

Agentic AI and IBM i

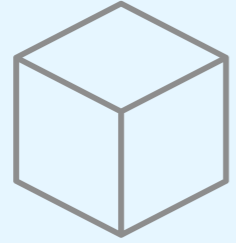
Jesse Gorzinski
Senior Business Architect, IBM

Agenda

- Introduction to Agentic AI
- Building your own agents
- IBM i agentic roadmap

Fundamental Shift in AI is underway

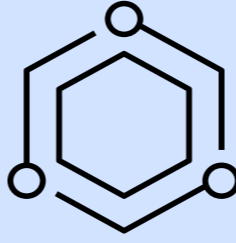
AI that can generate for you



Models

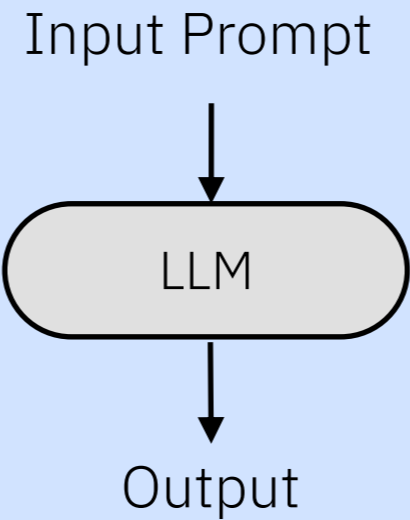
- Next Token Prediction
- Text Generation
- Pattern matching

AI that can chat for you



Assistants

Powered by single customized LLM



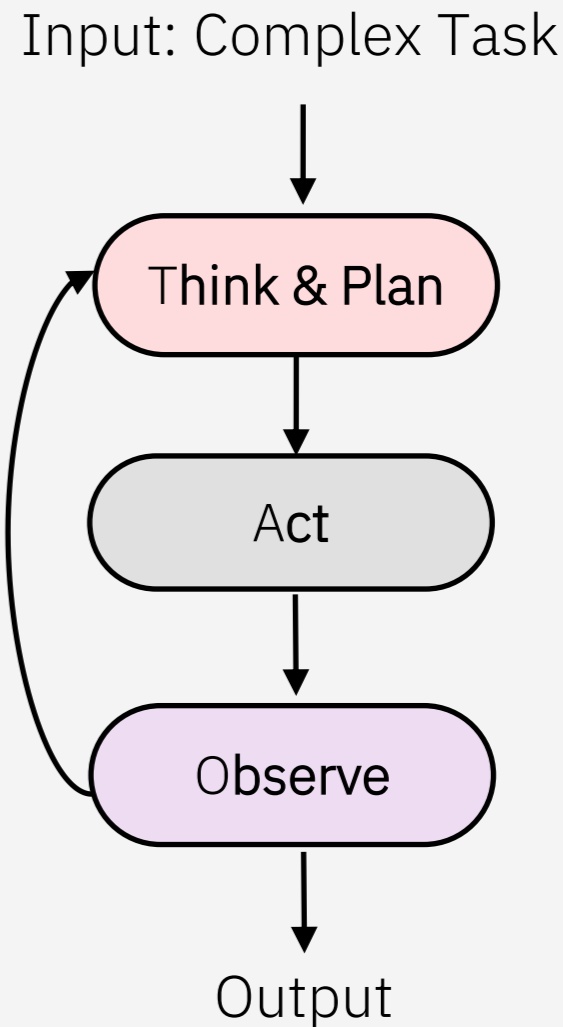
Feed forward Systems

AI that can do for you



Agents

Powered by Think-Act-Observe loop



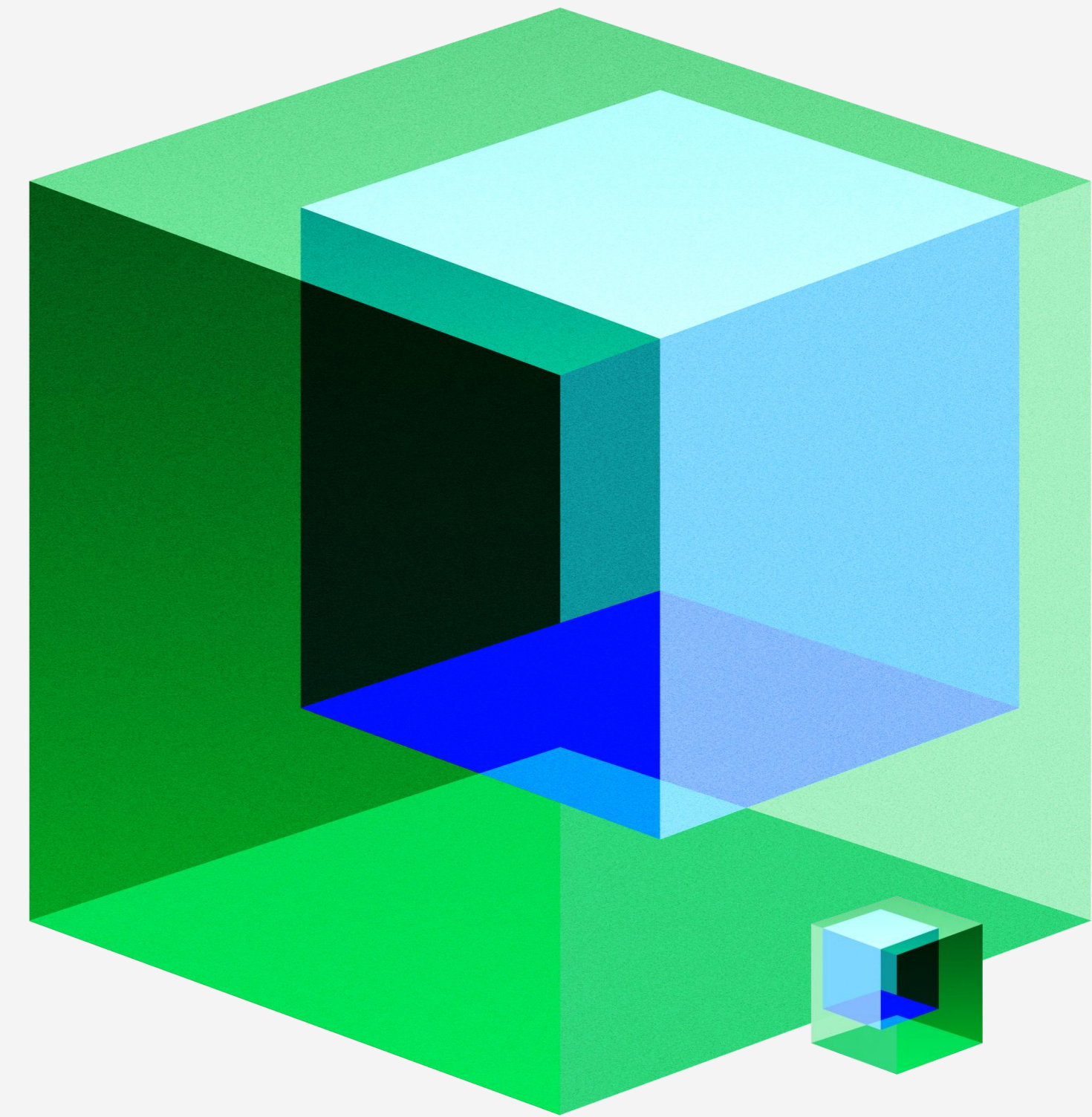
Feedback Systems

With agentic AI,
today's front-end
systems will become
back-end systems.

What is an AI agent?

