



# From Theory to Practice: Developing Agentic AI on Azure

Ricardo Niepel

Senior Solution Engineer – Cloud & AI Apps



[github.com/RicardoNiepel](https://github.com/RicardoNiepel)

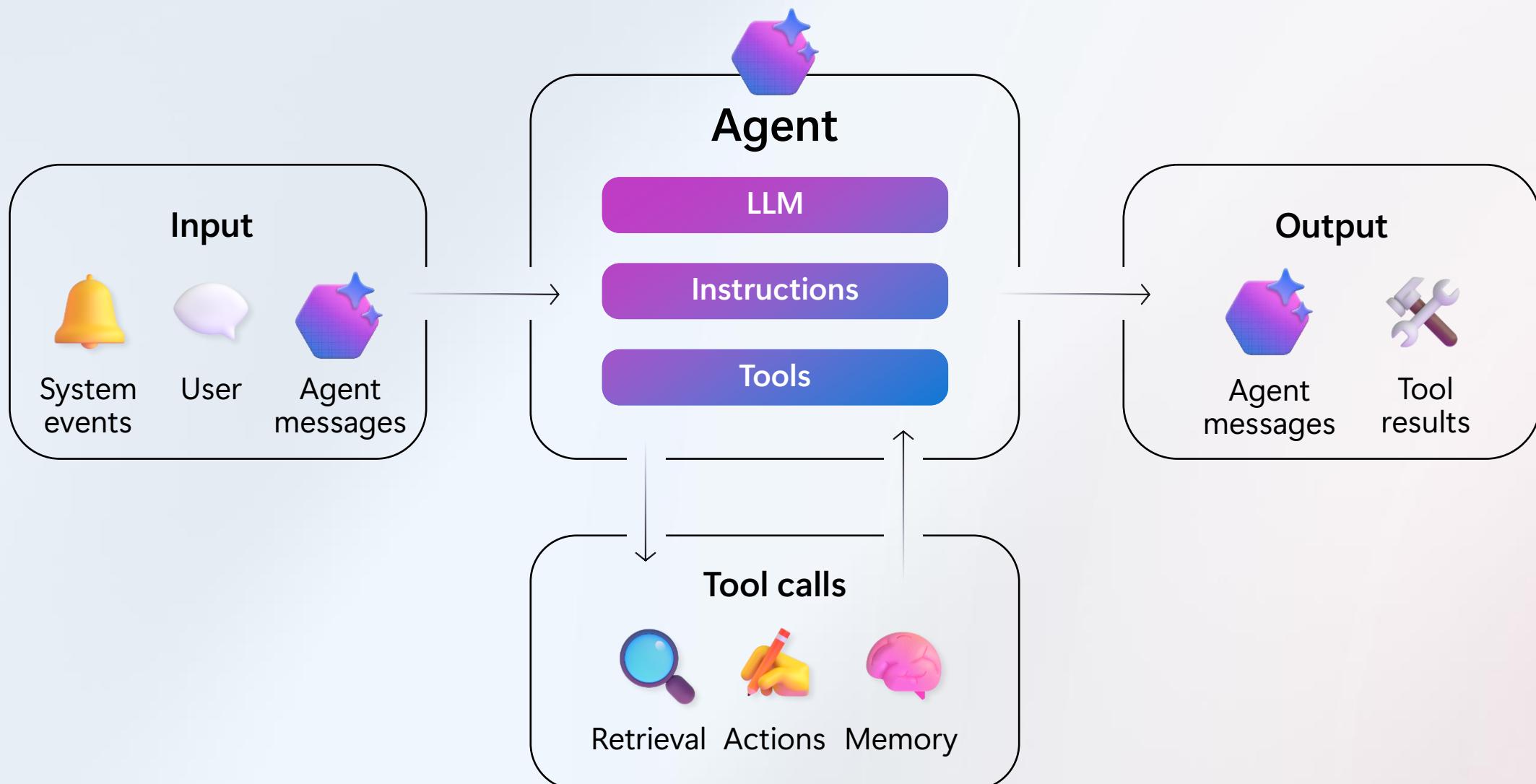


[ricardo.niepel@microsoft.com](mailto:ricardo.niepel@microsoft.com)

