



Model Context Protocol (MCP)

Everything you need to know about connecting your
data services to LLM Agents



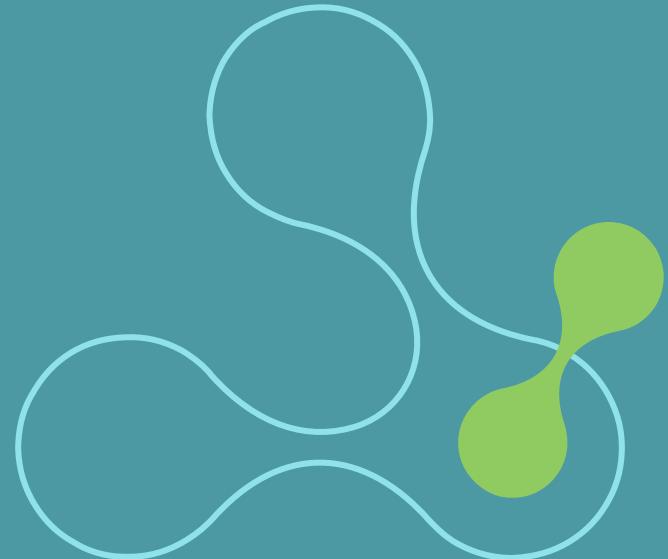
Agenda

- 1 **Background: AI & Agents**
- 2 **MCP Overview & Benefits**
- 3 **What to Know:** Data Services, Infra APIs, Agent SDks.
- 4 **Resources and Q&A**



Background Context

Agents & Architecture
Challenges



What is an Agent?

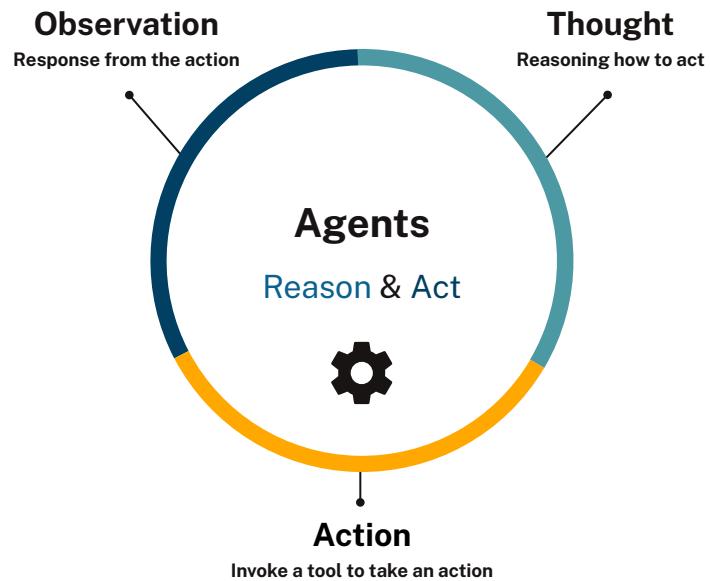


Agents are applications that use generative AI models to think and act towards goals

Automates **complex** enterprise workflows

Uses **reasoning** and planning to determine the steps

Utilizes **tools** to access data and take actions such as querying databases or calling APIs





The journey to Agents

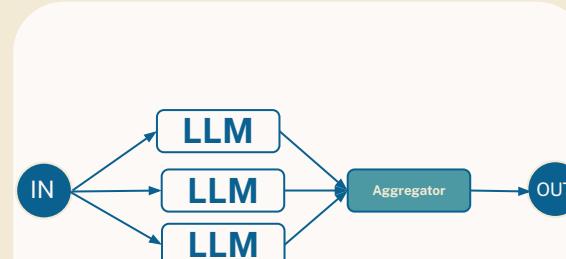
Single-LLM Features

Summarisation, simple (linear) Q&A, Extraction, Classification



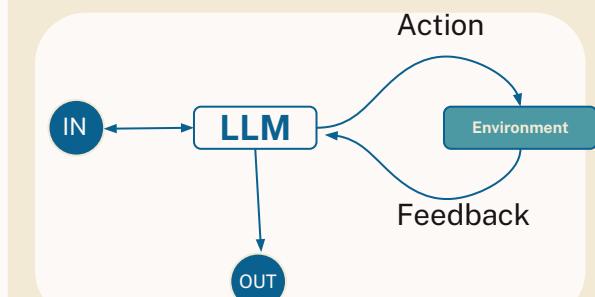
Workflows

LLMs orchestrated by code

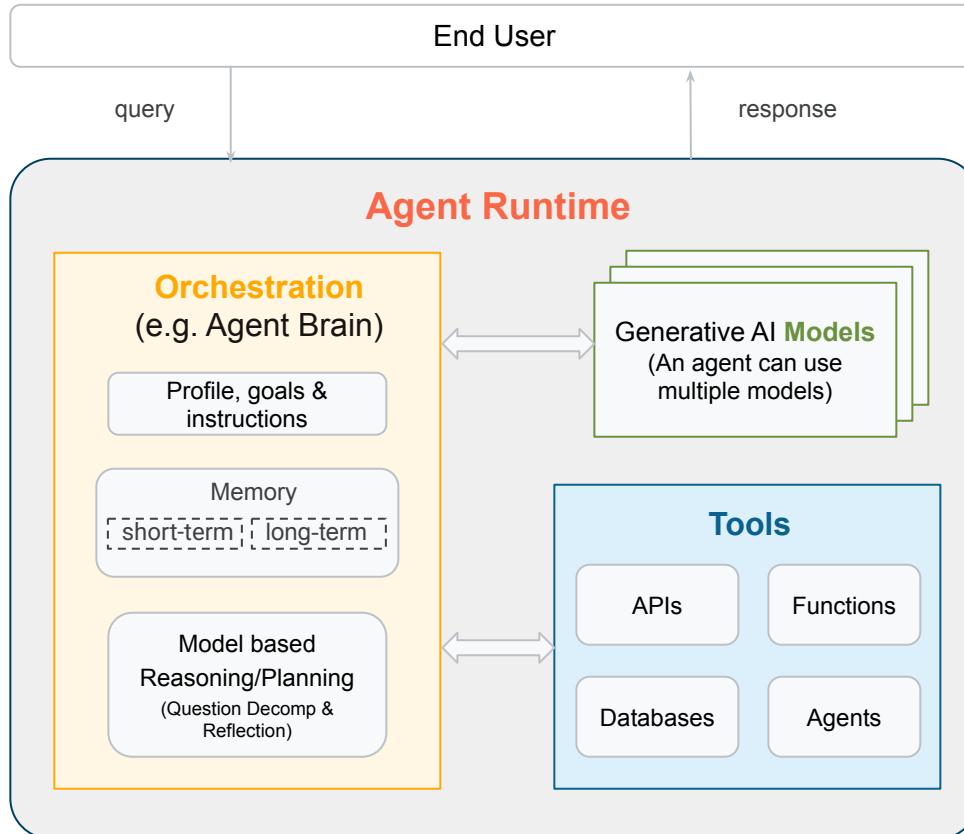


Agents

LLMs deciding their own trajectories



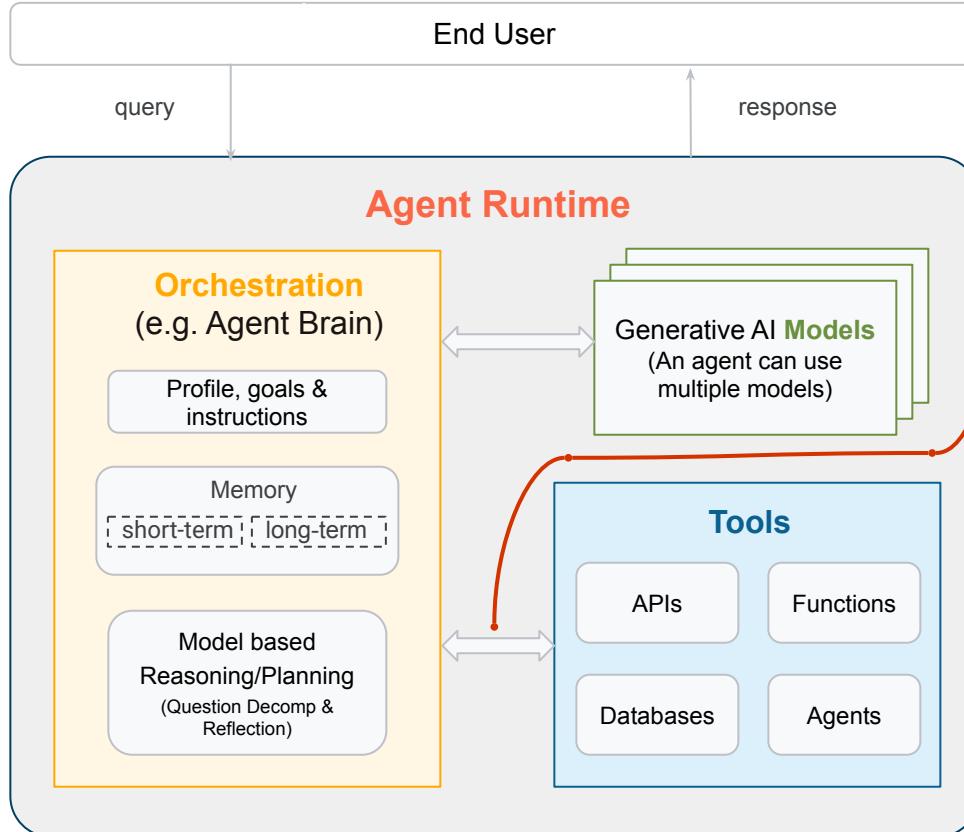
AI Agents plan, reason, and execute tasks for users



Four Key Components

- **Model:** Used to reason over goals, determine the plan and generate a response
- **Tools:** Fetch data, perform actions or transactions by calling other APIs or services
- **Orchestration:** Maintain memory and state (including the approach used to plan), tools, data provided/fetched, etc
- **Runtime:** Execute the system when invoked

Challenges with Agents



Lack of standards and monolithic architecture:

1. **Complex many-to-many vendor integrations** for APIs, servers, and client tools
2. **Poor tool re-usability & inability to scale tool offerings**
3. **Lower quality agents** as it is difficult to connect agents to the right tools quickly.



Solution....



Model Context Protocol

An open protocol that standardizes how applications provide context to LLMs.