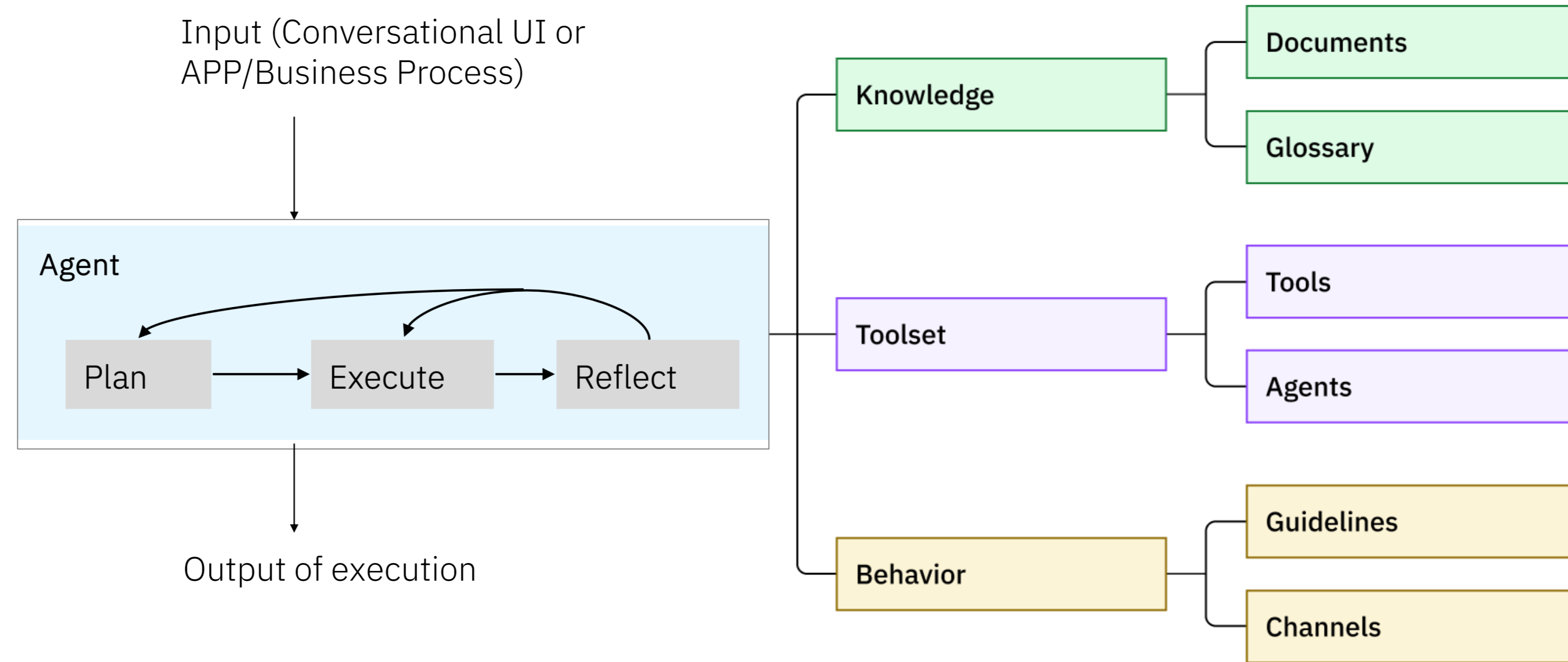
An AI agent is an application that can **act autonomously** to **understand, plan, and execute** a specific task.

AI agents use LLMs to reason and can interface with tools, other models, and other IT systems to **fulfill user goals**.

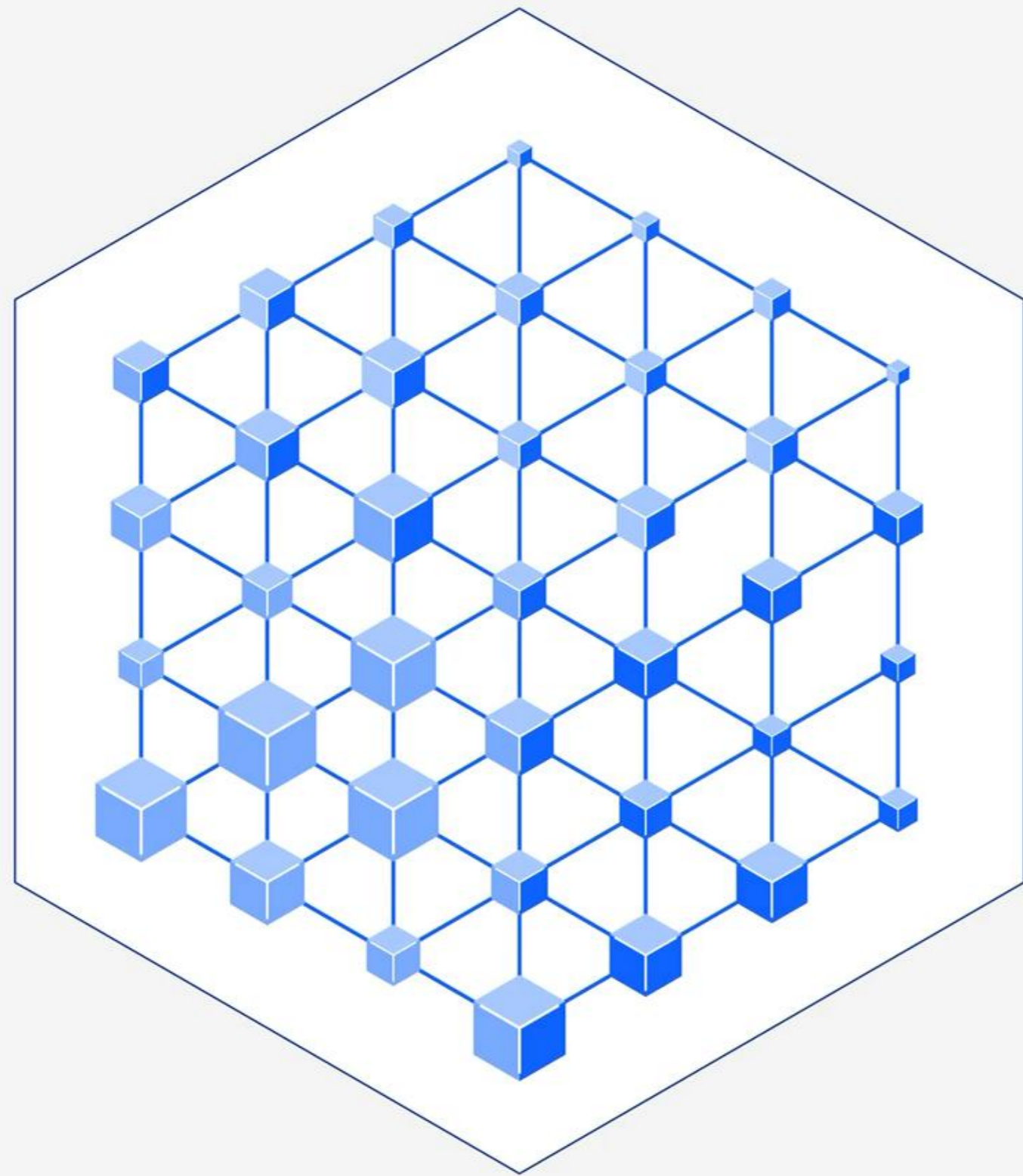


AI Agents

An AI agent is an **autonomous** system that can use **tools** and collaborate with other agents to **plan** and **act** on tasks. After it acts, the agent **reflects** on the results of its actions, learning iteratively and refining its approach to better align with its defined objectives.



The Orchestrator Agent is a multi-agent, multi-tool supervisor, router, and planner, facilitating complex task execution



What is agentic AI?

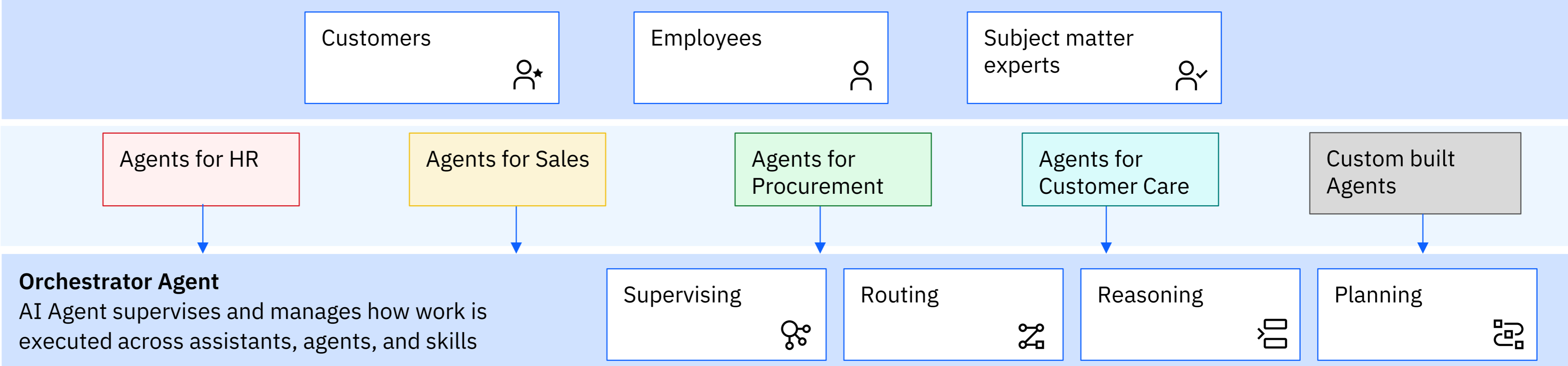
Agentic AI is a framework for accomplishing goals with limited supervision that consists of AI agents.

In multiagent systems, each agent performs a specific subtask that's required to reach the goal.

IBM watsonx Orchestrate

Empower customers and employees through simple, intuitive and guided conversations

Agent Catalog



Boost productivity with AI and automation

AI Agents
Uses tools and other agents to plan and act, automating complex tasks

Tools
APIs and automations that can be used by agents to accomplish tasks.

Accelerate time to value with pre-built capabilities or build your own

Studio
Discover, create and manage agents and tools that orchestrate tasks and workflows.

