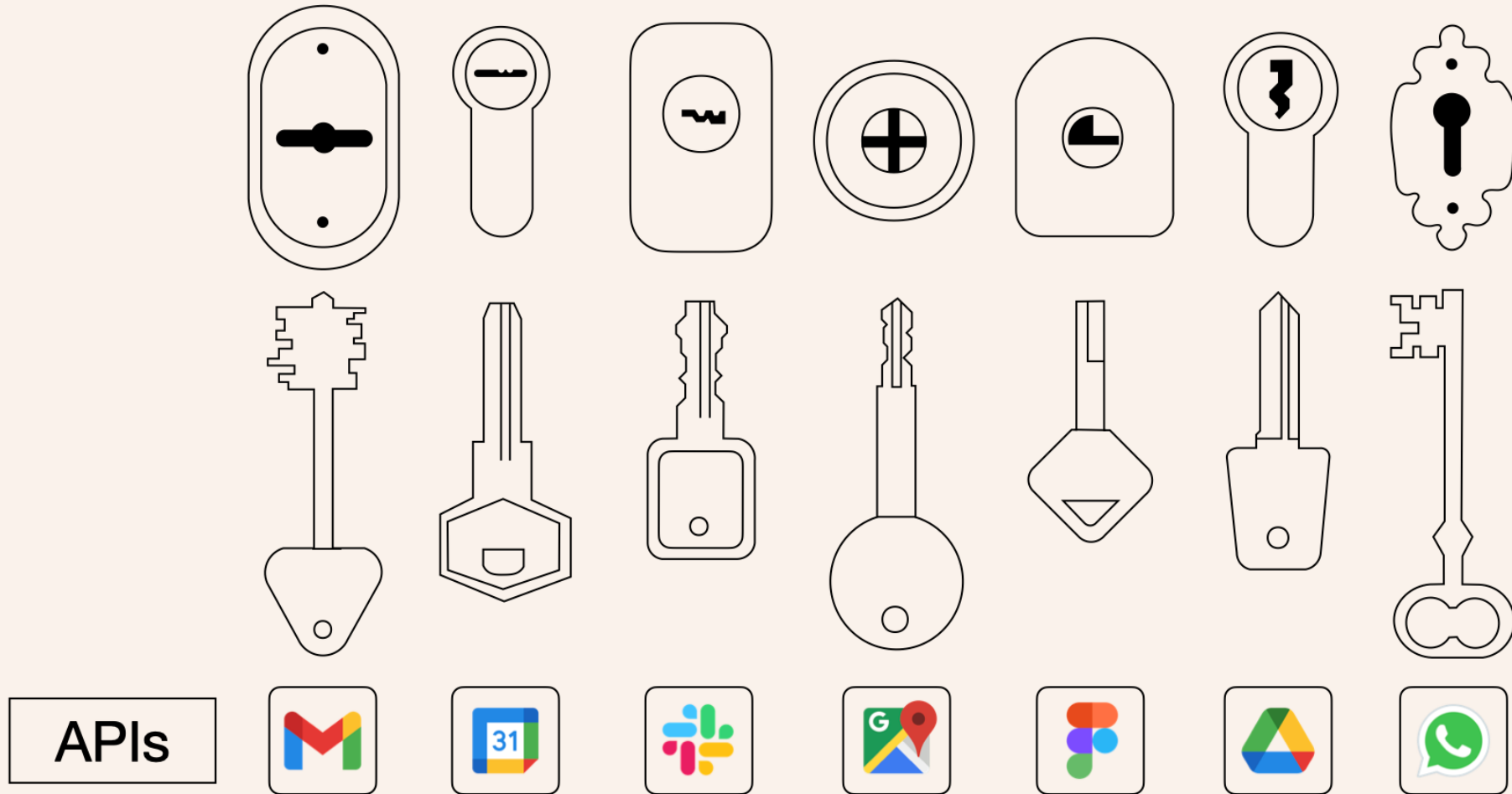
Flexibility: Allows switching between different LLM providers.