# Agentic AI is the new frontier



# What is an agent?



# Agentic AI development challenges

70%  
or more generative AI  
experiments never  
make it to production<sup>2</sup>



Model  
selection &  
deployment



Complex  
workflows



Content  
safety



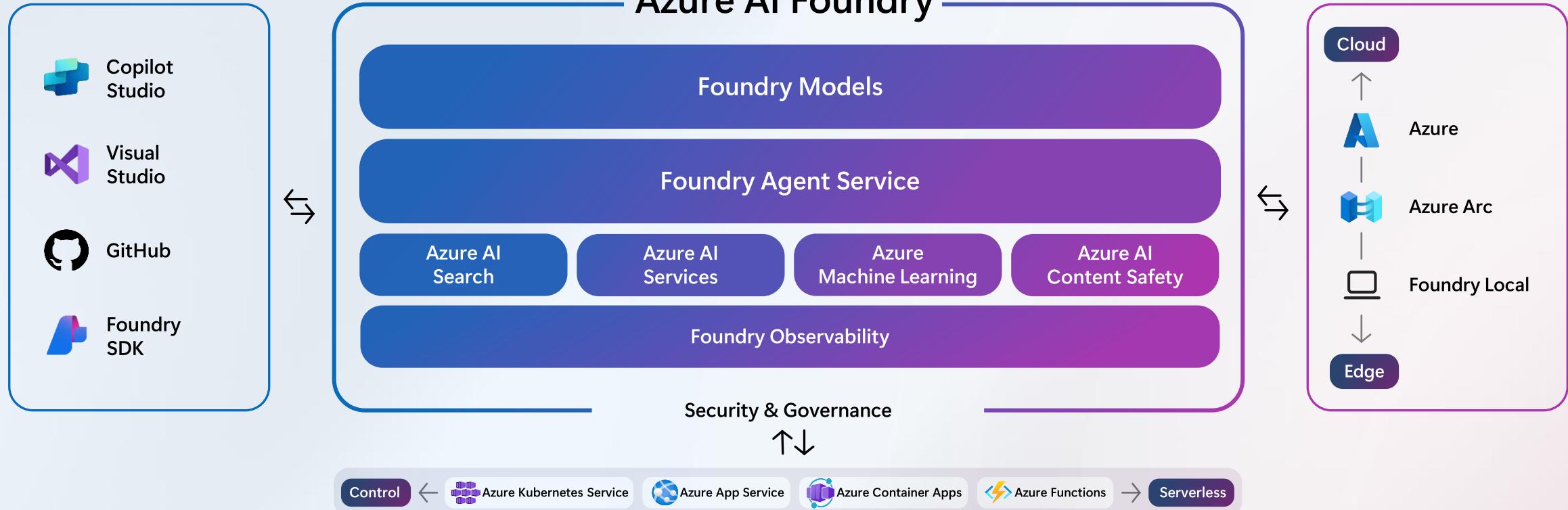