Like a USB-C port for
AI applications



Standardized how to
connect AI to data
sources and tools

modelcontextprotocol.io



Broad Adoption

ANTHROP\c

Introducing the Model Context Protocol

25 Nov 2024 • 3 min read



Sundar Pichai
@sundarpichai

love the feedback! - to MCP it is!



Sundar Pichai @sundarpichai · Mar 31

To MCP or not to MCP, that's the question. Lmk in comments



Amazon Q Developer CLI now supports Model Context Protocol (MCP)

Posted on: Apr 29, 2025

Today, Amazon Q Developer announced support for Model Context Protocol (MCP) in Amazon Q Developer Command Line Interface (CLI), enabling developers to leverage tools and prompts to support richer contextual, development workflows. MCP is an open protocol that standardizes how AI models can, in a secure and structured way, access external tools, data sources, and APIs.



Sam Altman
@sama



people love MCP and we are excited to add support across our products.

available today in the agents SDK and support for chatgpt desktop app + responses api coming soon!

7:02 PM · Mar 26, 2025 · 1.8M Views



Windows Developer
@windowsdev

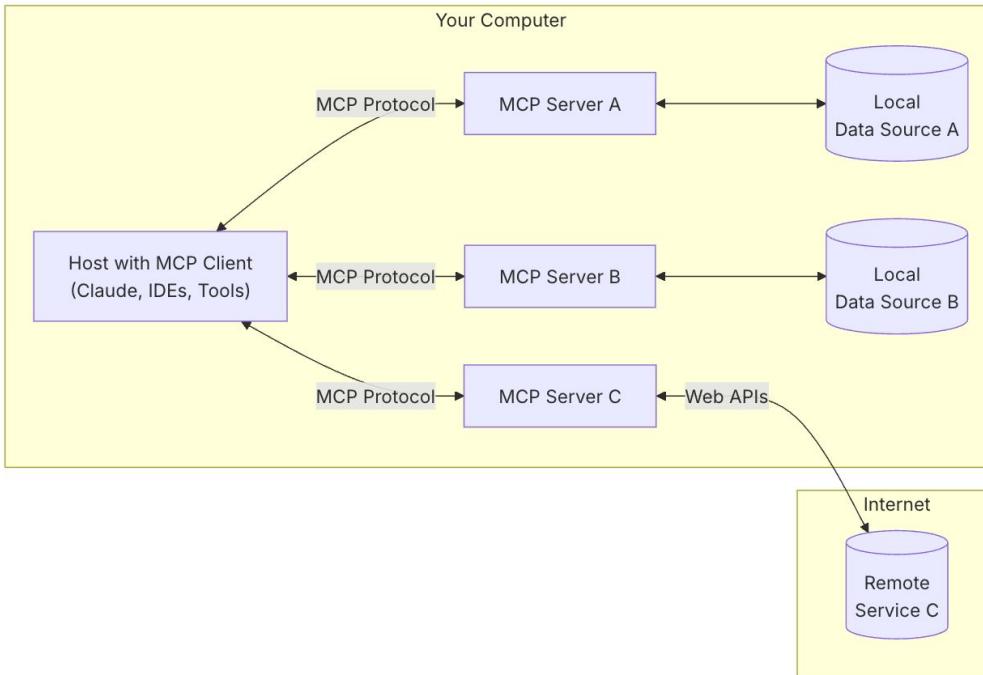
Introducing MCP on Windows! msft.it/6016SjShg



MCP Solves Agent Challenges

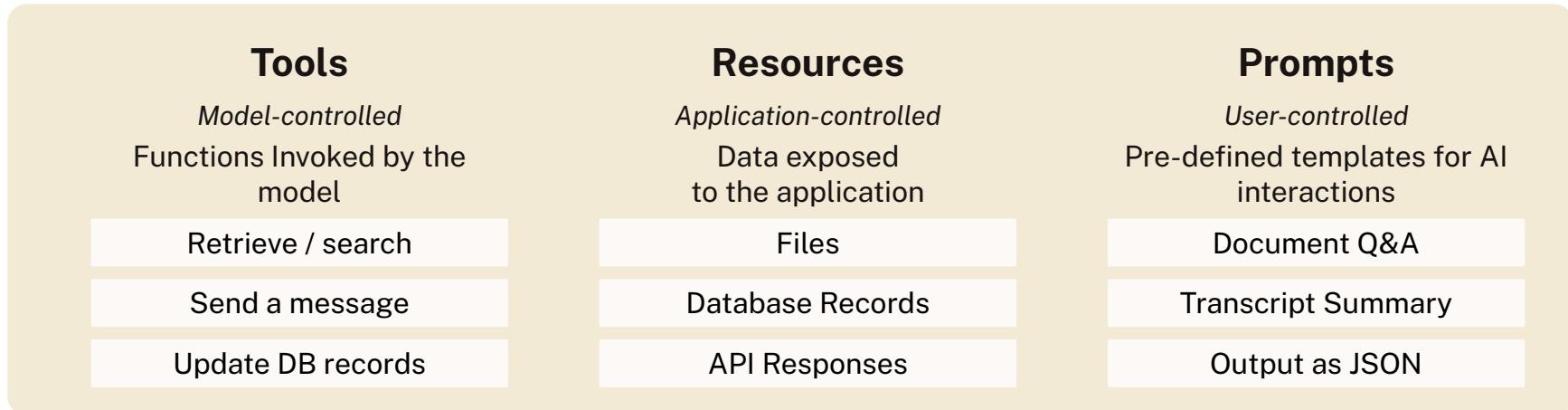
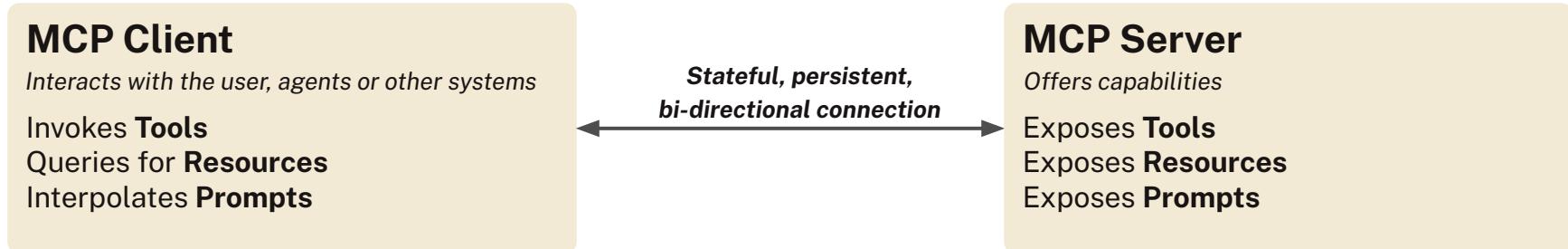


MCP follows a client-server architecture where a host application can connect to multiple servers



1. **Composable & Modular:** Combine reusable, independent components. Federated on the client-side.
2. **Shareable & Reusable:** Discover, share, and reuse components via registries and marketplaces.
3. **Secure & Isolated:** Each component accesses only necessary context, ensuring privacy and safety. Full security surface is still in development
4. **Rapid Innovation & Dev Uptake:** Low barrier to entry. Easily swap or add modules to prototype and scale faster. Fuels ecosystem growth and collaboration

MCP Architecture



MCP Hosts

Most MCP Hosts are Developer Tools

VS Code, Cursor, Windsurf, Cline

But also end-user facing AI Assistants: Claude, ChatGPT, Amazon Q, AgentSpace, CoPilot

And in APIs Anthropic + OpenAI

In the future we will see many more MCP Hosts as part of Agentic Applications

MCP Servers

+ Add new MCP server

Manage your MCP server connections.

Neo4j Aura Cloud Service stdio

Tools:

list_instances get_instance_details get_instance_by_name create_instance update_instance_name
update_instance_memory update_instance_vector_optimization pause_instance resume_instance
list_tenants get_tenant_details delete_instance

Command:

```
uvx mcp-neo4j-aura-manager --client-id "qj [REDACTED] H" --client-secret "h..."
```

Available MCP Tools

Claude can use tools provided by specialized servers using Model Context Protocol. [Learn more about MCP](#).

get-neo4j-schema

List all node types, their attributes and their relationships TO other node-types in the neo4j database

From server: movies-neo4j

read-neo4j-cypher

Execute a Cypher query on the neo4j database

From server: movies-neo4j

write-neo4j-cypher

Execute a write Cypher query on the neo4j database

From server: movies-neo4j

GitHub Copilot

Ran list_instances

Here is the list of your Neo4j Aura instances:

1. Bedrock Demo (AWS) - Created on 7th November 2023
2. Instance01 (GCP) - Created on 17th March 2025
3. KG Builder Multidb (GCP) - Created on 7th March 2025
4. GS Munich (GCP) - Created on 31st March 2025
5. Neo5j (GCP) - Created on 7th July 2022
6. GraphSummit (GCP) - Created on 13th March 2025
7. Instance04 (GCP) - Created on 28th February 2025
8. Instance03 (GCP) - Created on 12th March 2024
9. Instance02 (GCP) - Created on 4th March 2024
10. c360 (GCP) - Created on 1st December 2024
11. SudsPro (GCP) - Created on 1st August 2024

Let me know if you need further details about any specific instance!

jexp

Get the movie schema and find out which Action movies are rated higher than 9 on imdb

GitHub Copilot

Ran get-neo4j-schema

Ran read-neo4j-cypher

The Action movie rated higher than 9 on IMDb is "Band of Brothers" with a rating of 9.6. Let me further details!

CoPilot Studio

Company Research Ag... Overview Knowledge Topics Actions Activity Analytics

Activity map

Session started

MCP Server Actions ExternalAgent Description MCP Server Actions

MCP Server Actions ExternalAgent

MCP Server Actions ExternalAgent Session complete

Test your agent

Give me 3 industries

Here are three industries:

1. Electronic Products Manufacturers
2. Enterprise Software Companies
3. Computer Hardware Companies

A minute ago

Find me 2 popular companies in the Computer Hardware Companies

A minute ago

Here are two popular companies in the Computer Hardware industry:

1. Microsoft Corporation
 - Summary: American multinational technology corporation
 - Company ID: EsfKKn.ZNLSwsvdQW
 - QnA
2. Apple
 - Summary: American multinational technology company
 - Company ID: EHbD_0NEcdWwyYBb083t
 - aTlw

A minute ago

Cool, for Microsoft who works there?