Security: Ensures secure data handling.

APIs: Every tool needs its own key

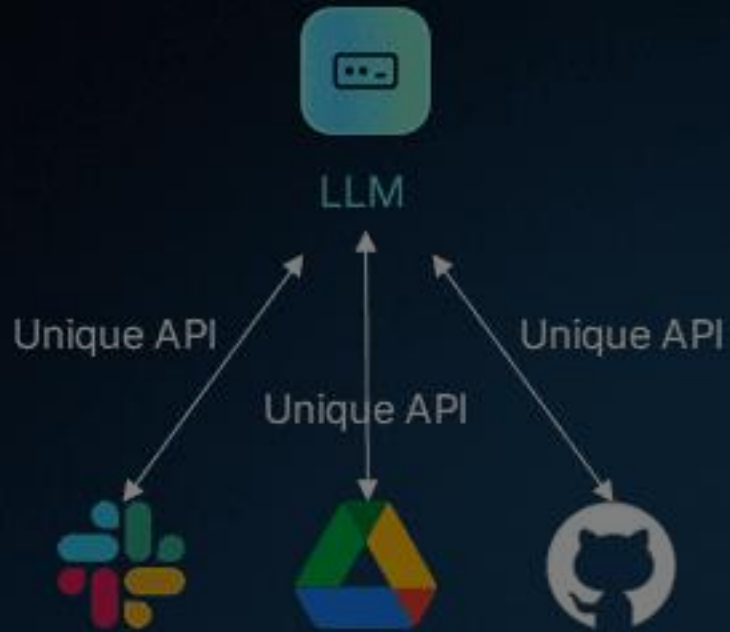
Traditional APIs require different authentication and integration for each service,
like needing different keys for different locks



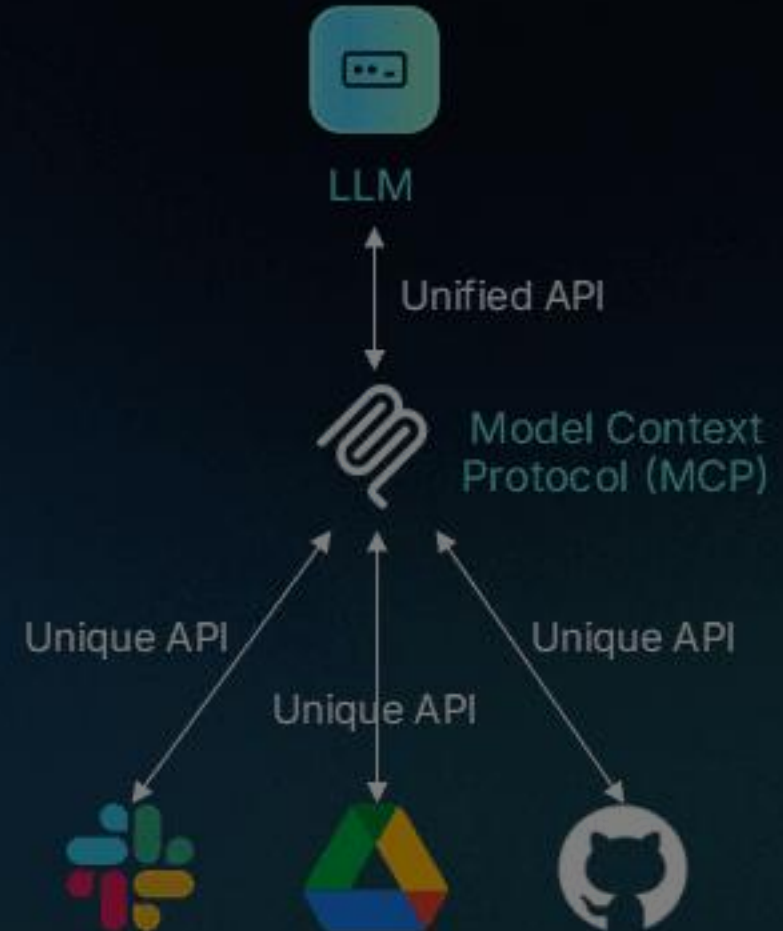
Why MCP ?

descope

Before MCP



After MCP

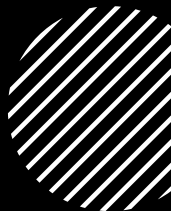


Source: <https://www.descope.com/learn/post/mcp>



MCP Architecture

(Client-
Server)



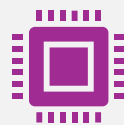
MCP Hosts: Programs that want to access data through MCP.