Observability  
and  
governance



Tool  
sprawl



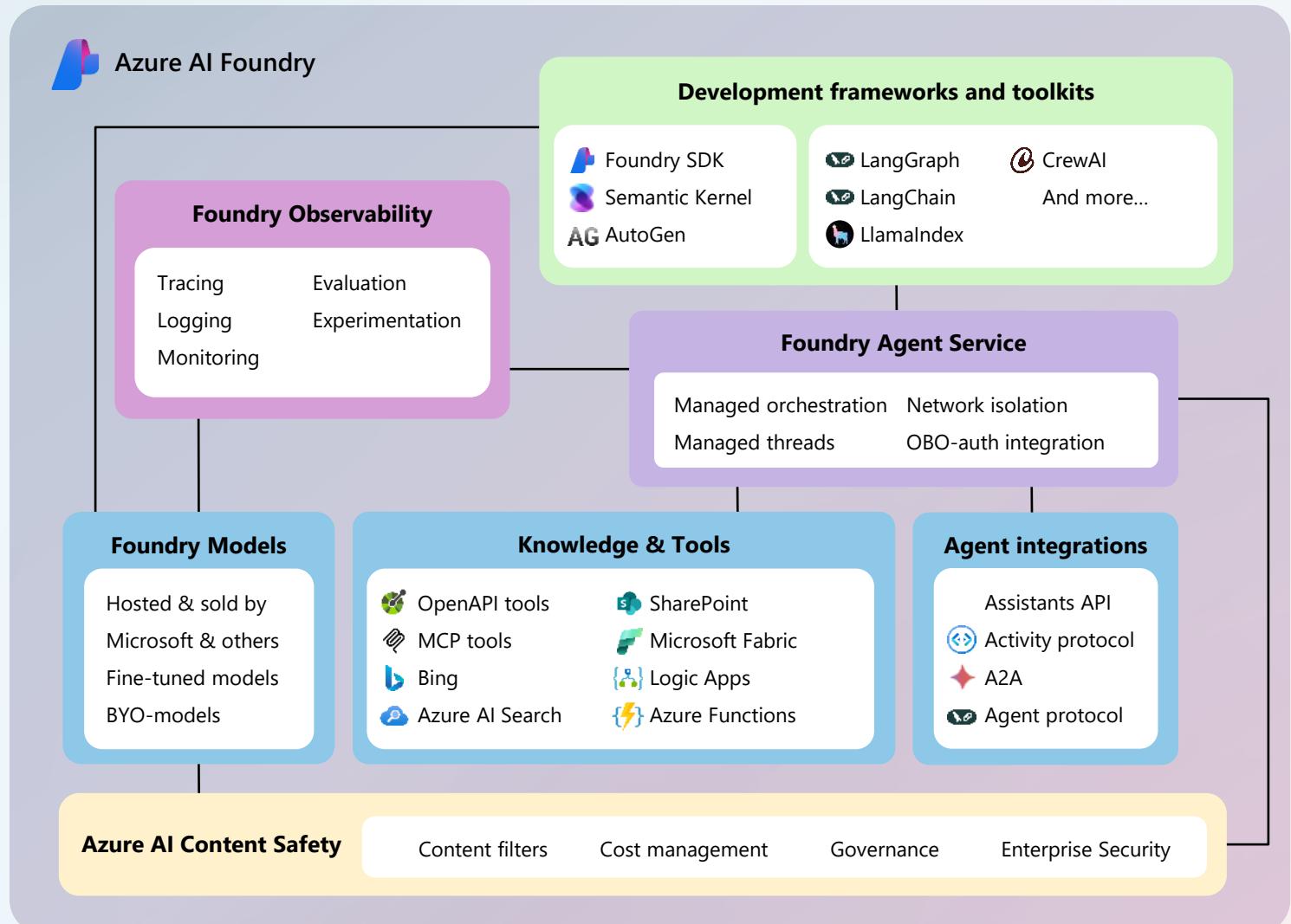
## Azure AI Foundry



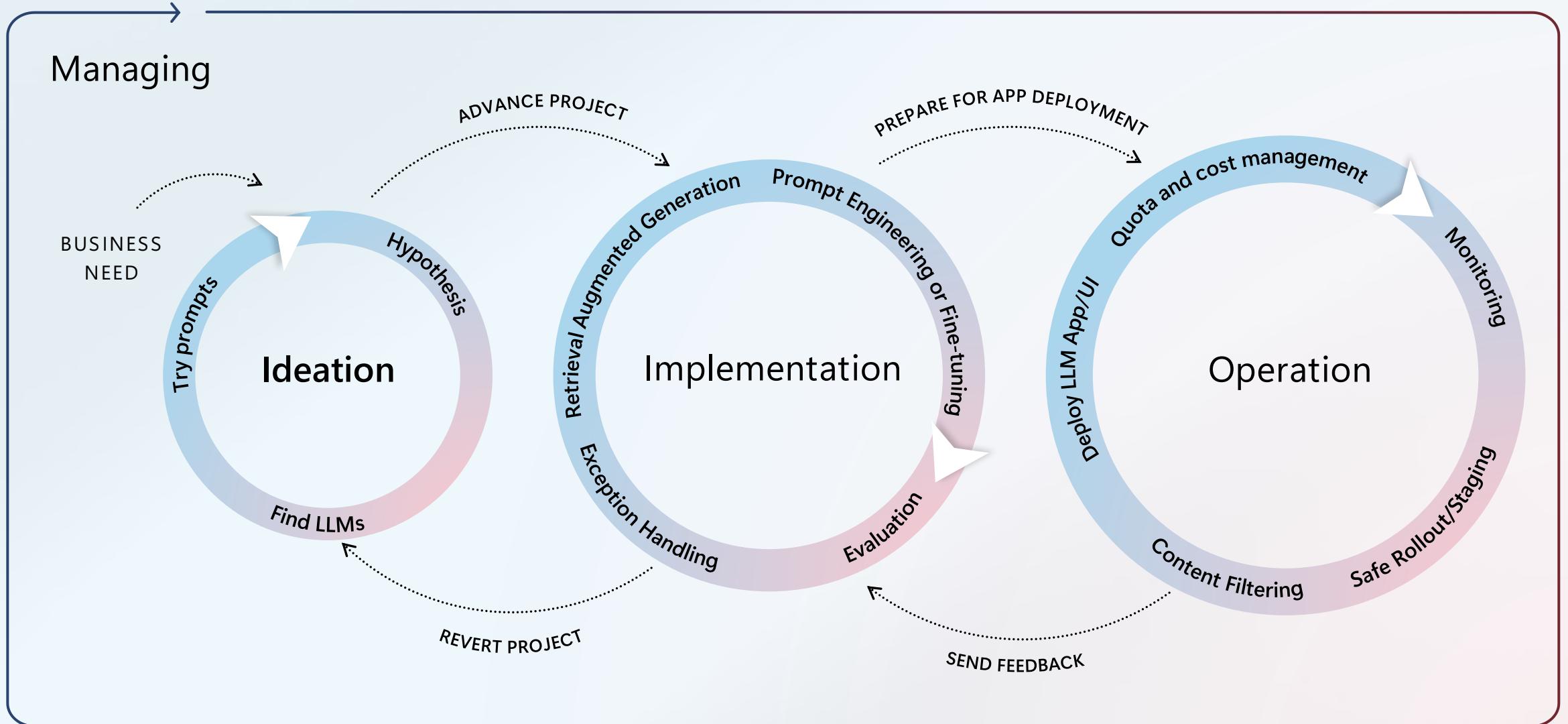


# Azure AI Foundry Agent Service

Combine the best models, services, and tools in Azure AI Foundry into reusable, testable agentic components.