Prebuilt tools

Custom tools – build new or discovery existing

Gen AI powered by watsonx.ai™

Use case

Reshaping HR with AI agents

Benefits

1. Pre-built integrations designed to seamlessly integrate with existing HCM platforms, ticketing tools, and more.
2. Pre-build skills which allow users to quickly start testing a range of automations from requesting time off to initiating employee transfers.
3. Simple and intuitive customization means HR teams can configure the system to enterprise requirements and policies


“You can train it do certain tasks within one process, but you can easily have it apply those same skills to other processes. It blows chatbots out of the water. [It really is changing our understanding of the future of work.](#)”

Jon Lester, VP of HR Technology, IBM

[Read the blog](#)



HR agent demonstration


[New chat](#) +

Active chat

New chat
Just now

Recent

Initiate employee transfer
11:10 AM

View latest paystub
10:30 AM

☀ Good afternoon 2:30 PM

Hi! How can I help you?

Approve time off
@HR Agent request time off for employee

→

Transfer employee
@HR Agent initiate transfer to new department

→

Approve Purchase Order
@Procurement Agent to show list of open POs

→

IBM AskHR

An HR digital assistant driving a seamless experience for employees and empowering HR professionals to focus on higher value tasks

10.1M Yearly interactions

765K Automated Tasks

40% Reduction in HR Operating Budget

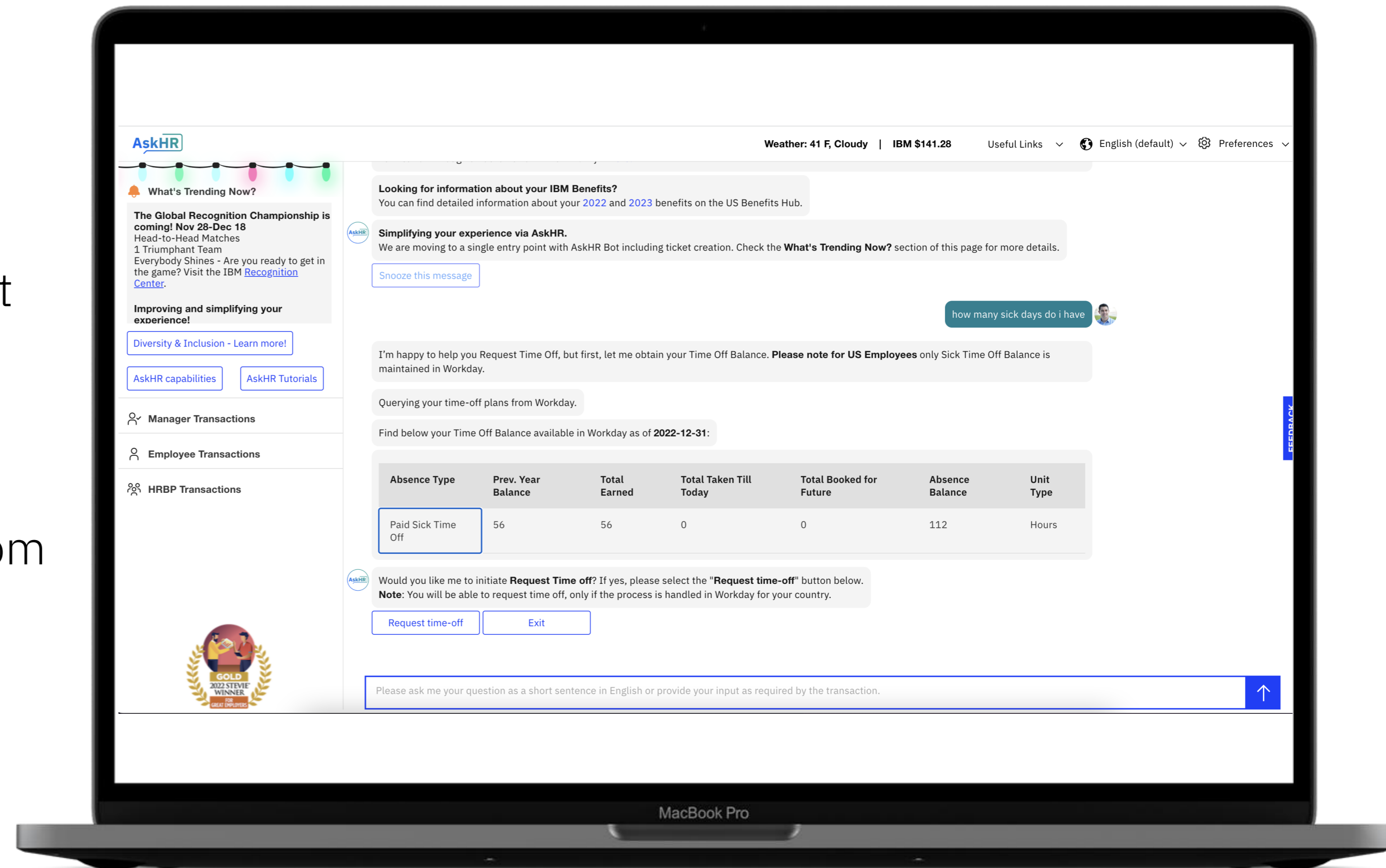
94% Employee inquiries handled by AskHR

+55 Improvement of HR NPS score from +19 → +74

96% Manager adoption

93% Executive adoption

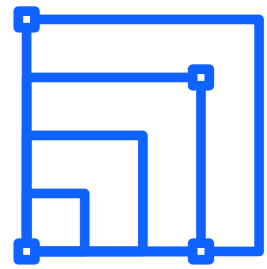
2 Bands Average increase in HR 'level'



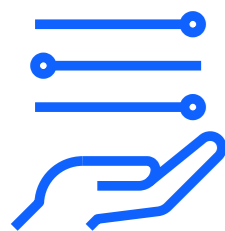
Also at work in IBM HR: Digital Labor



Intelligent Orchestration: Engagement with multiple personas in natural language or via events (e.g., emails, triggers, API calls)



Business Context: Remembers past business interactions to make workflows more effective(i.e., it has a long-term memory)



Skills: Out of the box capabilities that can be immediately used to create new workflows and can be added to easily

Use Cases



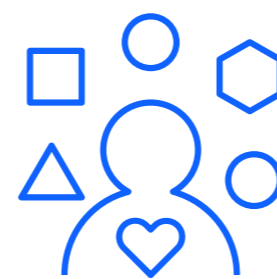
Quarterly Promotion (HiRo): Learns criteria for promotion and provides managers with selection options; Communicates with managers; 100% loads selections to HRIS. 50,000 manager productivity hours saved per year: 85% HR Business Partner time savings



Expense Audit & Recovery (sHeRlock): Detect fraud through anomalies in expense data; Communicate with managers/employees and handle queries; Setup overpayments, recover funds. Recoveries possible ~\$2M ; 6k hours saved for Expense team



Learning Class Management (cHaRlie): Display upcoming classes with low enrollments; View, promote, cancel and communicate classes. 16k Learning Event Manager hours saved; 2k IBMer hours saved through auto-class promotion; Manages 11,000 classes per year



Additional cases include job requisition creation (HeRmione); M&A Employee data integration (HaRmony); Legal compliance in Colorado (wage transparency - HaRper); *Return-to-Office Management (HeRmes); Performance Management (HeRcules); Talent Reviews (HactoR); Skills Update.(HarRy)*

Building your own agents

What is Mapepire?

Welcome to Mapepire

A cloud-friendly IBM i database access layer, built with simplicity and performance in-mind.