MCP Clients: Maintain connections with servers.

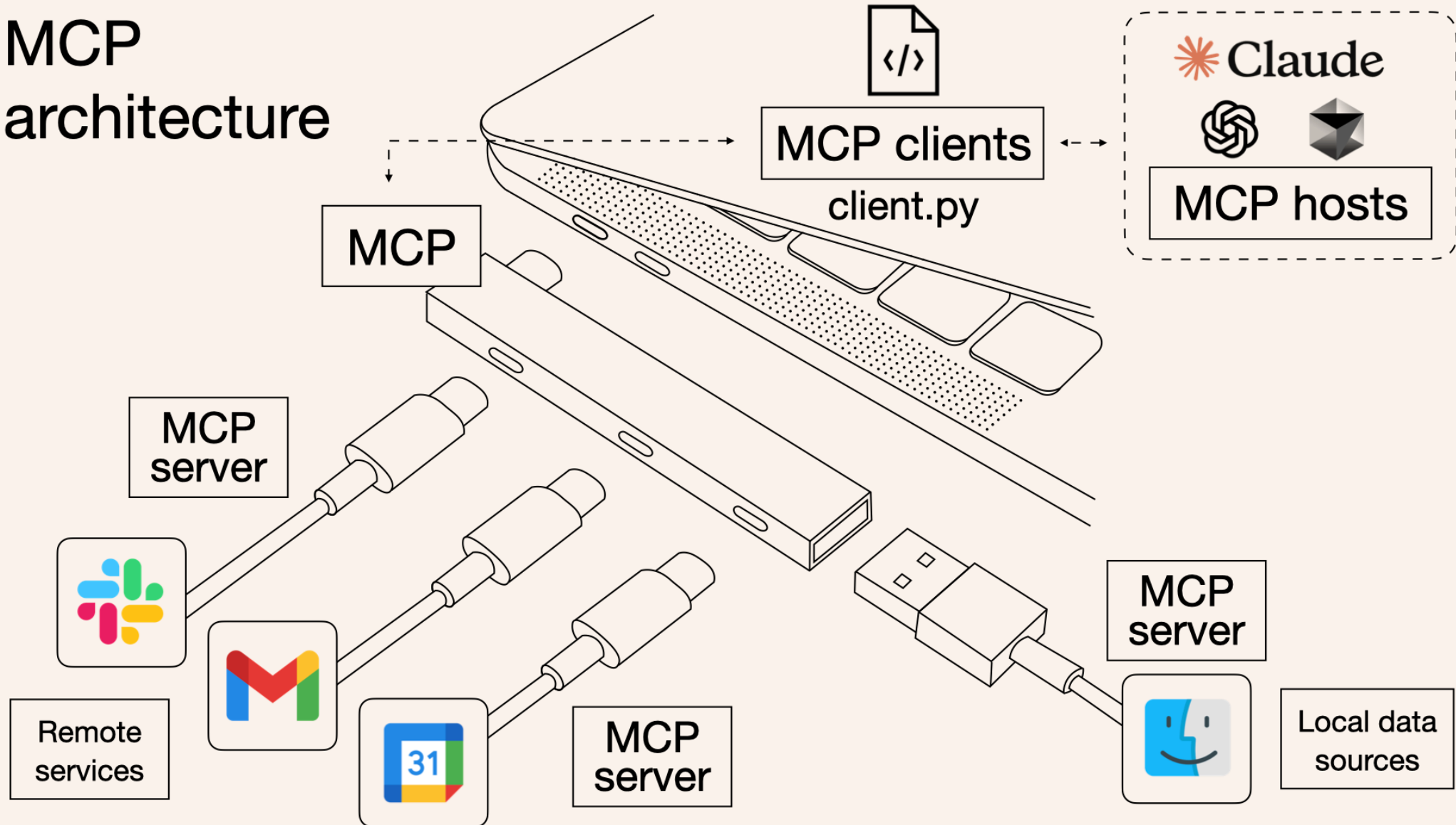


MCP Servers: Expose specific capabilities through MCP.