# AI Development Lifecycle



# Accelerate AI App development with GitHub and Azure

## GitHub Models

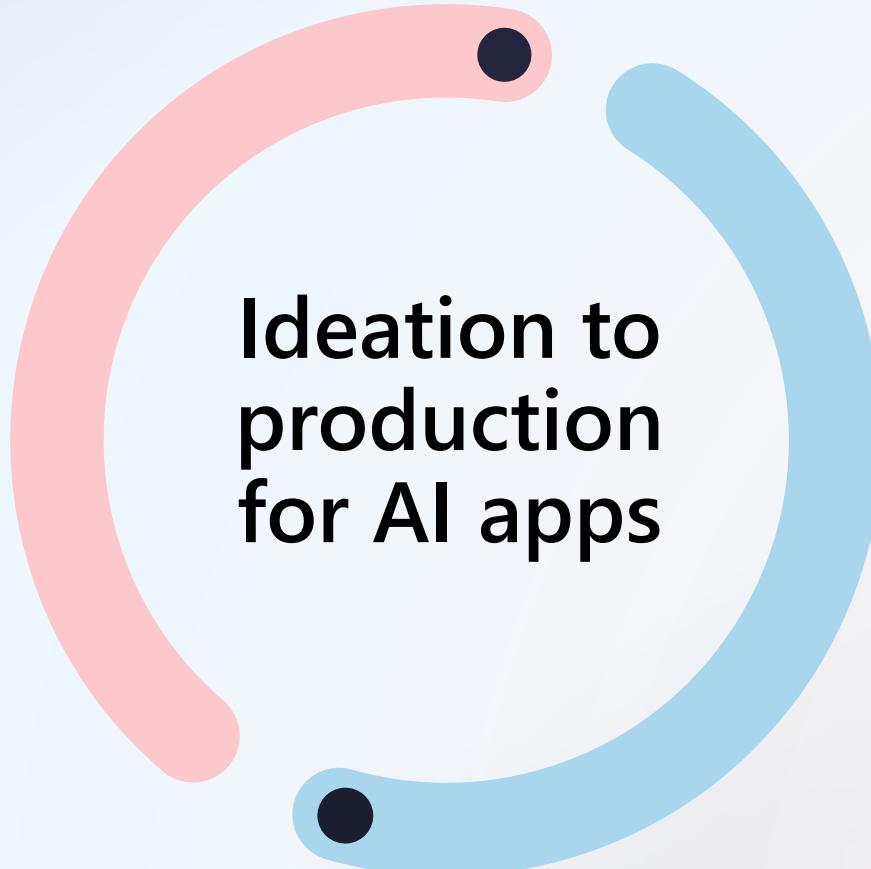
Making every developer an AI developer

-  Rapid prototyping of AI applications

-  Bring AI development into the familiar GitHub workflow

-  Test and experiment in a powerful, safe playground