Find out more →

Pick your client language ⓘ



*Super easy to use way to access
Db2 for i from any application*



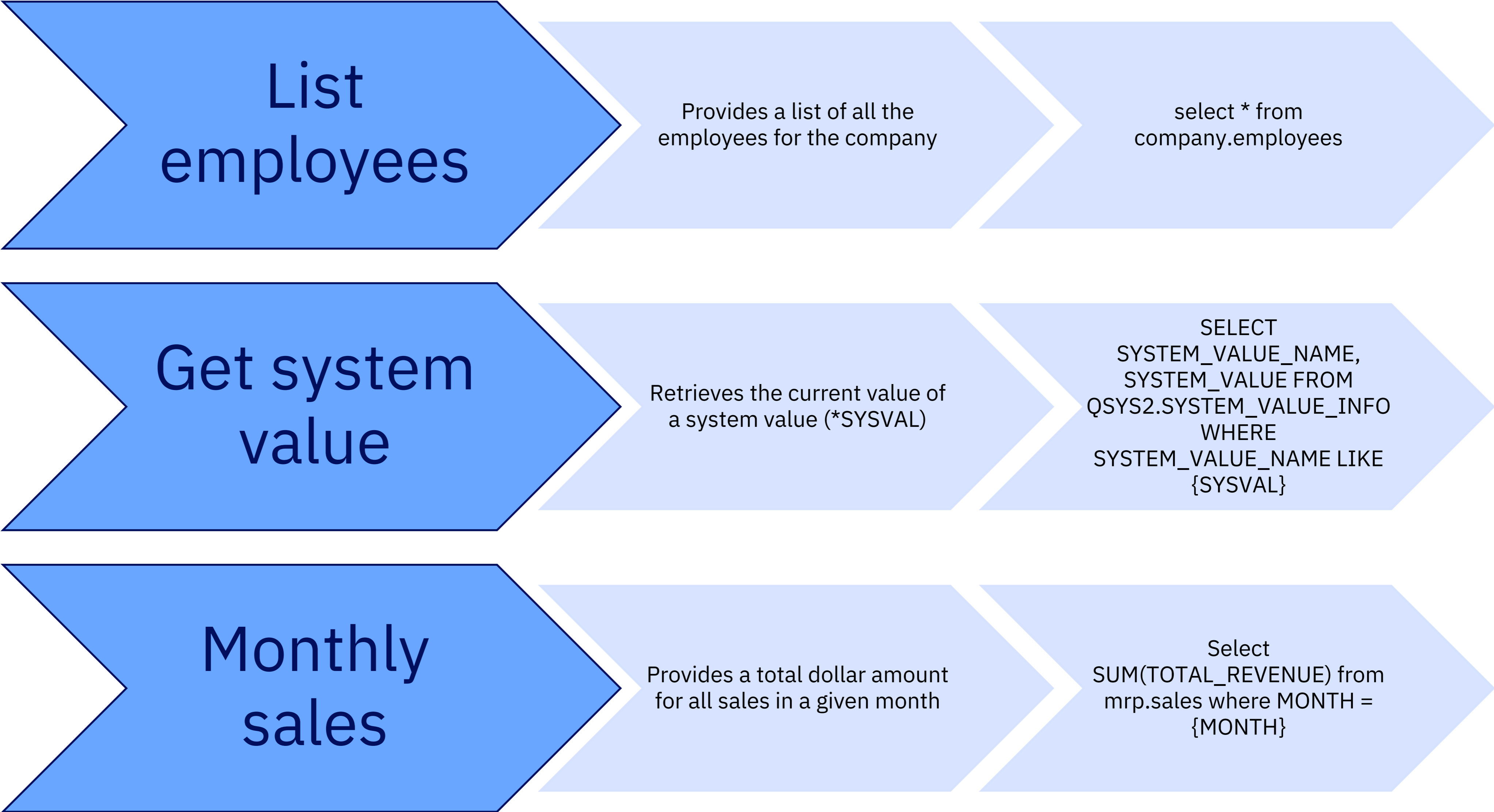
Mapping natural language to discrete data

```
class InfoSQLDatabaseTool(BaseDb2iDatabaseTool, BaseTool): # type: ignore[override, override]
    """Tool for getting metadata about a SQL database."""

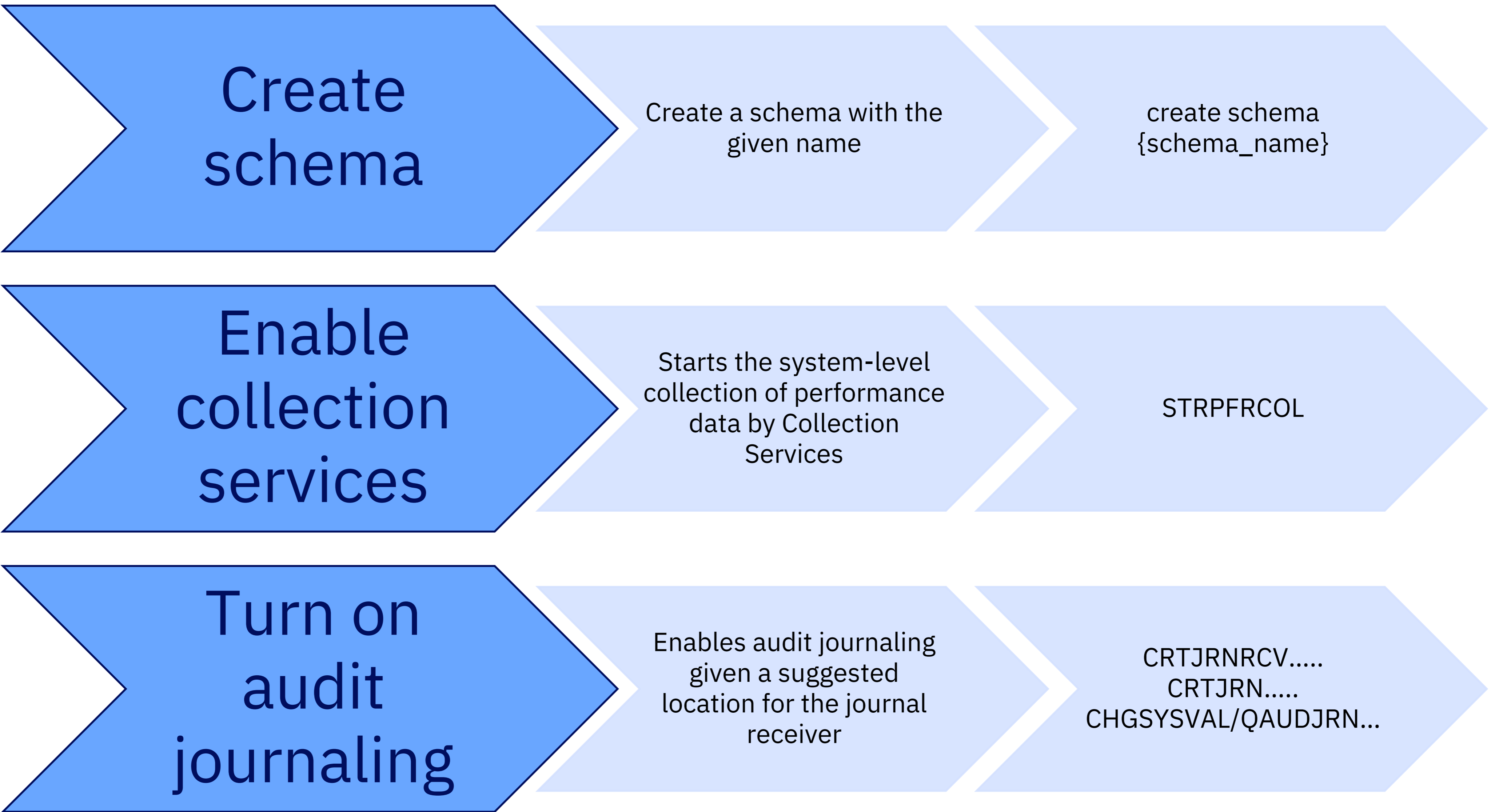
    name: str = "sql_db_schema"
    description: str = "Get the schema and sample rows for the specified SQL tables."
    args_schema: Type[BaseModel] = _InfoSQLDatabaseToolInput

    def _run(
        self,
        table_names: str,
        run_manager: Optional[CallbackManagerForToolRun] = None,
    ) -> str:
        """Get the schema for tables in a comma-separated list."""
        return self.db.get_table_info_no_throw(
            [t.strip() for t in table_names.split(",")]
        )
```

Mapping natural language to discrete data



Mapping natural language to discrete actions



Popular agentic frameworks

Application frameworks

- Langchain
- Agno
- CrewAI















Model Context Protocol (MCP)



Agentic with IBM i?

Samples published here: <https://github.com/ajshedivy/db2i-agents>

Agent Framework Comparison

Framework	Languages	Implementation Status	Db2i Access Method	Supports MCP	Description
 LangChain	Python <input checked="" type="checkbox"/>	Complete <input checked="" type="checkbox"/>	Mapepire 	Yes <input checked="" type="checkbox"/>	Popular framework for developing applications powered by LLMs
 MCP	Python <input checked="" type="checkbox"/> TypeScript <input checked="" type="checkbox"/>	Complete <input checked="" type="checkbox"/>	Mapepire 	Yes <input checked="" type="checkbox"/>	An open protocol that standardizes how applications provide context to LLMs.
 Agno	Python <input checked="" type="checkbox"/>	Complete <input checked="" type="checkbox"/>	Mapepire 	Yes <input checked="" type="checkbox"/>	A lightweight library for building Agents with memory, knowledge, tools and reasoning.
 BeeAI	Python <input checked="" type="checkbox"/> TypeScript <input checked="" type="checkbox"/>	Coming soon 	Mapepire 	Yes <input checked="" type="checkbox"/>	An open-source ecosystem that empowers developers to discover, run, and compose AI agents from any framework.
 CrewAI	Python <input checked="" type="checkbox"/>	Coming soon 	Mapepire 	No <input checked="" type="checkbox"/>	Fast and flexible Python Multi-Agent automation framework



 **Agent Chat**

Type your message...