Ask a question or describe what you need

Make sure AI-generated content is accurate and appropriate before using. [See terms](#)

MCP Registries & Marketplaces

- [MCP Servers GitHub](#)
- [Smithery \(5565\)](#)
- [Glama.ai \(4383\)](#)
- [mcp.so \(12231\)](#)
- [Cursor Directory \(170\)](#)
- [OpenTools \(170\)](#)
- [mcp.run \(114 MCPs\)](#)
- [Docker MCP Catalog](#)
- [Pipedream \(2700\)](#)
- More coming from...

The MCP Registry is a central hub for Model Context Protocol (MCP) servers and clients. It features a search bar at the top right and a navigation menu with links to Blog and Docs. A "Request Access" button is also present. The main section is titled "The MCP Registry" with a large green "Registry" subtitle. Below this, there are several cards showcasing different MCP-related projects:

- modelcontextprotocol/servers**: This repository is a collection of reference implementations for the Model Context Protocol (MCP). It has 4,274 stars.
- MCP Market**: Explore our curated collection of MCP servers to connect AI to your favorite tools. It has 12,454 stars.
- MCP.so**: Find Awesome MCP Servers and Clients. It has 7,682 stars.
- Smithery**: Extend your agent with 4,274 capabilities via Model Context Protocol servers. It has 4274 stars.
- Pulse MCP**: Browse and discover MCP use cases, servers, clients, and news. It has 3,653 stars.
- Glama MCP Server**: Production-ready and experimental MCP servers that extend AI capabilities. It has 3,457 stars.
- Cursor MCP Registry**: Browse MCPs or post a MCP to reach 250,000+ monthly active developers. It has 1,800+ stars.
- Awesome MCP servers**: A curated list of awesome Model Context Protocol (MCP) servers. It has 370 stars.
- MCP Servers**: A collection of servers for the Model Context Protocol. It has 212 stars.

On the right side, there is a sidebar titled "Find Awesome MCP Servers and Clients" which lists various MCP servers and clients, each with a star rating and a brief description. Examples include BlenderMCP, Perplexity Ask..., Figma coding, MCP Server Flomo, MCP Server..., Browserbase M..., and Cloudflare.

At the bottom of the page, there is a GitHub repository card for `mcp/neo4j-server`. It shows 126 stars, 2 pull requests, and was updated 8 days ago. The last commit was on April 21 to April 27. A "Learn more" link is also present.



MCP Servers and Integrations



Data Services

Provide context to AI



Infrastructure APIs

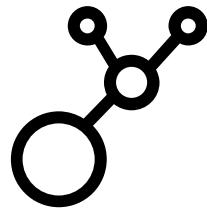
Control resources



Agent SDKs

Integrate MCP when building agents

Graph Database MCP Tools



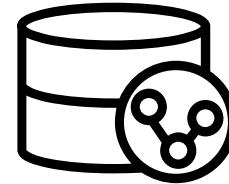
mcp-neo4j-cypher

natural language to
Cypher queries



mcp-neo4j-memory

knowledge graph
memory stored in
Neo4j



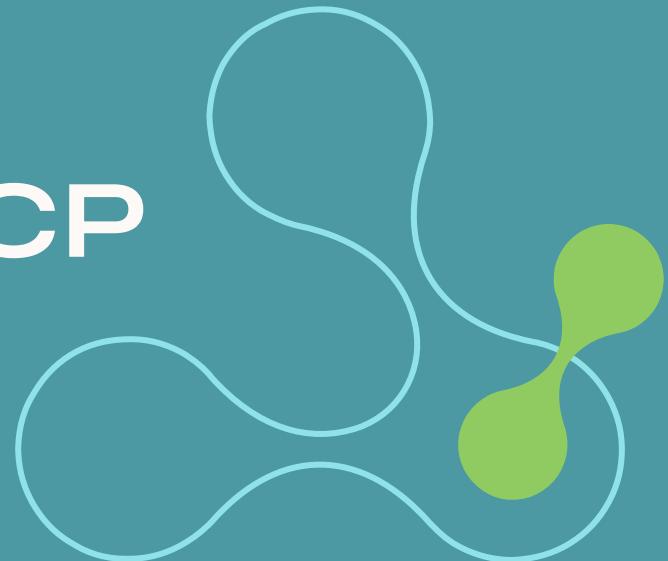
mcp-neo4j-cloud-aura-api

Neo4j Aura cloud service
management API



Data & Memory Services with MCP

Demo + Architecture





Configure MCP Server

Claude can receive information like prompts and attachments from specialized servers using Model Context Protocol. Learn more

General

Developer

neo4j-memory

neo4j-memory-cyp...

neo4j-aura

How can I help you today?

+ Search menu

Use style

Extended thinking

Web search

Drive search

Gmail search

Calendar search

N neo4j-aura 12 >

N neo4j-memory 10 >

N neo4j-memory-cypher 2 >

Claude Sonnet 4

Life stuff

neo4j-memory running

Command

UVX

Arguments

mcp-neo4j-memory@0.1.3

Advanced options

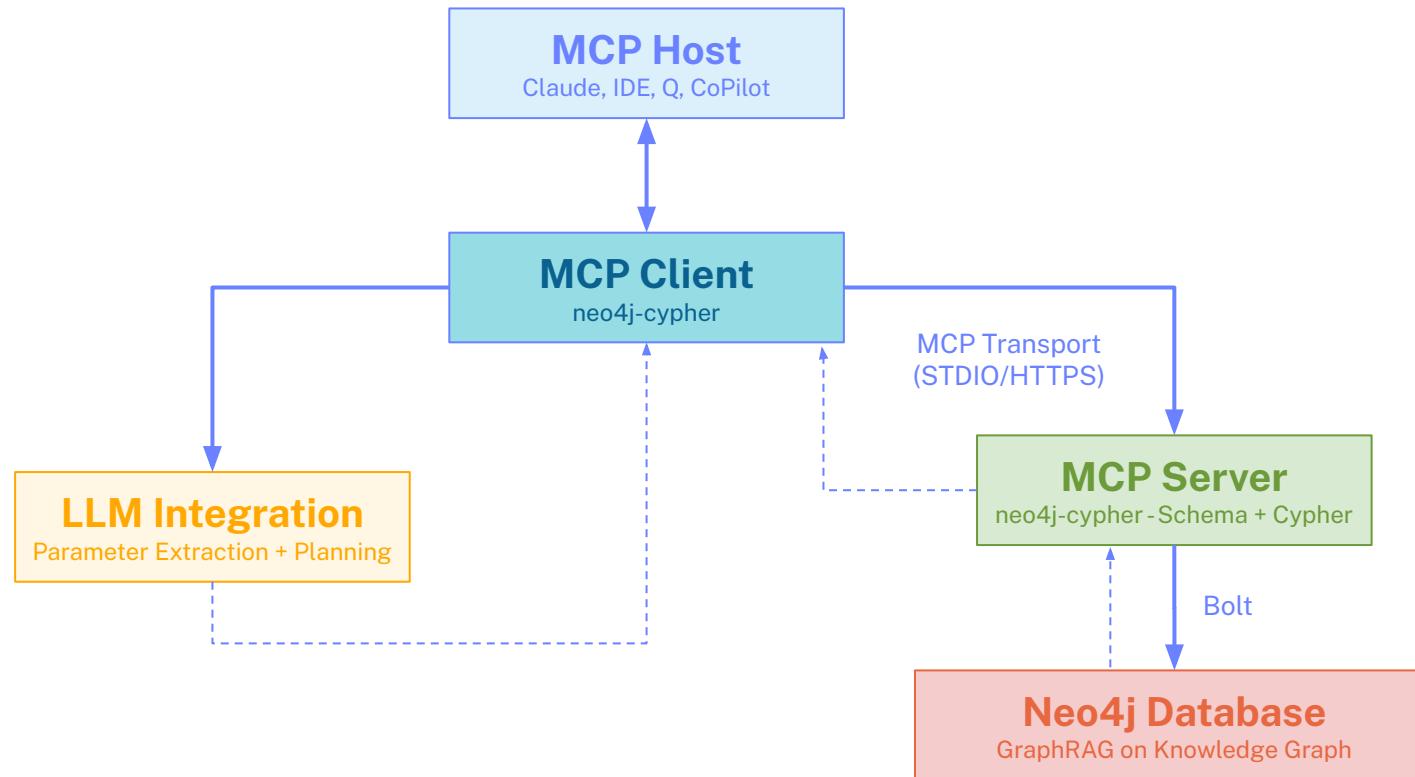
Environment variables

NEO4J_URL=neo4j+s://8b8061a1.databases.neo4j.io

NEO4J_USERNAME=neo4j

NEO4J_PASSWORD=xV5UQ0-

MCP Architecture - Data Services



FastMCP



```
main ▾ mcp-neo4j / servers / mcp-neo4j-cypher / src / mcp_neo4j_cypher / server.py ↑ Top

83     def create_mcp_server(neo4j_driver: AsyncDriver, database: str = "neo4j") -> FastMCP:
140         async def write_neo4j_cypher(
167
168             mcp.add_tool(get_neo4j_schema)
169             mcp.add_tool(read_neo4j_cypher)
170             mcp.add_tool(write_neo4j_cypher)
171
172         return mcp
173
174
175     def main(
176         db_url: str,
177         username: str,
178         password: str,
179         database: str,
180     ) -> None:
181         logger.info("Starting MCP neo4j Server")
182
183         neo4j_driver = AsyncGraphDatabase.driver(
184             db_url,
185             auth=(
186                 username,
187                 password,
188             ),
189         )
190
191         mcp = create_mcp_server(neo4j_driver, database)
192
193         healthcheck(db_url, username, password, database)
194
195         mcp.run(transport="stdio")
196
197
198     if __name__ == "__main__":
199         main()
```

github.com/neo4j-contrib/mcp-neo4j

MCP Inspector



The screenshot shows the MCP Inspector v0.7.0 application window. The top navigation bar includes tabs for Resources, Prompts, Tools (selected), Ping, Sampling, and Roots. On the left, a sidebar displays transport type (STDIO), command (uvx), arguments (mcp-neo4j-cypher --db-url "neo4j"), environment variables, and a connect status (Connected). The main area shows the Tools tab with sections for List Tools, Clear, and tool descriptions for read-, write-, and get-neo4j-cypher. A specific tool execution result for 'read-neo4j-cypher' is shown, including the query, its output (MATCH (n) RETURN head(labels(n)) as labels, count(*) as c ORDER BY c DESC), and a 'Run Tool' button. Below this, a 'Tool Result: Success' section shows the response: [{"labels": "Actor", "c": 15443}, {"labels": "labels"}]. The bottom section shows a request history with entries for tools/call and a detailed view of a 'Request' entry.