-  Simplify deployment to Azure



## Azure AI Foundry

Design, customize, and manage AI apps and agents at scale

-  Comprehensive catalog of models: foundational to fine-tuned

-  Powerful AI services for enterprise scale apps

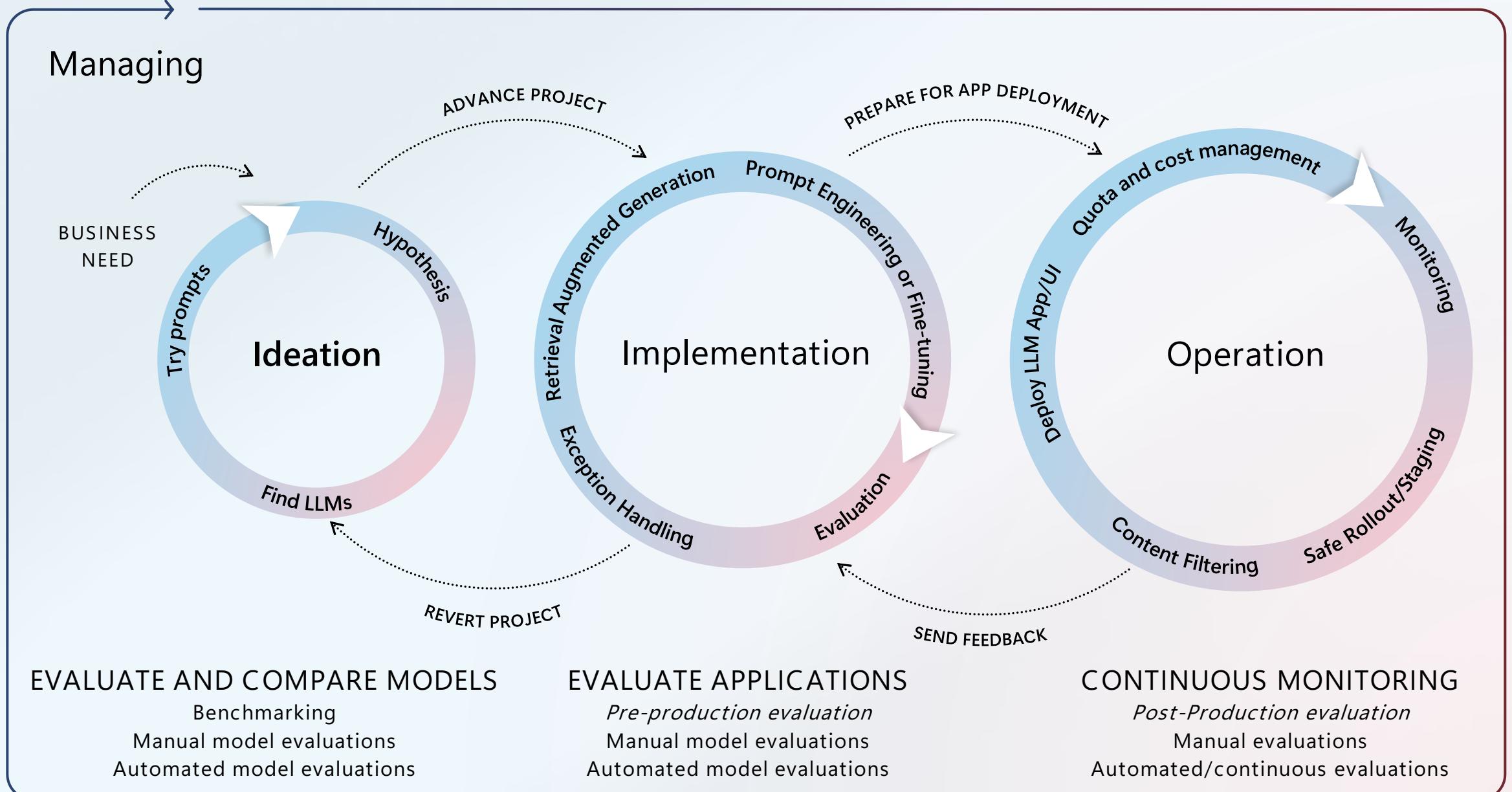
-  Evaluate, secure, and ensure content safety