Transport Layer: STDIO and HTTP + SSE(Server-Side Events)

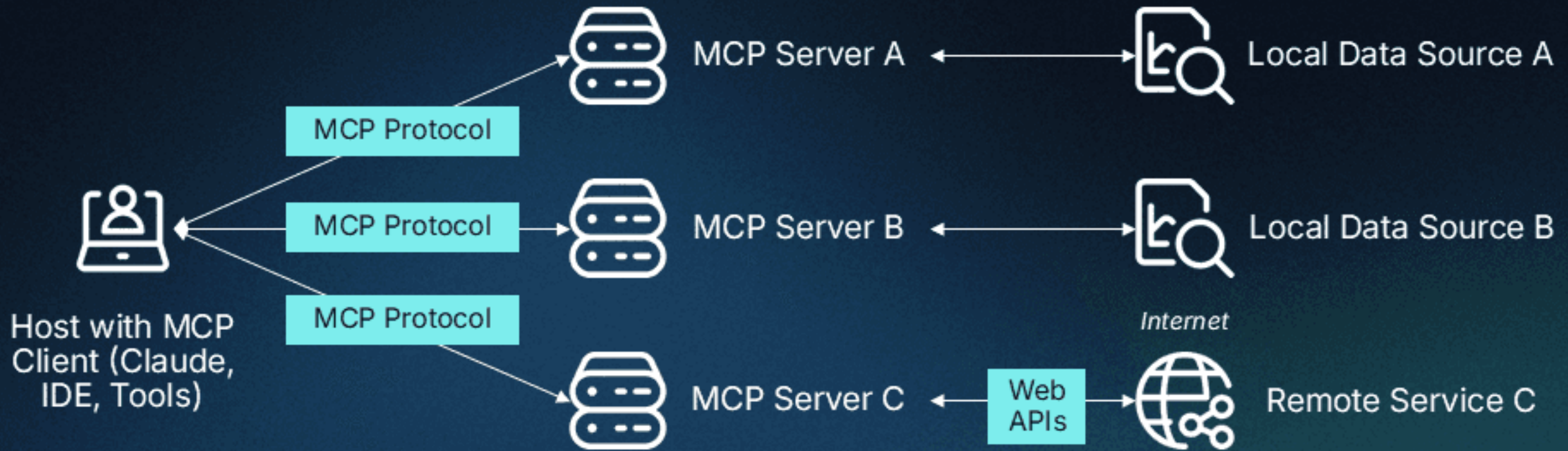
MCP architecture



Source: <https://norahsakal.com/blog/mcp-vs-api-model-context-protocol-explained/>

MCP Architecture

descope



Source: <https://www.descope.com/learn/post/mcp>

How MCP works ?



Host requests data.