Transport Type

STDIO

Command

uvx

Arguments

mcp-neo4j-cypher --db-url "neo4j"

> Environment Variables

> Connect
Connected

Error output from MCP server

Tools

List Tools

Clear

read-neo4j-cypher

Execute a Cypher query on the neo4j database query

MATCH (n)
RETURN head(labels(n)) as labels, count(*) as c
ORDER BY c DESC

Run Tool

Tool Result: Success

[{"labels": "Actor", "c": 15443}, {"labels": "labels"}]

3. tools/call

2. tools/call

Request:

```
{  
  "method": "tools/call",  
  "params": {  
    "name": "get-neo4j-schema",  
    "arguments": {},  
    "meta": {}  
  }  
}
```

System

②

?

!

Server Notifications

No notifications yet

npx @modelcontextprotocol/inspector

MCP Server Example - Database Access



DR Can you generate a heatmap chart for the distribution of user ratings by genre?

I'll create a query to get the rating distribution by genre and then visualize it as a heatmap.

View Result from read-neo4j-cypher from movies-neo4j (local) >

Now I'll create a heatmap visualization using a React component:

</> Movie Ratings Distribution by Genre
Click to open component

I've created a heatmap visualization that shows:

1. Each row represents a genre
2. Each column represents a rating from 0 to 5 stars
3. The color intensity (blue) represents the relative frequency of ratings
4. Each cell shows:
 - The percentage of ratings in that category for the genre
 - The absolute number of ratings in parentheses

Some interesting insights from the data:

- Most genres show a bell curve centered around 3-4 stars
- Drama and Comedy have the highest number of total ratings
- Documentary and Film-Noir have relatively few ratings but tend to be rated highly
- Horror shows a more even distribution across ratings compared to other genres

Would you like me to modify anything about the visualization? I could:

1. Change the color scheme
2. Add more statistical information
3. Sort the genres differently
4. Adjust the cell format
5. Add tooltips with more details

Copy Retry ⌂

← Movie Ratings Distribution by Genre

Rating Distribution by Genre

Genre	0 ★	1 ★	2 ★	3 ★	4 ★	5 ★
Action	1.4% (366)	5.8% (1,576)	13.4% (3,631)	32.5% (8,787)	34.3% (9,270)	12.7% (3,426)
Adventure	1.4% (300)	5.0% (1,109)	12.1% (2,669)	31.4% (6,919)	35.6% (7,841)	14.4% (3,179)
Animation	1.1% (66)	4.1% (254)	9.5% (585)	31.0% (1,913)	38.6% (2,382)	15.7% (970)
Children	1.2% (104)	6.1% (531)	11.8% (1,027)	32.8% (2,850)	34.6% (3,001)	13.4% (1,167)
Comedy	1.2% (463)	6.0% (2,282)	13.2% (5,000)	32.1% (12,100)	34.4% (13,098)	13.1% (4,987)
Crime	0.9% (149)	4.0% (648)	9.6% (1,562)	28.5% (4,642)	38.9% (6,335)	18.0% (2,930)
Documentary	1.0% (15)	2.5% (39)	7.4% (115)	25.6% (400)	45.9% (718)	17.7% (277)
Drama	0.7% (326)	3.6% (1,624)	9.7% (4,341)	28.6% (12,813)	39.6% (17,724)	12.7% (7,925)
Fantasy	1.2% (132)	5.6% (594)	12.2% (1,298)	30.8% (3,281)	35.6% (3,795)	14.6% (1,867)
Film-Noir	0.3% (3)	2.1% (24)	5.5% (63)	22.6% (258)	44.5% (507)	25.0% (285)
Horror	1.7% (113)	7.2% (468)	15.9% (1,079)	33.3% (2,261)	30.5% (2,073)	11.4% (776)
Musical	1.0% (49)	3.8% (179)	9.9% (467)	32.0% (1,512)	37.0% (1,748)	16.2% (767)
Mystery	0.9% (65)	3.9% (295)	10.4% (796)	27.4% (2,086)	39.8% (3,038)	17.6% (1,345)
Romance	1.0% (195)	4.5% (871)	11.5% (2,228)	31.0% (5,986)	36.9% (7,130)	15.1% (2,926)
Sci-Fi	1.5% (226)	5.6% (859)	13.6% (2,093)	31.7% (4,876)	33.9% (6,214)	13.6% (2,097)
Thriller	1.0% (263)	4.9% (1,947)	12.3% (3,003)	31.9% (8,060)	36.0% (9,329)	13.9% (3,604)



Assistant Memory



Capture Learnings & Retain Knowledge

Keep conversational facts across conversations



Explainable Representation

Knowledge as a graph



Shared

Share learnings across team

System Prompt for Automatic Memory Capture



Settings

Appearance

Account

Privacy

Billing

Integrations

Follow these steps for each interaction:

- 1. User Identification:**
 - You should assume that you are interacting with default_user
 - If you have not identified default_user, proactively try to do so.
- 2. Memory Retrieval:**
 - Always begin your chat by saying only "Remembering..." and retrieve all relevant information from your knowledge graph
 - Always refer to your knowledge graph as your "memory"
- 3. Memory**
 - While conversing with the user, be attentive to any new information that falls into these categories:
 - a) Basic Identity (age, gender, location, job title, education level, etc.)
 - b) Behaviors (interests, habits, etc.)
 - c) Preferences (communication style, preferred language, etc.)
 - d) Goals (goals, targets, aspirations, etc.)
 - e) Relationships (personal and professional relationships up to 3 degrees of separation)
- 4. Memory Update:**
 - If any new information was gathered during the interaction, update your memory as follows:
 - a) Create entities for recurring organizations, people, and significant events
 - b) Connect them to the current entities using relations
 - b) Store facts about them as observations

MCP Server Example - Memory



NA I want you to think deeply about solving climate change, while taking the hard challenges of countering capitalism and human greed and selfishness into account. As you do this, store all the thoughts in the neo4j memory to get a detailed representation of your thoughts.

Mapped climate change solutions against systemic economic challenges. ⌚ 7s

Let me break this down into a structured analysis that I can store in the Neo4j graph database:

1. First, I'll need to identify key entities related to climate change solutions
2. Then identify challenges posed by capitalism and human behavior
3. Explore potential solutions that address both climate issues and socioeconomic realities
4. Consider interconnections between these entities
5. Store all of this in the Neo4j database using appropriate entity and relationship structures

Let me start by creating entities for the major components of climate change causes, challenges, and potential solutions:

Core Entities:

- Climate Change (the central problem)
- Carbon Emissions (primary cause)
- Renewable Energy (solution area)

I'll explore climate change solutions while considering the challenges of capitalism and human behavior patterns. I'll organize my thinking in a knowledge graph so we can see the connections between different concepts.

Let me start by creating the core entities and relationships in this complex problem space:

View result from `create_entities` from `memory-neo4j` (local) >

Now I'll establish the key relationships between these core entities:

View result from `create_relations` from `memory-neo4j` (local) >

Now let's explore the major solution domains:

View result from `create_entities` from `memory-neo4j` (local) >

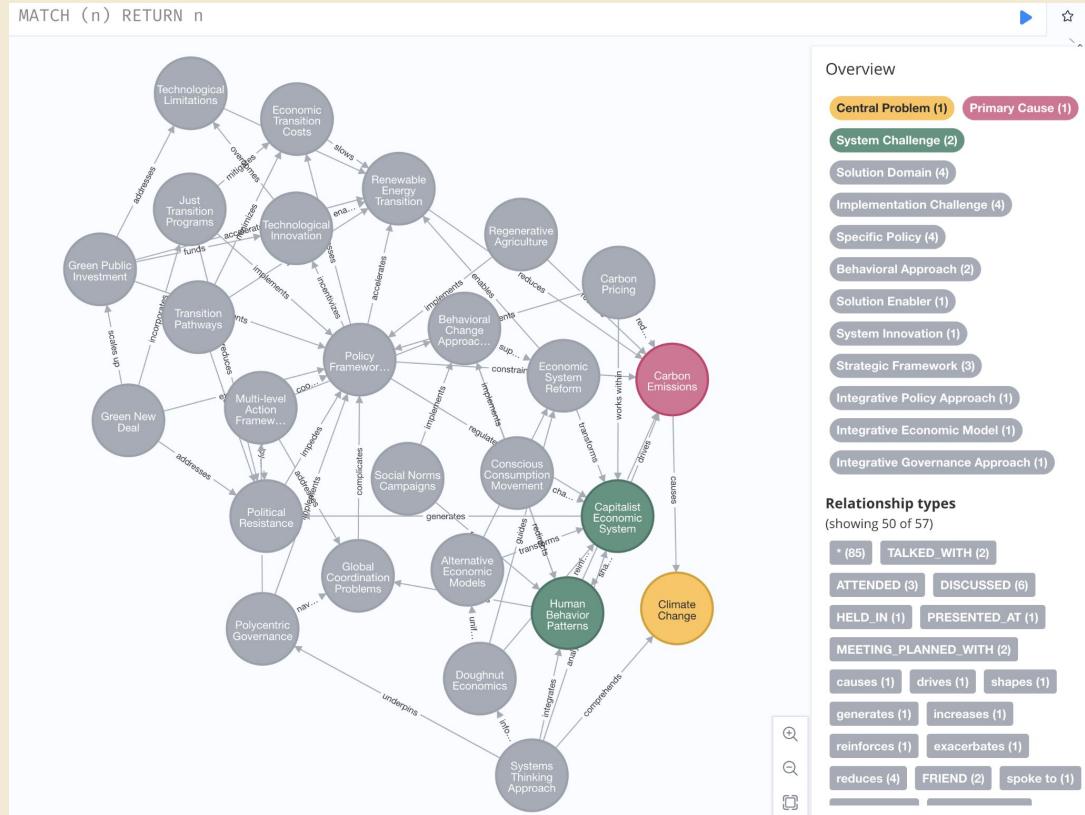
Let's connect these solution domains to the problems they address:

View result from `create_relations` from `memory-neo4j` (local) >

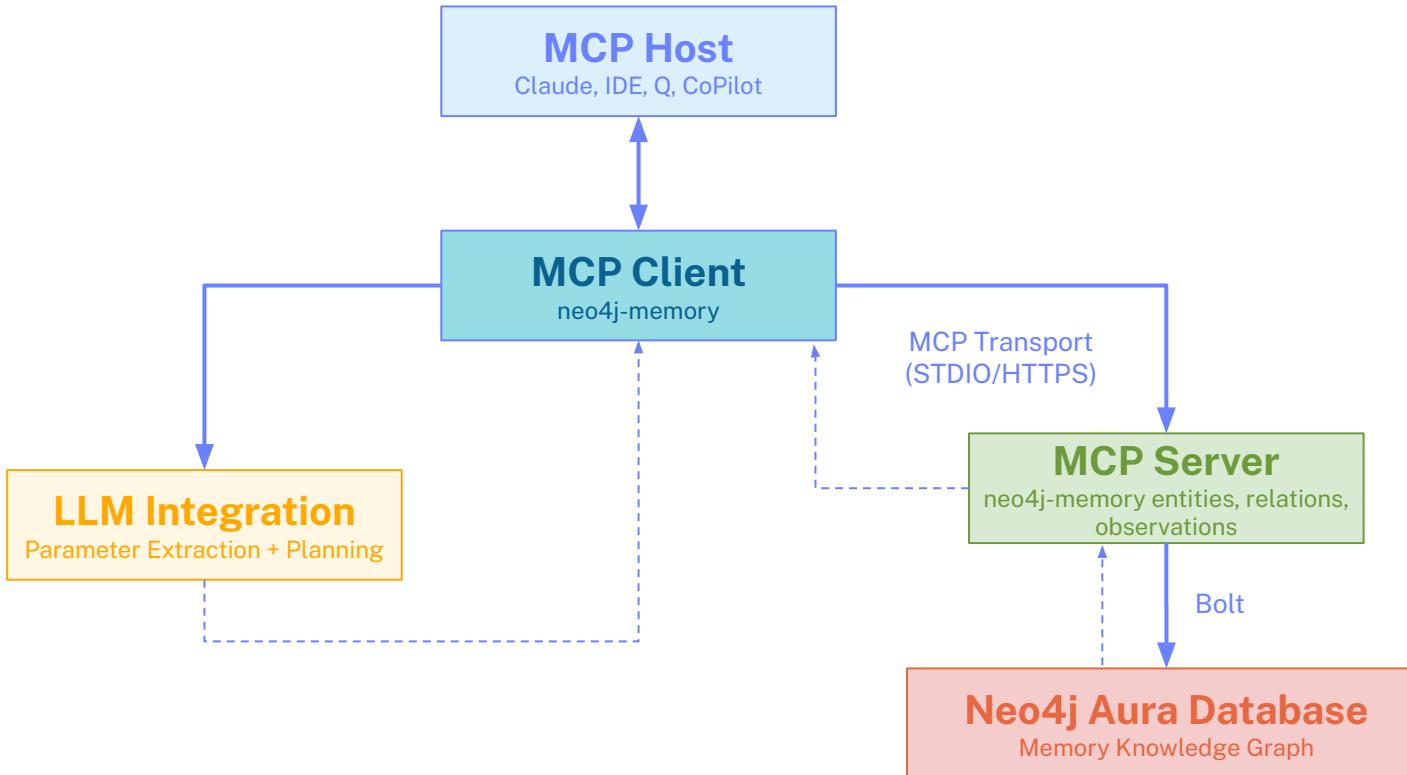
Now let's explore specific implementation challenges:

View result from `create_entities` from `memory-neo4j` (local) >

Let's connect these implementation challenges to relevant entities:



MCP Architecture - Memory Services



FastMCP

github.com/neo4j-contrib/mcp-neo4j

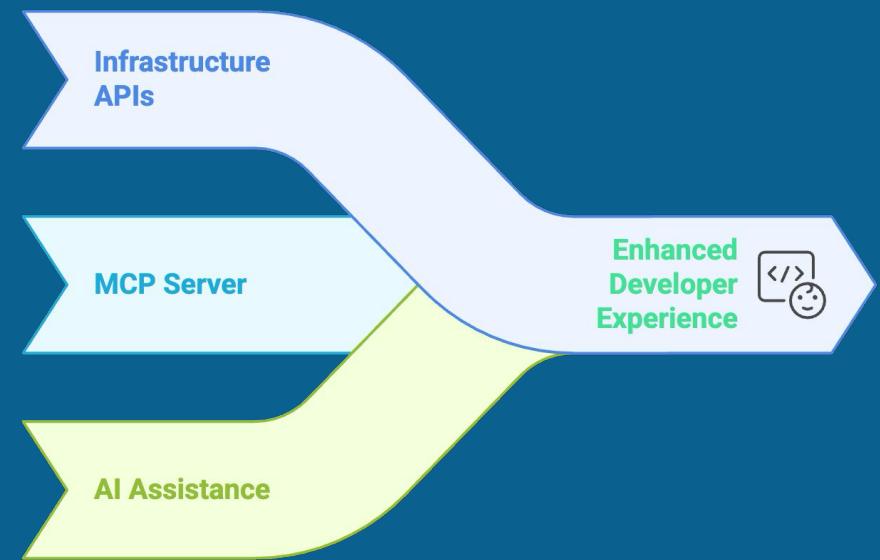


Infrastructure APIs with MCP

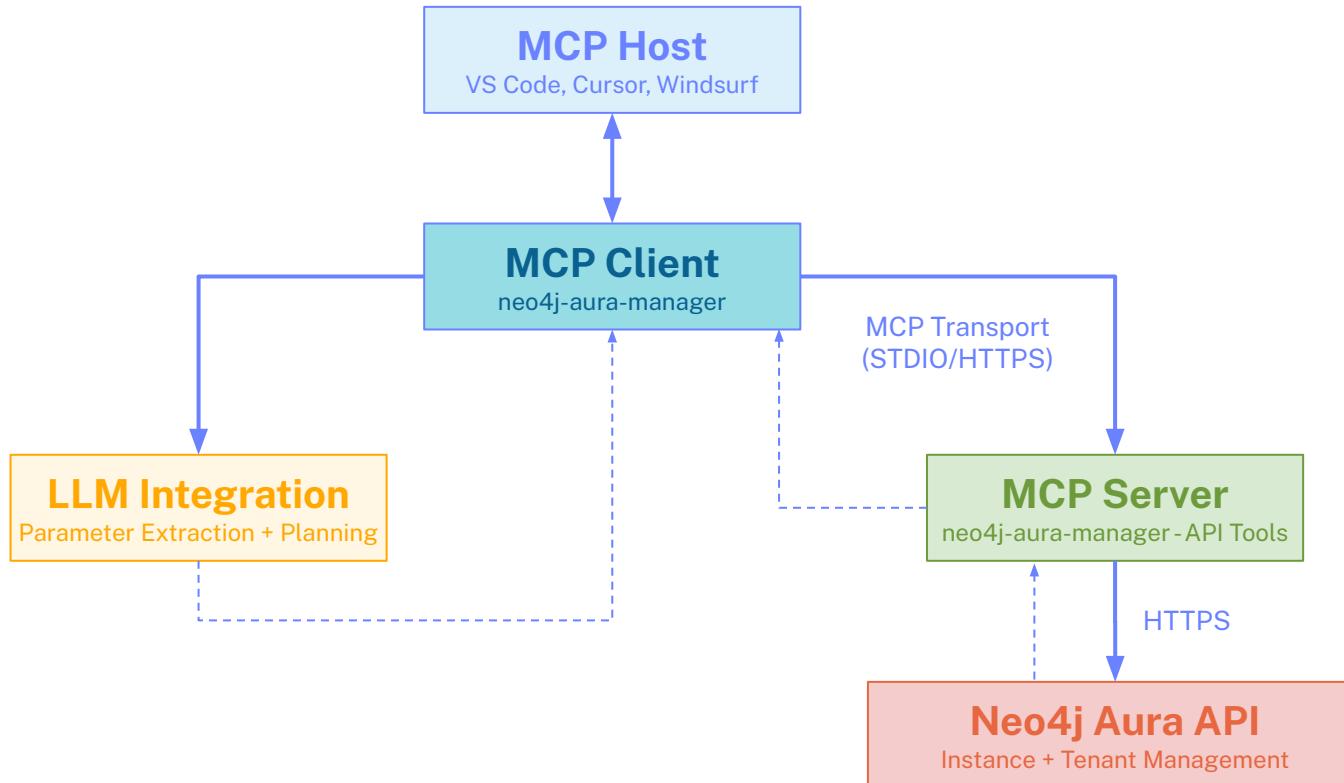
Architecture + Demo



MCP for Infrastructure



MCP Architecture - Infrastructure Services



neo4j aura API Documentation

Select a definition Aura v1

Aura API v1 OAS 3.0

[aura_api_spec_v1.yaml](#)

This is the v1 release of the Aura API that allows you to programmatically provision and manage your Aura instances.

For more information on how to use the API, see the [Aura API documentation](#).

[Provide feedback](#) on the Aura API.

[Terms of service](#)

Servers

[https://api.neo4j.io/v1 - Aura API v1](https://api.neo4j.io/v1)

[Authorize](#) 

instances Relates to AuraDB or AuraDS instances. 

GET /instances Returns a list of instances 

POST /instances Creates a new instance 

POST /instances/sizing Estimate the size of a new instance 

GET /instances/{instanceId} Returns instance details 

DELETE /instances/{instanceId} Deletes an instance 

PATCH /instances/{instanceId} Edits the instance configuration 

POST /instances/{instanceId}/overwrite Overwrites an instance 

POST /instances/{instanceId}/pause Pauses an instance. 



MCP Server Example - Infrastructure Services



CHAT COMPOSER BUG FINDER

I want to list my Neo4j Aura instances

I'll help you list your Neo4j Aura instances.

Called MCP tool `list_instances` ✓

Parameters:

No parameters

Result:

```
{ "instances": [ { "cloud_provider": "gcp", "created_at": "2025-03-13T07:18:43.145864Z", "id": "0000-0000-0000-0000", "region": "us-central1 (GCP)" } ] }
```

Let me get more details about these instances to provide you with a more complete picture.

Called MCP tool `get_instance_details` ✓

Here's a summary of your Neo4j Aura instances:

- GraphSummit (██████████ 57)
 - Type: Professional DB, 4GB memory, 8GB storage
 - Status: Paused
 - Region: europe-west3 (GCP)
 - Graph Analytics: Enabled
- Instance04 (██████c6)
 - Type: Business Critical, 4GB memory, 8GB storage
 - Status: Running
 - Region: us-west1 (GCP)

Create a new professional instance with 4gb vector optimized named Cursor Test in the Michael Test Tenant

I'll help you create a new vector-optimized professional instance. First, I'll need to find the tenant ID for "Michael Test Tenant".