-  Continuous monitoring and governance across environments

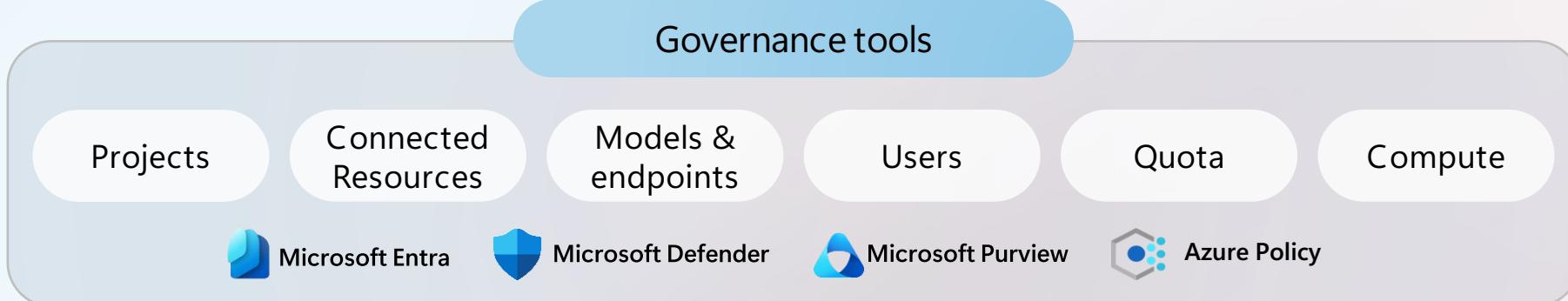
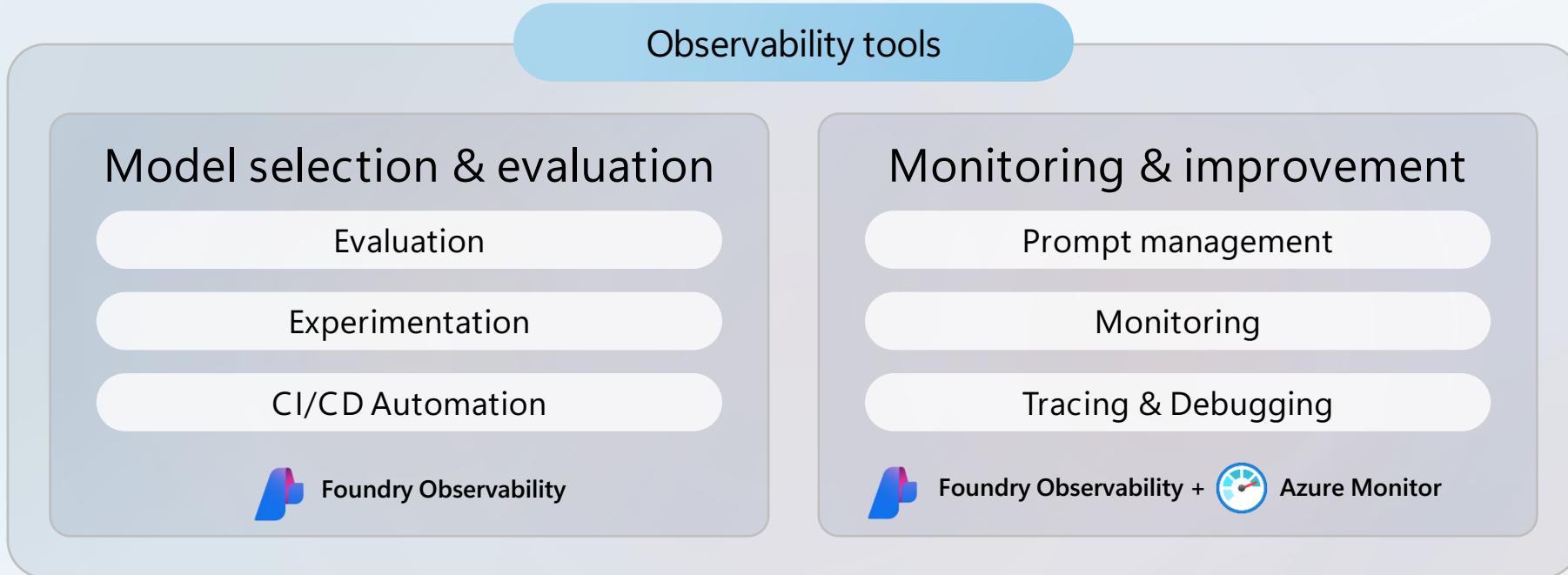
# Demo