Hide Tool Calls

Send



agent

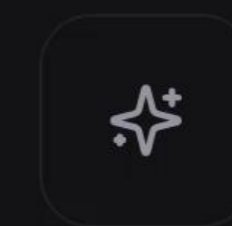
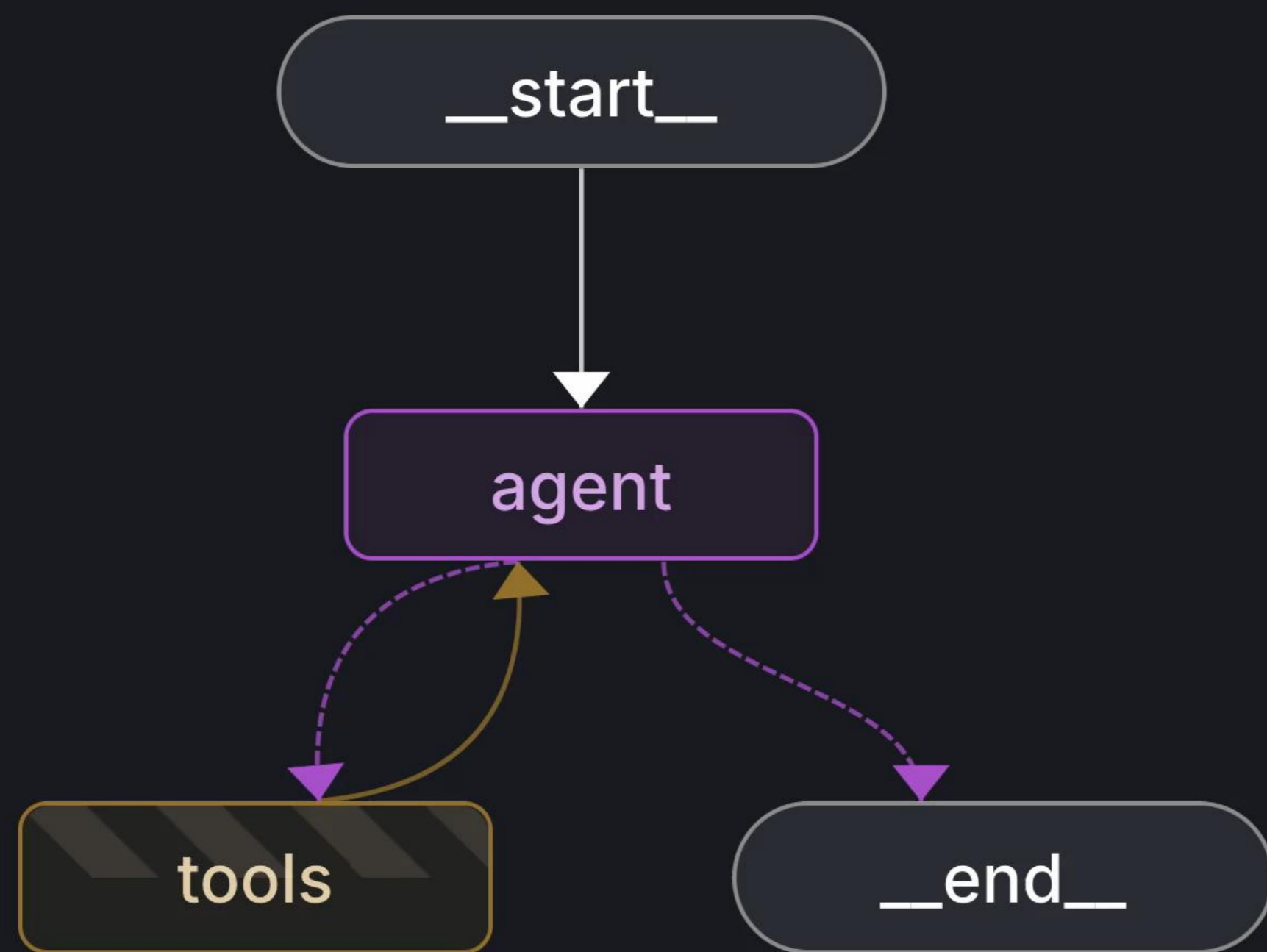
Memory

Interrupts 1

New Thread



Pretty



New Thread

Submit your input to run the assistant



Input

View Raw

Messages

Required

+ Message

Manage Assistants

Submit

OUTPUT





```
(base) ~/Documents/IBM/sandbox/oss/ai/db2i-ai/db2i-agents/examples/agents/agno [main]  
$ uv run agent.py --debug
```



```
(base) ~/Documents/IBM/sandbox/oss/ai/db2i-ai/db2i-agents/examples/agents/agno [main]  
$ uv run mapepire_ai.py --debug
```


db2i-agents

CONTINUE + ↻ 🗑️ ⚙️ ⋮ Local Assistant

Ask anything, '@' to add context

Claude 3.7 Sonnet 📧 @ Tools 🔄 @codebase ↵ Enter

← Last Session



Show All Commands ⌘ ⌘ P

Go to File ⌘ P

Open Chat ⌘ I

Start Debugging F5

Open Settings ⌘ ,

< main* 🔄 🛠️ Launchpad 0 12 🛠️ common1 🔄 Live Share Git Graph 🚀 Deploy 📁 New job (1)

3.12.7 (".venv": venv) 📌 Go Live 🔄 Reload 🔄 Continue 🗨️

Message

What is the total compensation of employee 000010?

Tool Calls

- `fetch_employee_info(id=000010)`

Response (5.0s)

```
[{'EMPNO': '000010', 'FIRSTNAME': 'CHRISTINE', 'MIDINIT': 'I', 'LASTNAME': 'HAAS', 'WORKDEPT': 'A00', 'PHONENO': '3978', 'HIREDATE': '01/01/65', 'JOB': 'PRES', 'EDLEVEL': 18, 'SEX': 'F', 'BIRTHDATE': None, 'SALARY': 52750.0, 'BONUS': 1000.0, 'COMM': 4220.0}]
```

The total compensation for employee 000010, Christine I. Haas, is calculated as follows:

- **Salary:** \$52,750.00
- **Bonus:** \$1,000.00
- **Commission:** \$4,220.00

Total Compensation: \$52,750.00 (Salary) + \$1,000.00 (Bonus) + \$4,220.00 (Commission) = **\$57,970.00**

```
$ uv run get_ptf_info.py
```

Message

Are there any PTF group updates available?

Tool Calls

- `get_ptf_currency_info()`

Response (7.4s)

There are indeed some PTF Group updates available. Here are the details of the available updates:

- 1 SF99662 – 740 IBM HTTP Server for i**
 - Current Level Installed: 42
 - Level Available: 43
 - Last Updated by IBM: 05/12/2025
- 2 SF99738 – 740 Group Security**
 - Current Level Installed: 75
 - Level Available: 76
 - Last Updated by IBM: 05/13/2025
- 3 SF99739 – 740 Group Hiper**
 - Current Level Installed: 149
 - Level Available: 150
 - Last Updated by IBM: 05/13/2025