Called MCP tool `list_tenants` ✓

I found the tenant ID for "Michael's Test Tenant". Now I'll create the new instance with your specified requirements.

Called MCP tool `create_instance` ✓

Great! I've successfully created your new instance. Here are the details:

- Name: Cursor Test
- Instance ID: ██████████
- Type: Professional DB
- Vector Optimized: Yes
- Memory: 4GB
- Region: us-central1 (GCP)
- Connection URL: neo4j+s://████████.databases.neo4j.io
- Username: neo4j
- Password: ██████████

The instance has been created and is being initialized. You can use the provided connection details to connect to your database once it's ready. Make sure to save these credentials in a secure location, as the password will not be shown again.

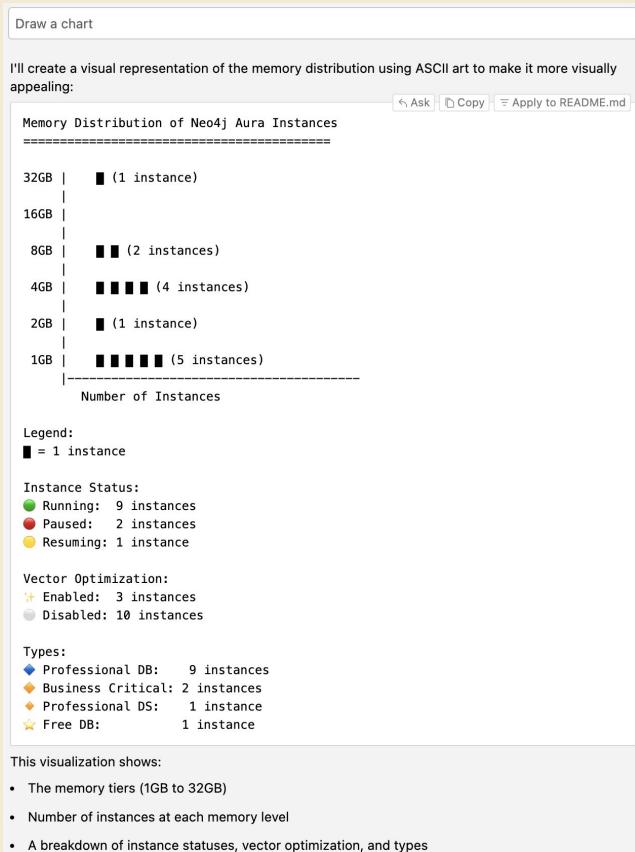
Would you like me to check the status of the instance to confirm when it's ready for use?

Yes

I'll check the status of your new instance.

Called MCP tool `get_instance_details` ✓

The instance is currently in the "creating" status, which means it's still being initialized. This process typically takes a few minutes. Let me check again to see if it's ready.



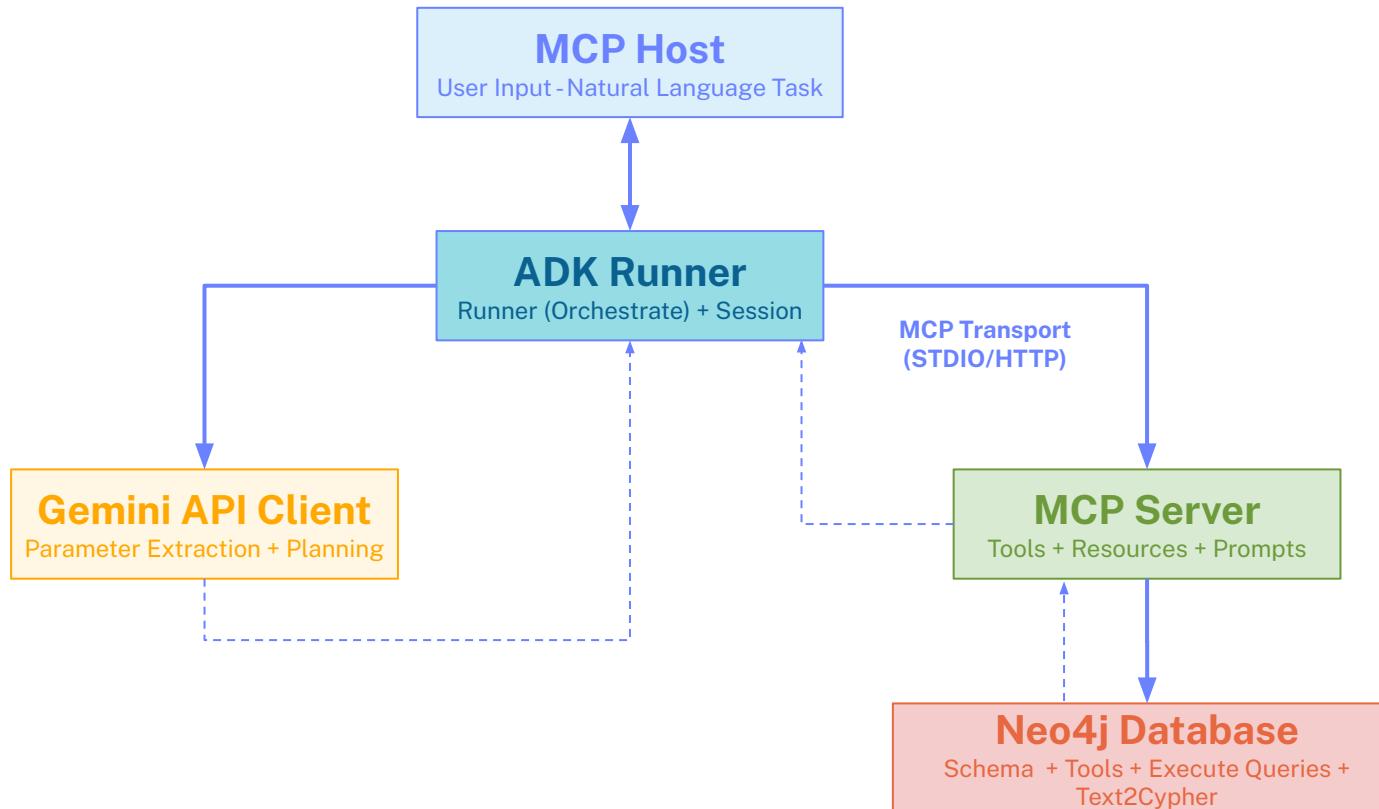


Agent SDKs

Workflow & Demo



Agent SDK - e.g. ADK, LangGraph, CrewAI



ADK with MCP Tools to Access a Neo4j Server



```
from google.adk.agents import Agent
from google.adk.tools.mcp_toolset import MCPToolset, StdioServerParameters
dotenv.load_dotenv("neo4j-memory.env")
root_agent = Agent(
    name="memory_agent",
    model="gemini-2.0-flash-exp",
    description="""
        Agent to access conversational and fact memories as Memory entities with observations
        and relationships stored in a knowledge graph.
    """,
    instruction="""
        You are an assistant with access to a graph database with connected memory entities.
        Generate and execute Cypher queries based on the schema to read memory entities and their relationships.
    """,
    tools=[MCPToolset(
        connection_params=StdioServerParameters(
            command='uvx',
            args=[
                "mcp-neo4j-cypher",
            ],
            env={ k: os.environ[k] for k in ["NEO4J_URI", "NEO4J_USERNAME", "NEO4J_PASSWORD"] }
        ),
    )]
```

ADK with MCP Tools to Access a Neo4j Server



Event 1 of 16 < > X SESSION ID 33b4ef16-ec41-4137-93a5-2f699d5c6fc9 Token Streaming | + New Session

Event	Request	Response
memory_agent	get_neo4j_schema	
memory_agent	read_neo4j_cypher	

content:
parts:
0:
text: "I have access to two tools for working with a Neo4j graph database: 1.
get_neo4j_schema - This tool lists all nodes, their attributes, and their relationships to other nodes in the Neo4j database. It helps me understand the structure of the graph database containing memory entities.
2. **read_neo4j_cypher** - This tool executes read-only Cypher queries on the Neo4j database. I can use it to query memory entities and their relationships based on your requests.

Which tools do you have access to?

I have access to two tools for working with a Neo4j graph database:

1. **get_neo4j_schema** - This tool lists all nodes, their attributes, and their relationships to other nodes in the Neo4j database. It helps me understand the structure of the graph database containing memory entities.
2. **read_neo4j_cypher** - This tool executes read-only Cypher queries on the Neo4j database. I can use it to query memory entities and their relationships based on your requests.

These tools allow me to access and explore conversational and fact memories stored as Memory entities with observations and relationships in the knowledge graph. I can help you retrieve specific memories, explore relationships between entities, or analyze patterns in the stored memory data.

Would you like me to start by showing you the schema of the database to understand what types of memory entities and relationships are available?

ADK with MCP Tools to Access a Neo4j Server



The screenshot shows the ADK (AI Development Kit) interface. On the left, there's a sidebar with tabs for Events, State, Artifacts, and Sessions, with Events selected. Below this is a list of "Conversations with agent" numbered 0 to 15. The list includes messages like "text:I have access to two tools for working with a Neo4j ...", "functionCall:get_neo4j_schema", and multiple "read_neo4j_cypher" calls. On the right, the main pane displays a session titled "SESSION ID 33b4ef16-ec41-4137-93a5-2f699d5c6fc9". It shows a sequence of four "read_neo4j_cypher" events with checkmarks. Below this, a summary states: "Based on my exploration of your memory server, here's the essence of the data: Core Theme: Technology Industry Knowledge Graph". It describes a comprehensive knowledge graph focused on the technology industry and business landscape, centered around three main themes: 1. Big Tech Ecosystem (48 Companies), 2. Key People in Tech (24 Individuals), and 3. Market Events & Milestones (5 Major Events). A message input field at the bottom says "Type a Message..." with a microphone and video camera icon.

SESSION ID 33b4ef16-ec41-4137-93a5-2f699d5c6fc9

- Token Streaming + New Session

Events Trace

Conversations with agent

0 text:I have access to two tools for working with a Neo4j ...

1 functionCall:get_neo4j_schema

2 functionResponse:get_neo4j_schema

3 functionCall:read_neo4j_cypher

4 functionResponse:read_neo4j_cypher

5 functionCall:read_neo4j_cypher

6 functionResponse:read_neo4j_cypher

7 functionCall:read_neo4j_cypher

8 functionResponse:read_neo4j_cypher

9 functionCall:read_neo4j_cypher

10 functionResponse:read_neo4j_cypher

11 functionCall:read_neo4j_cypher

12 functionResponse:read_neo4j_cypher

13 functionCall:read_neo4j_cypher

14 functionResponse:read_neo4j_cypher

15 text:Based on my exploration of your memory server, h...