## Ideation with GitHub Models

# Evaluations are an iterative, ongoing process



# End-to-end observability and simplified governance



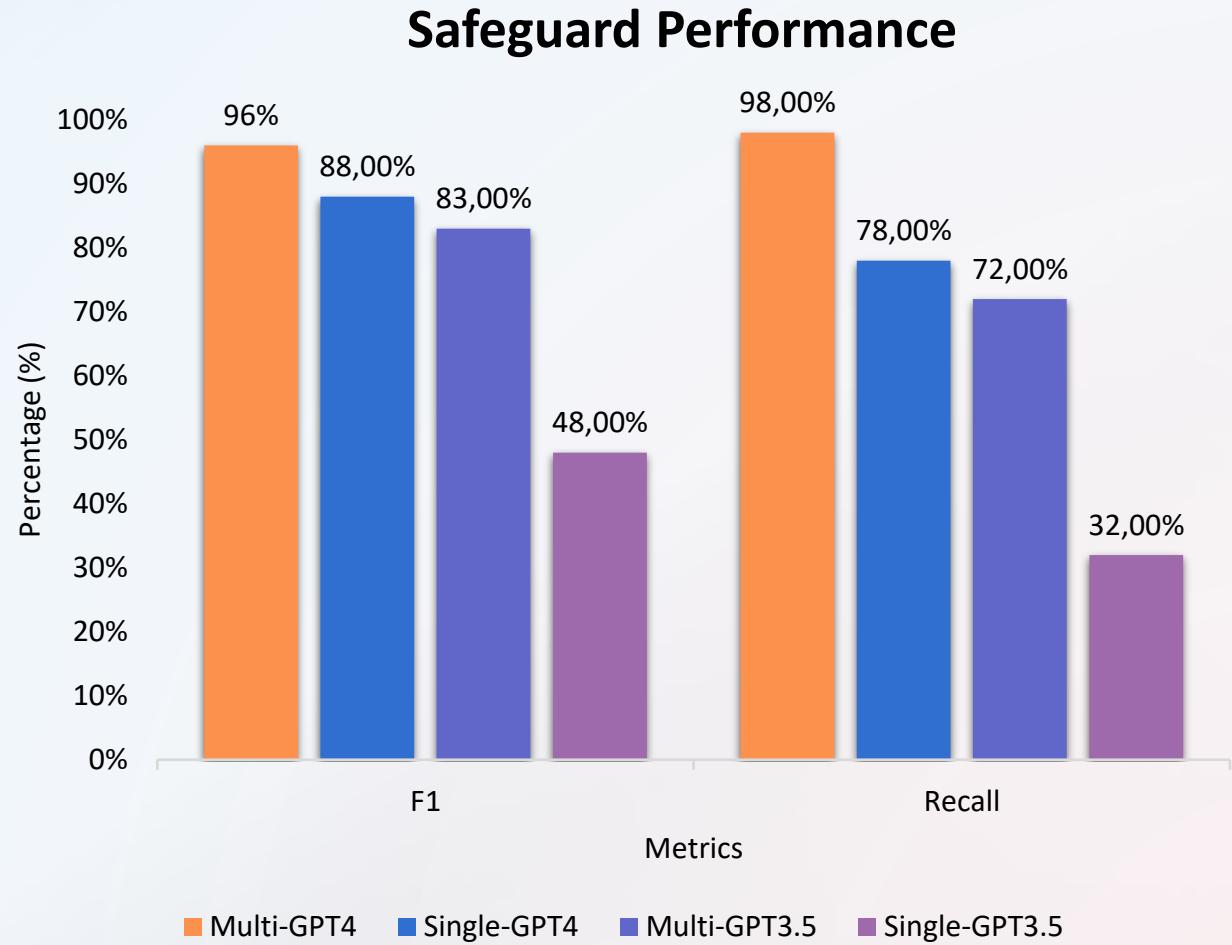
# Demo

## Evaluations with Azure AI Foundry

# When should I use multi-agents over a single agent?

Multi agent systems can solve more complex tasks

Single agents can solve a wide range of problems and are simpler to implement. Multi agent systems should only be used if a single agent is unable to solve the challenge, to handle tasks that involve more data, diverse roles, or complex workflows.



# Agentic Scenarios

Deterministic Process  
Deterministic Outcome

Traditional Software

Deterministic Process  
Probabilistic Outcome

Customer Support  