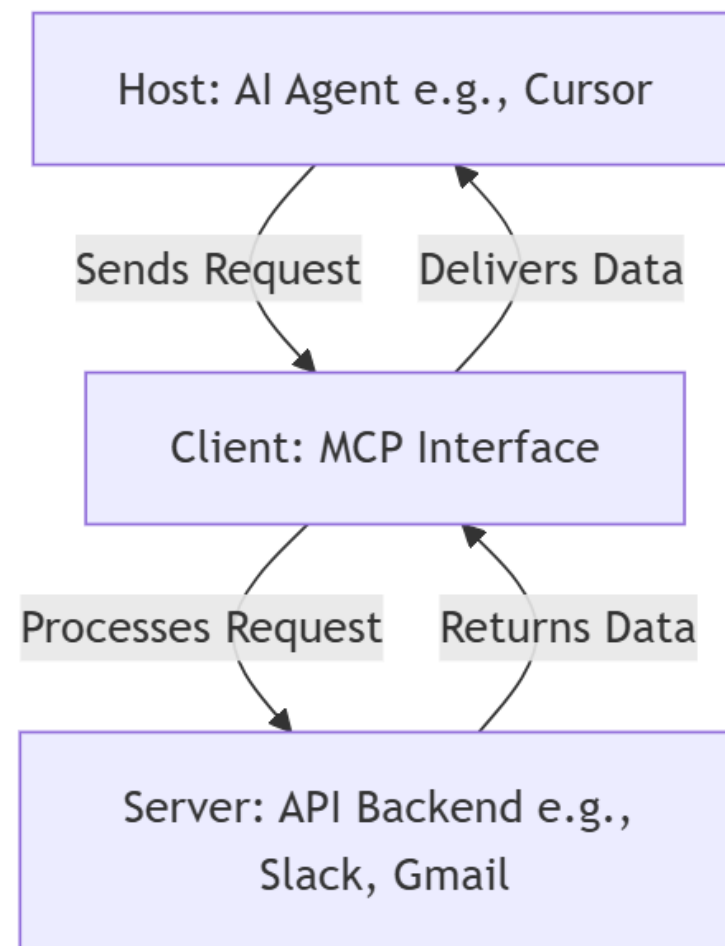


Client connects to the server.



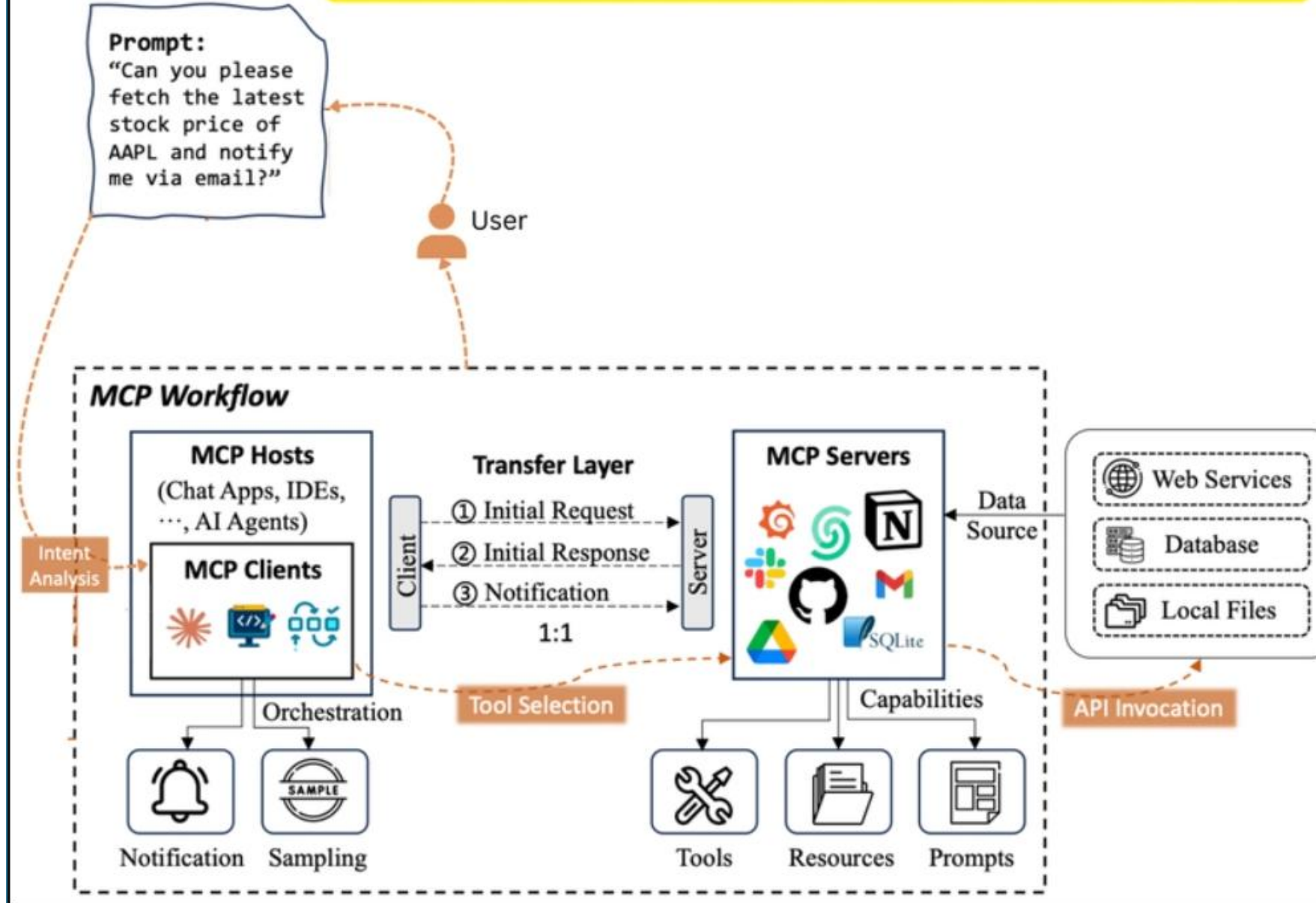
Server provides the requested data.