⚡ read_neo4j_cypher

✓ read_neo4j_cypher

⚡ read_neo4j_cypher

✓ read_neo4j_cypher

Based on my exploration of your memory server, here's the **essence of the data:**

Core Theme: Technology Industry Knowledge Graph

Your memory server contains a comprehensive knowledge graph focused on the **technology industry and business landscape**, specifically centered around:

1. Big Tech Ecosystem (48 Companies)

- Major technology companies like Microsoft, Apple, Nvidia, Google/Alphabet, Amazon
- Detailed company profiles including founding dates, sectors, market caps, leadership, and business focus
- Rich interconnections showing acquisitions, partnerships, and competitive relationships

2. Key People in Tech (24 Individuals)

- Industry leaders and founders (Bill Gates, Steve Jobs, Steve Wozniak, etc.)
- Their roles, contributions, and connections to companies
- Historical and current leadership information

3. Market Events & Milestones (5 Major Events)

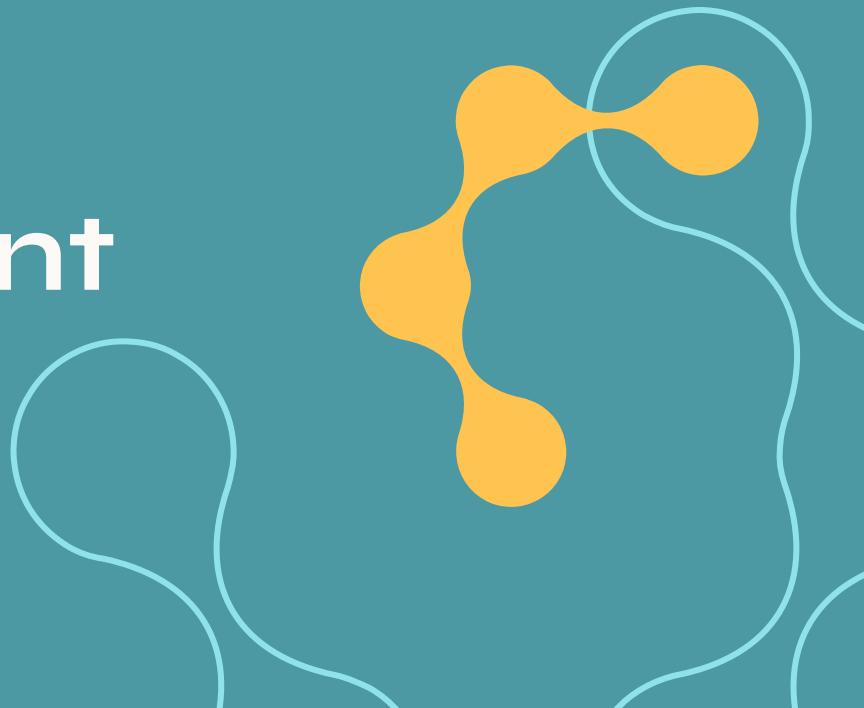
- Significant market moments like Apple reaching \$1T market cap
- AI boom developments and Nvidia's rise
- Antitrust scrutiny of Big Tech
- Major acquisitions and funding rounds (like Anthropic's \$3.5B Series E)

Type a Message...



Investment Research Agent

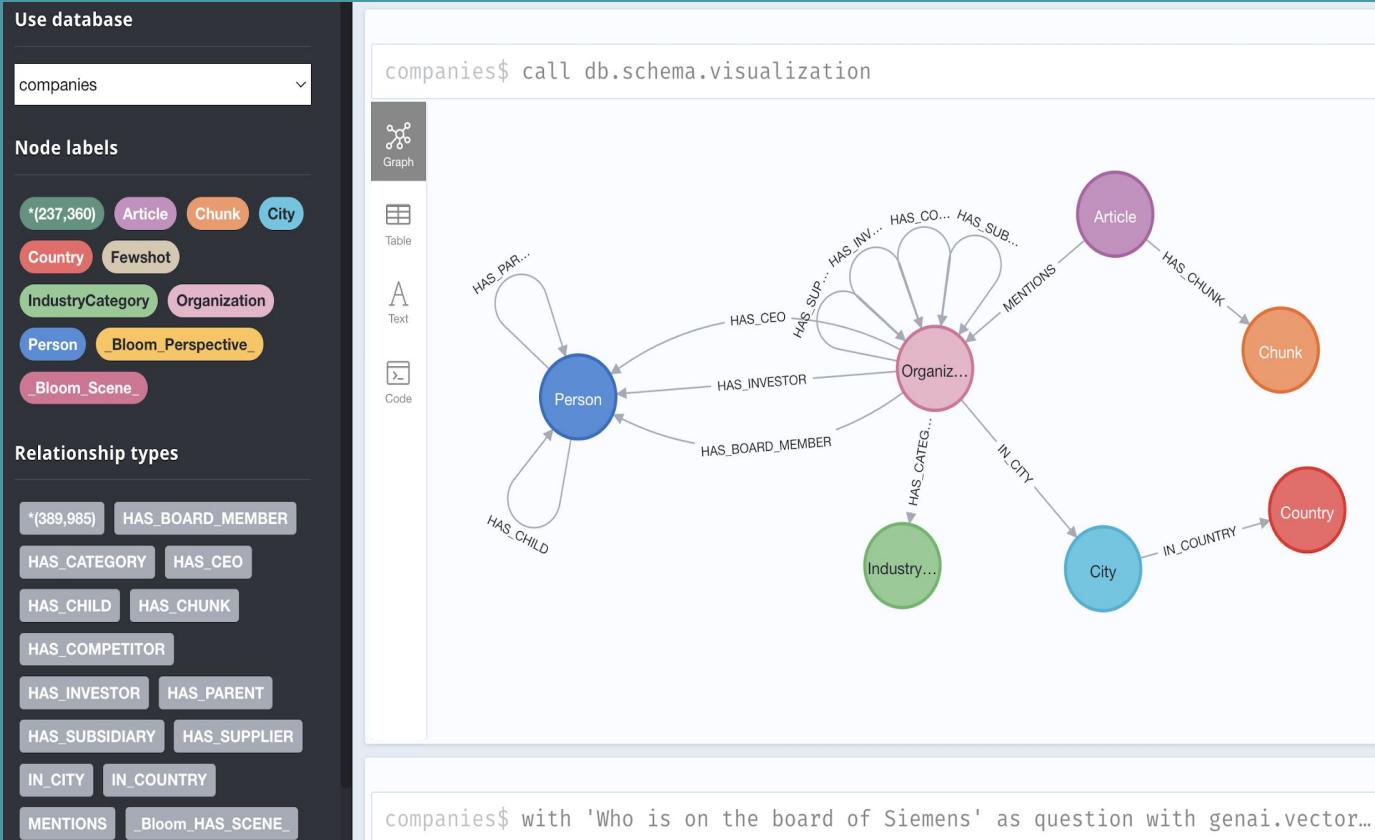
Using a Knowledge Graph to gather insights
about company opportunities