For the rest of the PTF Groups, the installed levels are already current. If you need assistance updating these, make sure to follow your system's maintenance procedures or seek help from your system administrator.

```
performance -- -zsh -- 152x63
$ uv run metrics_assistant.py
Message
What's the current system performance status? Are there any bottlenecks?

Tool Calls
• get_performance_metrics(id=system_status)
• get_performance_metrics(id=system_activity)
• get_performance_metrics(id=memory_pools)
• get_performance_metrics(id=unnamed_temp_storage)
• get_performance_metrics(id=http_server)

Response (23.7s)
The system performance status based on the current metrics are as follows:

System Status

• CPU Utilization:
  • Average CPU utilization is at 0.61%, with maximum utilization at 2.62%. This indicates the CPU is not significantly taxed.
• Memory Usage:
  • Total jobs in the system: 1486, out of which 398 are active.
  • Main storage size is 133,021,696 KB.
• Disk Usage:
  • System ASP (Auxiliary Storage Pool) is 48.48% utilized.

System Activity

• The CPU is operating well below full capacity, with an average utilization of 86.36 (which appears to be the rate or speed rather than usage) and current operations distributed across 3 CPUs.

Memory Pool Usage

• BASE memory pool is the most utilized with 2267 current threads, well within the maximum active threads allowed (10,266).
• Memory pools are appropriately sized with no specific pool showing signs of excessive usage.

Unnamed Temporary Storage

• Current size of unnamed temporary storage is around 11,066,355,712 bytes, with the peak recorded at 15,511,887,872 bytes. This seems to be manageable but should be monitored to protect against growth.

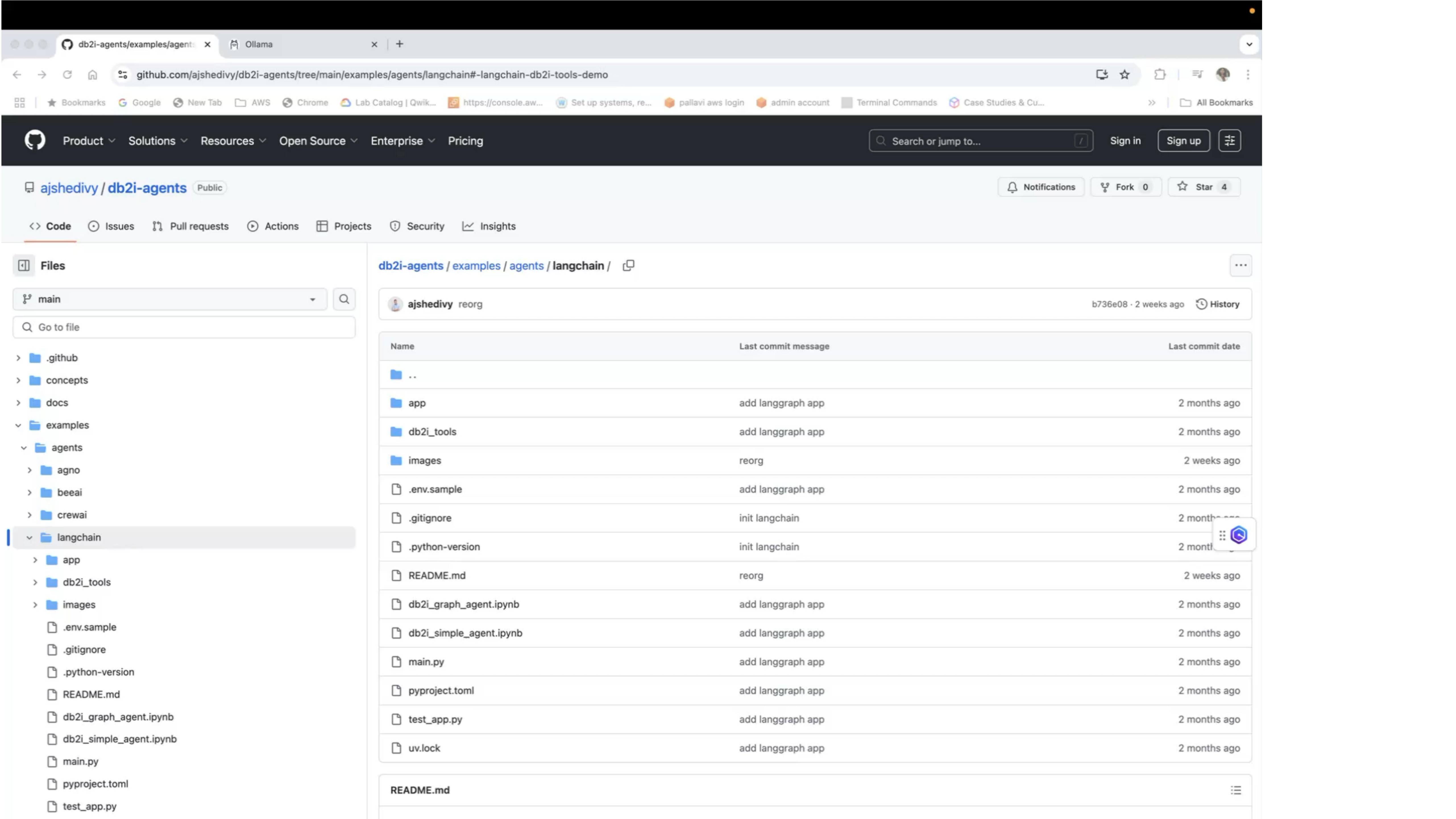
HTTP Server Performance

• HTTP servers are handling requests effectively, with some rejections noted (113 rejected out of 488 total requests handled normally).
• Notably, the ADMIN_WEBSPHERE function shows cached processing time (85.701 seconds), insights into heavier processing requirements.

Analysis and Recommendations

1 CPU and Memory Utilization: The system doesn't show any performance bottlenecks in terms of CPU use or memory pool distribution. Continue routine monitoring to ensure no unexpected peaks occur.
2 Temporary Storage: While current usage appears reasonable, ensure regular monitoring to prevent unexpected storage increases exceeding capacity, especially given the peak sizes noted.
3 HTTP Server Rejections: Evaluate why HTTP server requests are being rejected or why certain processed requests experience substantial cache times. If these are part of standard operation or threshold controls, this is acceptable but should be documented.
4 General System Checks: Since system values are within acceptable ranges, no immediate action is required, however, periodic audits of threshold settings, especially around the more heavily used services, would be beneficial to maintain optimal performance.

This current snapshot suggests the IBM i system is performing efficiently at this moment.
```



Files

main
Go to file

- > .github
- > concepts
- > docs
- > examples
- > agents
 - > agno
 - > beeai
 - > crewai
 - > langchain
 - > app
 - > db2i_tools
 - > images
 - .env.sample
 - .gitignore
 - .python-version
 - README.md
 - db2i_graph_agent.ipynb
 - db2i_simple_agent.ipynb
 - main.py
 - pyproject.toml
 - test_app.py

db2i-agents / examples / agents / langchain /

ajshedivy reorg b736e08 · 2 weeks ago History

Name	Last commit message	Last commit date
..		
app	add langgraph app	2 months ago
db2i_tools	add langgraph app	2 months ago
images	reorg	2 weeks ago
.env.sample	add langgraph app	2 months ago
.gitignore	init langchain	2 months ago
.python-version	init langchain	2 months ago
README.md	reorg	2 weeks ago
db2i_graph_agent.ipynb	add langgraph app	2 months ago
db2i_simple_agent.ipynb	add langgraph app	2 months ago
main.py	add langgraph app	2 months ago
pyproject.toml	add langgraph app	2 months ago
test_app.py	add langgraph app	2 months ago
uv.lock	add langgraph app	2 months ago

README.md

Simple Agent: PTF currency

Message

Are there any PTF group updates available?

Tool Calls

- `get_ptf_currency_info()`

Response (7.7s)

There is one PTF group update available:

- **PTF Group Title:** SF99662 – 740 IBM HTTP Server for i
 - **PTF Group ID:** SF99662
 - **Current Installed Level:** 42
 - **Available Level:** 43
 - **Last Updated by IBM:** 05/12/2025

The rest of the PTF groups are up-to-date and do not have any new updates available.

Simple Agent: PTF currency

Message

Are there any missing technology refresh PTFs?

Tool Calls

- `get_missing_ptf_info(name=SF99737)`

Response (17.9s)

Your system is missing some PTFs from the "Technology Refresh" group (SF99737). Here are the details:

1 PTF Identifier: SI76963

- Program: 5733CY3
- APAR Name: SE76021
- PTF Date: 09/09/21
- Cumulative Package: 1000
- IPL Required: Immediate

2 PTF Identifier: SI76991

- Program: 5770SS1
- APAR Name: SE76039
- PTF Date: 09/09/21
- Cumulative Package: 2125
- IPL Required: Immediate

Both PTFs require an immediate IPL (Initial Program Load) to take effect. You may want to install these PTFs to ensure your system is up to date with the latest Technology Refresh updates.

Generate SQL

Tools for SQL generation:

- **list-usable-tables**: List the tables in the database (Schema).
- **describe-table**: Describe a table in the database.
- **run-sql-query**: Run a SQL query on the database.

Message

How many employees are in each department?

Tool Calls

- list-usable-tables()
- describe-table(table_name=EMPLOYEE)
- describe-table(table_name=DEPARTMENT)
- run-sql-query(sql=SELECT D.DEPTNAME, COUNT(E.EMPNO) AS EMPLOYEE_COUNT FROM SAMPLE2.EMPLOYEE E JOIN SAMPLE2.DEPARTMENT D ON E.WORKDEPT = D.DEPTNO GROUP BY D.DEPTNAME;)

Response (11.1s)

Here is the number of employees in each department:













- ADMINISTRATION SYSTEMS: 7 employees
- SPIFFY COMPUTER SERVICE DIV.: 5 employees
- SOFTWARE SUPPORT: 6 employees
- INFORMATION CENTER: 4 employees
- PLANNING: 1 employee
- MANUFACTURING SYSTEMS: 11 employees
- SUPPORT SERVICES: 1 employee
- OPERATIONS: 7 employees

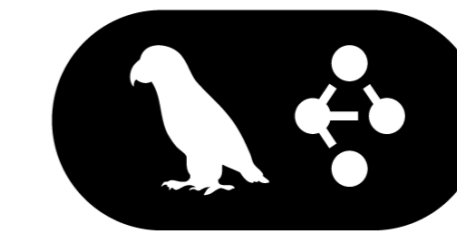
Agentic AI with IBM i

Samples published here: <https://github.com/ajshedivy/db2i-agents>



Agent Framework Comparison

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 BeeAI	Python <input checked="" type="checkbox"/> TypeScript <input checked="" type="checkbox"/>	Coming soon 	Mapepire 	Yes <input checked="" type="checkbox"/>	An open-source ecosystem that empowers developers to discover, run, and compose AI agents from any framework.
 CrewAI	Python <input checked="" type="checkbox"/>	Coming soon 	Mapepire 	No <input checked="" type="checkbox"/>	Fast and flexible Python Multi-Agent automation framework