How MCP works ?



Source: <https://ssojet.com/blog/the-model-context-protocol-mcp-explained-a-game-changer-for-ai-and-startups/>

The Workflow of Model Context Protocol (MCP)



Distribution

```
    message =  
    if not hasattr(self, '_headers_buffer'):  
        self._headers_buffer = []  
    self._headers_buffer.append("%s %s %s\r\n" %  
                                (self.protocol_version, code, message))  
    ('latin-1', 'strict'))  
  
    def _header(self, keyword, value):  
        """Send a MIME header to the headers buffer."""  
        self.request_version = 'HTTP/0.9'  
        if not hasattr(self, '_headers_buffer'):  
            self._headers_buffer = []  
        self._headers_buffer.append(  
            ("%s: %s\r\n" % (keyword, value)).encode('latin-1'))  
  
    keyword.lower() == 'connection':  
    if value.lower() == 'close':  
        self.close_connection = True  
    elif value.lower() == 'keep-alive':  
        self.close_connection = False
```

Source Code Package



Docker

MCP Server – Time Source Code - Packages

- Microsoft.Extensions.Hosting
- ModelContextProtocol

```
using Microsoft.Extensions.Hosting;  
using ModelContextProtocol.Server;
```


MCP Server – Time Source Code - Server

```
6  Console.WriteLine("Starting MCP .Net BLR server...");
7
8  var builder = Host.CreateApplicationBuilder(args);
9  builder.Services
10     .AddMcpServer()
11     .WithStdioServerTransport()
12     .WithToolsFromAssembly();
13
14  await builder.Build().RunAsync();
15
16  Console.WriteLine("MCP .Net BLR server stopped.");
17
```


MCP Server – Time Source Code - Tool

```
19  [McpServerToolType]
    0 references
20  public class TimeTool
21  {
22      [McpServerTool, Description("Get the current time")]
        0 references
23      public string GetCurrentTime()
24      {
25          return DateTime.UtcNow.ToString("o");
26      }
27  }
```



Demo



References




<https://arxiv.org/pdf/2503.23278>

<https://github.com/modelcontextprotocol/csharp-sdk>

<https://devblogs.microsoft.com/dotnet/build-a-model-context-protocol-mcp-server-in-csharp/>

<https://laurentkempe.com/2025/03/22/model-context-protocol-made-easy-building-an-mcp-server-in-csharp/>



Thank you –
Q & A



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<https://github.com/praveenraghuvanshi>



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https://t.me/joinchat/lifUJQ_PuYT757Turx-nLg