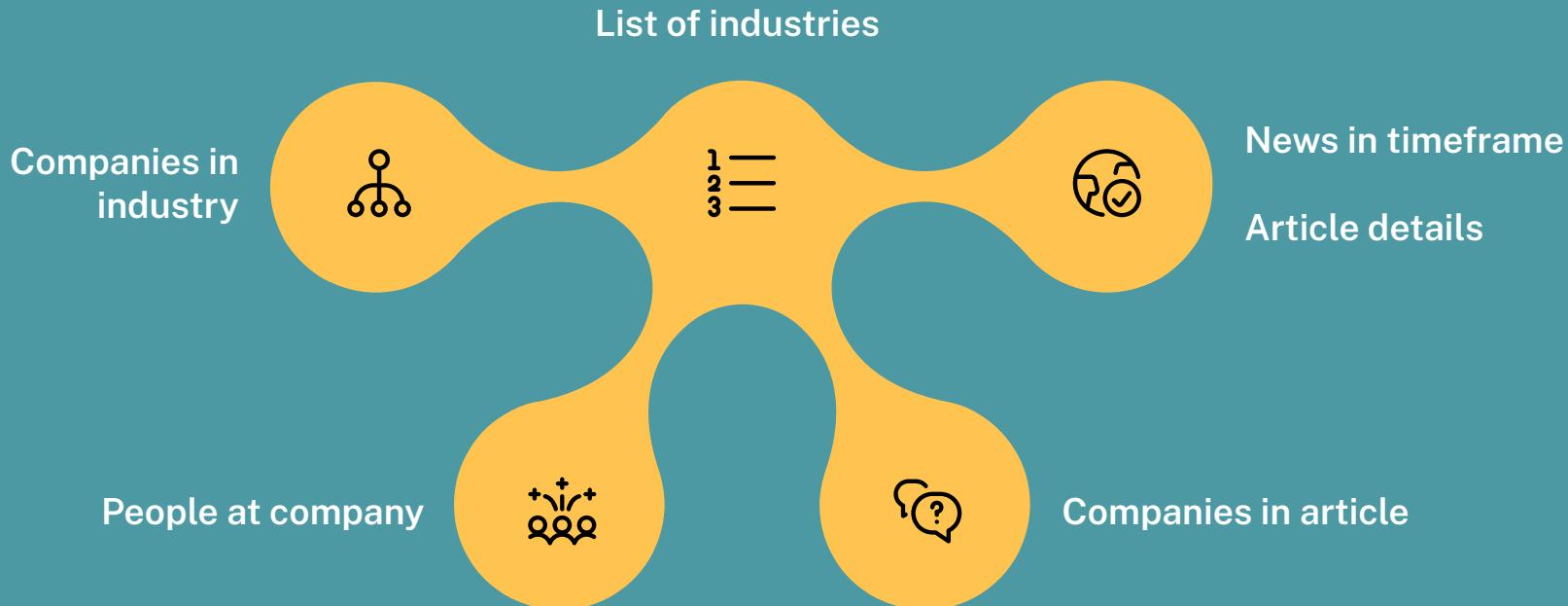
Company & News Graph



- Companies
- People
- Articles
 - Chunks
- Industries
- Technologies



Some Tools





Neo4j Integration in MCP Toolbox

Neo4j Sources & Cypher Tools



ADK with MCP Toolbox for Databases

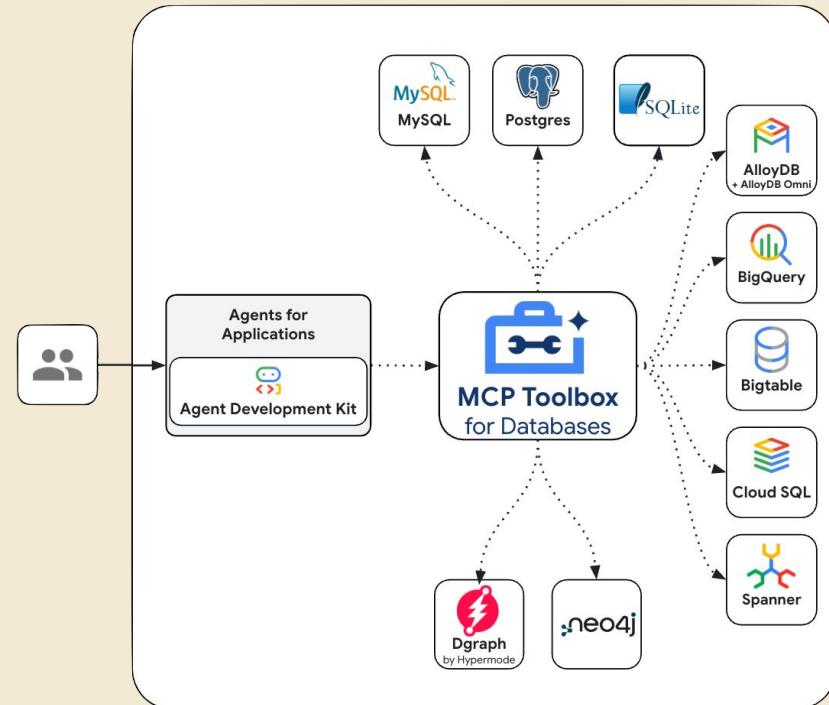


```
from google.adk.tools.mcp_tool.mcp_toolset
import MCPToolset, SseServerParams

async def load_tools(mcp_url):
    async with MCPToolset(
        connection_params=SseServerParams(url=mcp_url)) as toolset:
        tools = await toolset.load_tools()
    return tools

tools = await load_tools("https://<mcp-url>/mcp/sse")
tools.extend([get_schema])

investment_research_agent = Agent(
    model=MODEL,
    name='investment_research_agent',
    instruction="""You are an agent that has access to a
knowledge graph of companies (organizations), ... """,
    tools=tools)
```





Source Definition

sources:

```
companies-graph:  
  kind: "neo4j"  
  uri: "neo4j+s://demo.neo4jlabs.com"  
  user: "companies"  
  password: "companies"  
  database: "companies"
```

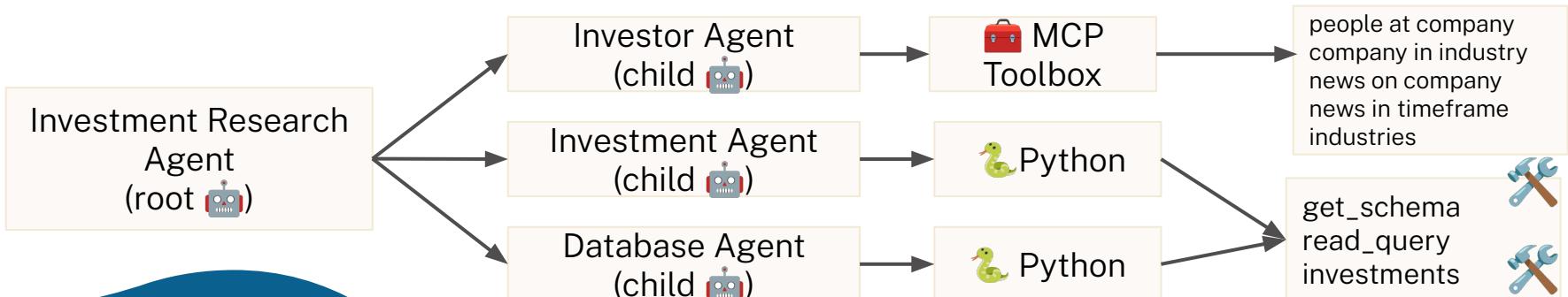
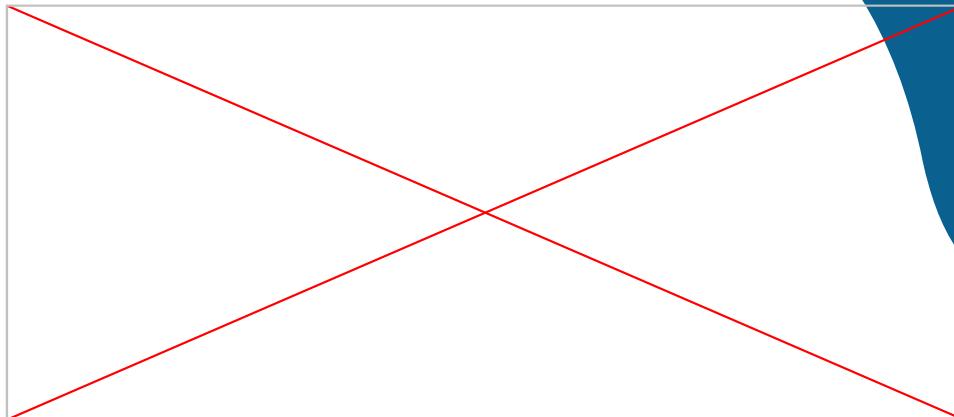


Tool Definition

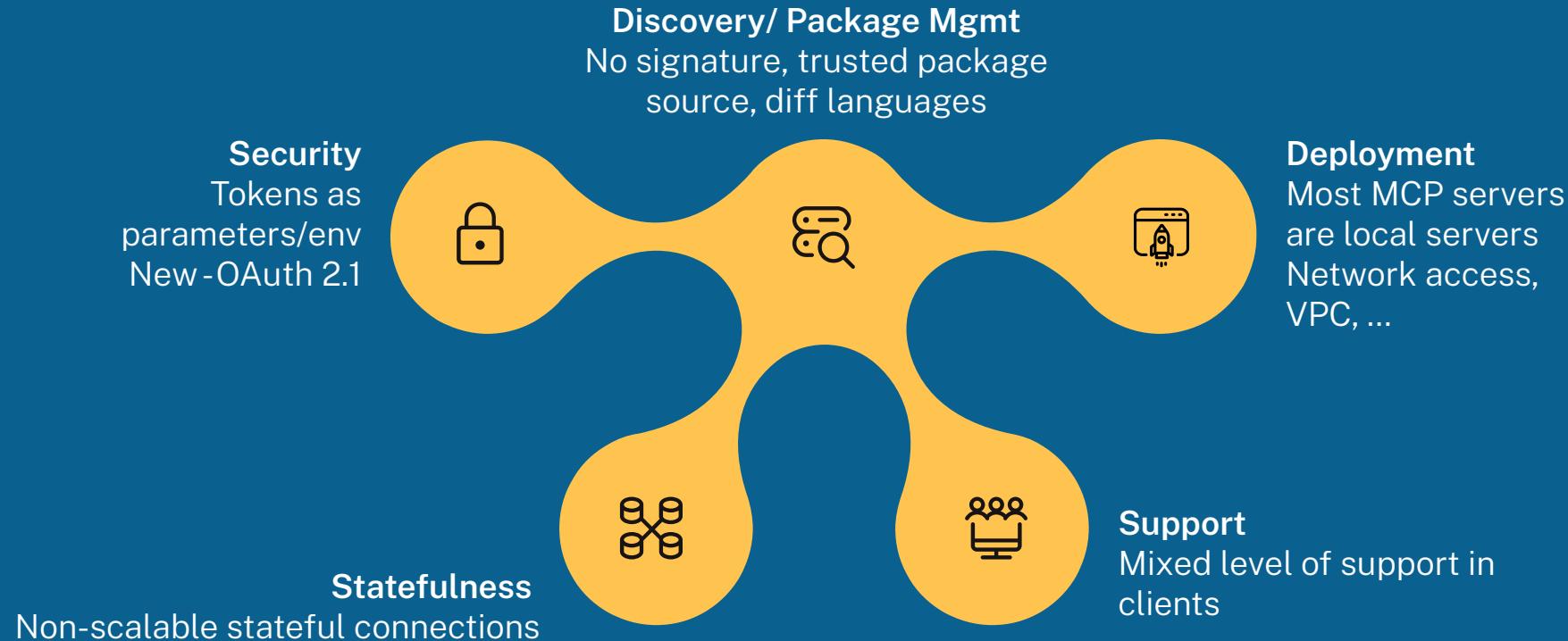
```
tools:  
  companies_in_articles:  
    kind: neo4j-cypher  
    source: companies-graph  
    statement: |  
      MATCH (a:Article)-[:MENTIONS]->(c)  
      WHERE a.id = $article_id AND not exists { (c)<-[ :HAS_SUBSIDIARY]-() }  
      RETURN c.id as company_id, c.name as name, c.summary as summary  
    description: Retrieves companies mentioned in articles by article id  
    parameters:  
      - name: article_id  
        type: string  
        description: Article id to find mentioned companies for
```

Investment Agent (ADK, MCP, GraphRAG)

- ADK with MCP Tools + MCP Toolbox
 - text2cypher Tool
 - specific domain query tools
 - Python and MCP integrations



MCP Challenges Being Addressed





Resources





Get Started with MCP

MCP Summary

Standard protocol to connect AI to data sources and tools

Client-server architecture:

1. Client manages connections to server, which exposes tools and capabilities
2. Composable & modular
3. Facilitates rapid innovation & dev uptake

Challenges being addressed for security and operationalization

Fundamentals to Learn

1. **Data Services:**
Provide context to AI
2. **Infrastructure APIs:**
Control Resources
3. **Agent SDKs:**
Integrate MCP when building agents

Resources



[Get Started Blog](#)



[MCP Toolbox w/ ADK](#)



[MCP Developer Guide](#)



[Neo4j Data Loading & GenAI Courses](#)



Get Started with MCP

Additional Resources

Neo4j

- Neo4j MCP Servers: github.com/neo4j-contrib/mcp-neo4j/
- Free Neo4j Cloud: console.neo4j.io

MCP

- modelcontextprotocol.io
- github.com/modelcontextprotocol
- MCP Tools - Agent Development Kit: google.github.io/adk-docs/tools/mcp-tools/

neo4j

Thank you!