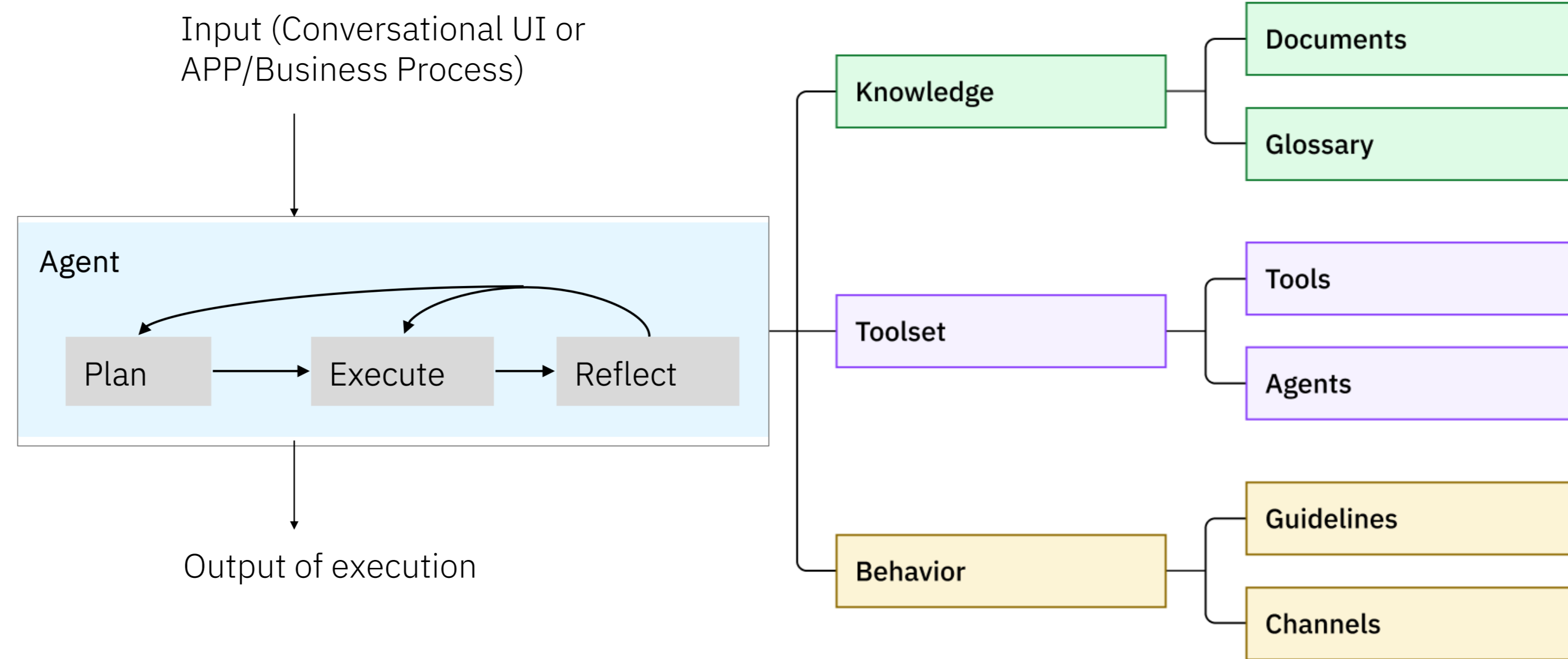
LangGraph



IBM i agentic roadmap

AI Agents

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The Orchestrator Agent is a multi-agent, multi-tool supervisor, router, and planner, facilitating complex task execution

IBM i Agentic – Mission Statement is to enable...

End Users to use natural language to

- Get information from company-specific Db2 data
- Improve, monitor and manage system security
- Manage the system

Application Builders to use natural language to

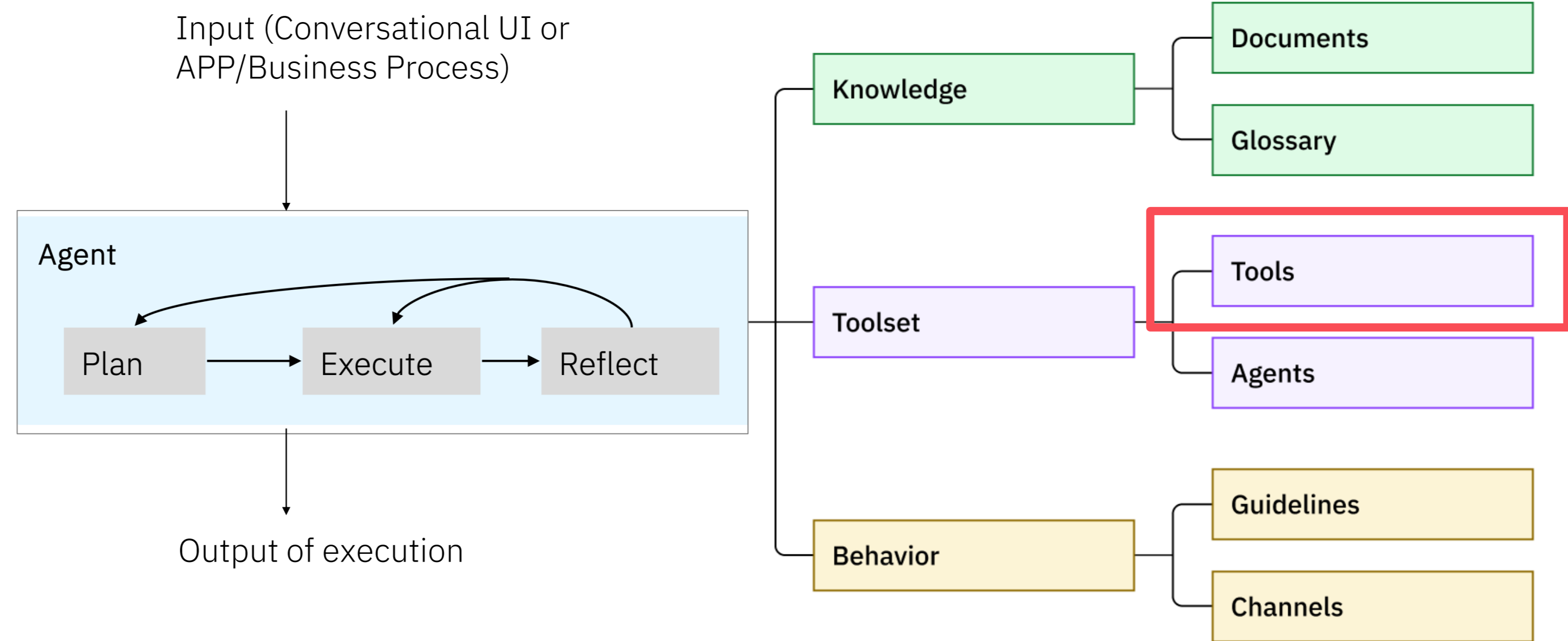
- Build, enhance, modernize and maintain solutions faster
- Deploy updates to the applications on the IBM i architecture
- Employ skilled professionals who are not familiar with traditional IBM i languages

IBM/Red Hat Products & Applications use a common set of IBM i tools

- AIOps/Hybrid Console
- Project Bob
- OpenShift AI
- watsonx

AI Agents

An AI agent is an **autonomous** system that can use **tools** and collaborate with other agents to **plan** and **act** on tasks. After it acts, the agent **reflects** on the results of its actions, learning iteratively and refining its approach to better align with its defined objectives.



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Universal MCP Server

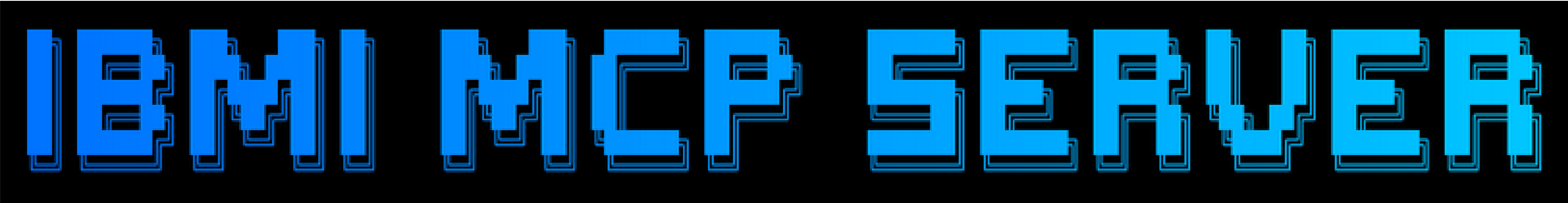
<https://ibm.biz/ibmi-mcp>

 **ibmi-mcp-server** Public

MCP server for IBM i

TypeScript	^5.8.3	MCP SDK	^1.17.1	MCP Spec	2025-06-18	Version	1.9.1	Coverage	64.67%	License	Apache 2.0
Status	Stable	 Ask DeepWiki									

 [Documentation](#) |  Docs are under active development



Your system has 10 PTF groups with updates available and 4 PTF groups that are current. Here's the detailed breakdown:

[Check PTF currency for my system <addi](#)

Critical Updates Available (High Priority)

PTF Group	Title	Installed Level	Available Level	Behind By	Last Updated
SF99739	Group Hiper	149	158	9 levels	10/14/2025
SF99738	Group Security	75	82	7 levels	08/19/2025

Other Updates Available

PTF Group	Title	Installed Level	Available Level	Behind By	Last Updated
SF99662	IBM HTTP Server for i	42	47	5 levels	10/16/2025
SF99665	Java	27	30	3 levels	10/07/2025
SF99664	Backup Recovery Solutions	46	48	2 levels	10/02/2025
SF99737	Technology Refresh	11	12	1 level	07/24/2025
SF99666	High Availability for IBM i	20	21	1 level	07/24/2025
SF99668	IBM Db2 Mirror for i	26	27	1 level	07/23/2025
SF99704	Db2 for IBM i	30	31	1 level	07/23/2025
SF99663	Performance Tools	16	17	1 level	06/27/2025

Current PTF Groups (No Updates Needed)

Ask anything... 

what is my performance status look like?

openai/gpt-oss-20b

> Thought for a brief moment

`run_agent`({"agent_id": "metrics-assistant", "message": "What's ..."})

> Arguments: {"agent_id": "metrics-assistant", "message": "What's my performance status?"}
> Result: [{"type": "text", "text": "\\\"run_id\\\": \\\"5c33c7de-6736-4a9f-8168-0c4cb92e5d4a\\\", \\\"agent_id\\\": \\\"metrics-assistant\\\", ..."}]

Here's a concise snapshot of your system's performance status:

Area	Metric	Value	Status
CPU	Avg Utilization	34.31%	✔ Healthy
	Max Utilization	79.24%	✔ Good
	Avg CPU Rate	83.75%	⚠ Slightly elevated (watch peak hours)
Memory	Total RAM	128 GB	✔ Healthy
	ASP Used	52.85%	✔ Good
Job Activity	Total Jobs	2,893 / 165,000 max	✔ Healthy
	Active Jobs	1,068	✔ Good
	Batch Running	256	✔ Normal
Capacity	Virtual CPUs	3 / 5 max	✔ Headroom available

Quick Takeaways

- CPU and memory are well within normal ranges.
- No jobs are waiting to run; batch queues are typical for scheduled tasks.
- You have 2 virtual CPUs of capacity left if you ever need to scale.

Overall: Your system is healthy and performing optimally.

Let me know if you'd like deeper dives into any metric (e.g., temporary storage, HTTP server stats, or a trend analysis).

🔄 → 📌 📄 📝 🗑

Send a message to the model...

🗑 📌 ^ Reasoning Effort ibmi-agno-mcp x User (⌘U) Insert (⌘I) ↑



admin

New Chat

Users

Systems ^

Manage

New System

Data ^

Tools

Prompts

Here's a potential title for our c...

"Re: Department Details - Spiff...

"Retrieving Spiffy Department ...

"Checking if Spiffy Department...

"Department Details: Spiffy Co...

"Checking if 'Spiffy' Departme...

Tools

Tools that can be used in Mapepire AI and via MCP.

New tool



Get Department By Name

Get department details by name



Get Employees By Department

Get employee details by department



Employee Info

Information for a specific employee



Salary Info

Find employees that have a salary greater than a specified amount



Users

Systems

[Manage](#)[New System](#)

Data

[Tools](#)

Prompts

[Here's a potential title for our c...](#)["Re: Department Details - Spiff...](#)["Retrieving Spiffy Department ...](#)["Checking if Spiffy Department...](#)["Department Details: Spiffy Co...](#)["Checking if 'Spiffy' Departme...](#)

Do I have a department called Spiffy?

[View result of get department details by name ▶](#)

It appears that you do have a department called "Spiffy Computer Service Div." with the department number "A00".

What are the employees in that department?

[View result of get employee details by department ▶](#)

The employees in the "Spiffy Computer Service Div." department (department number A00) are:

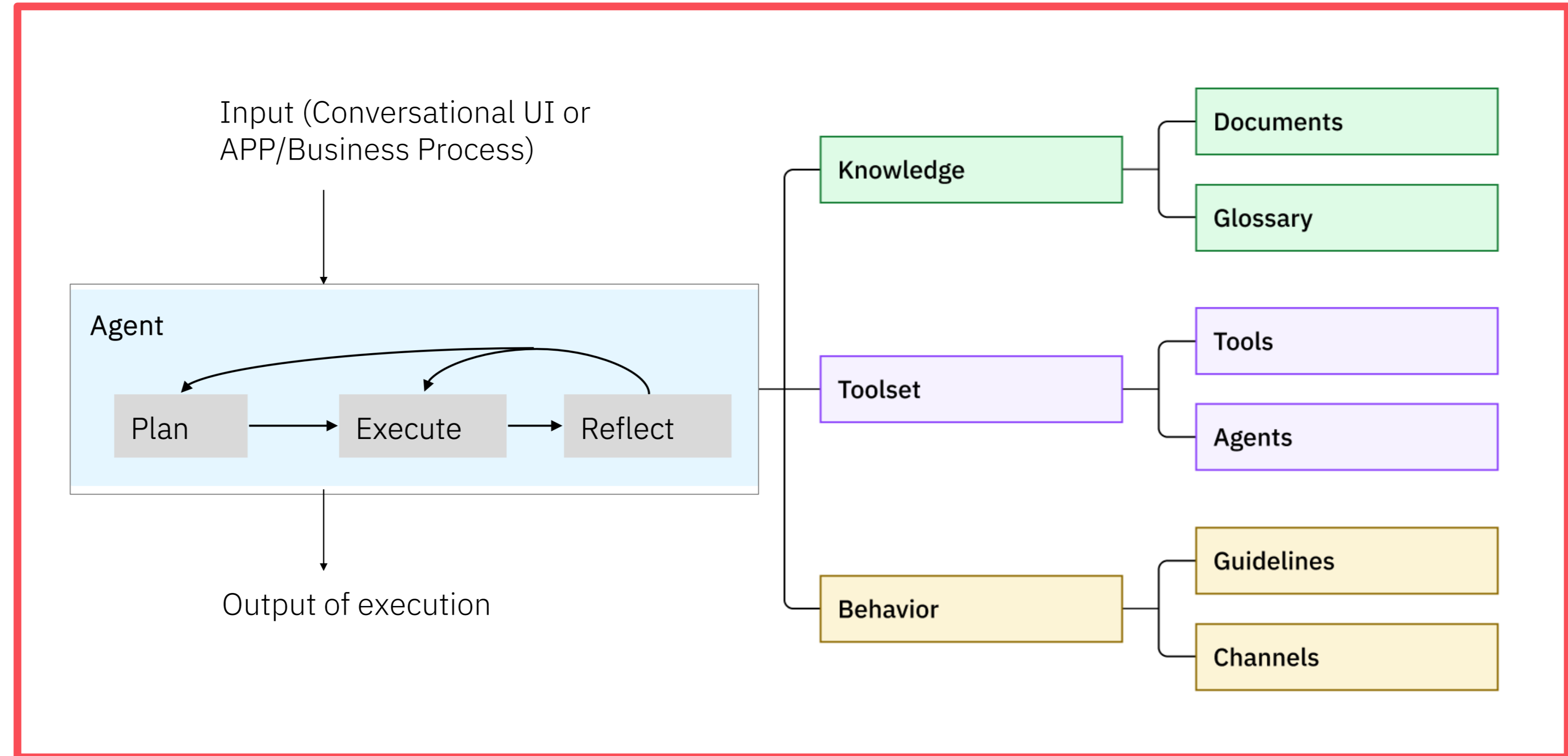
- Christine Haas (EMPNO: 000010)
- Vincenzo Lucchesi (EMPNO: 000110)
- Alan O'Connell (EMPNO: 000120)
- Dian Henninger (EMPNO: 200010)
- Greg Orlando (EMPNO: 200120)

Note that the "BIRTHDATE" field is null for all employees, indicating that their birthdate is unknown or not available in the database.



Future

An AI agent is an **autonomous** system that can use **tools** and collaborate with other agents to **plan** and **act** on tasks. After it acts, the agent **reflects** on the results of its actions, learning iteratively and refining its approach to better align with its defined objectives.



The Orchestrator Agent is a multi-agent, multi-tool supervisor, router, and planner, facilitating complex task execution

IBMi