Marketing Campaign

Probabilistic Process  
Deterministic Outcome

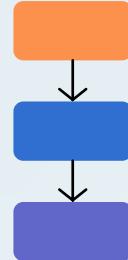
Loan Reviewer

Probabilistic Process  
Probabilistic Outcome

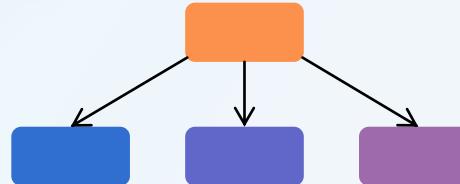
Research Agents

# Multi-Agent Orchestration Patterns

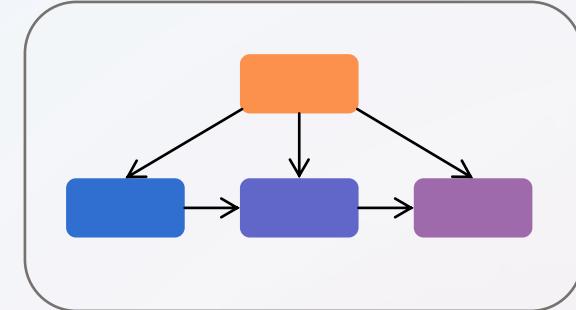
**Sequential**



**Concurrent**



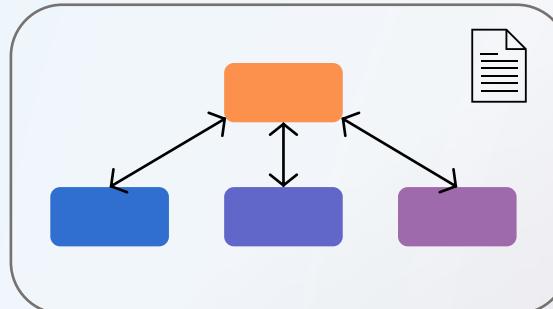
**Handoff**



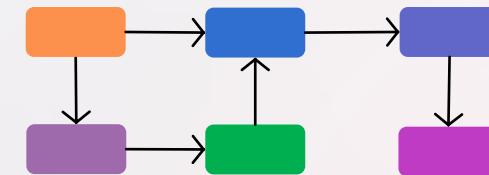
**Group Chat**



**Magentic**



**Workflow Process**





# Semantic Kernel

## AI and Agent Orchestration



.NET



Python



Java

### AI Services

- |               |                 |
|---------------|-----------------|
| Azure OpenAI  | Foundry Catalog |
| OpenAI        | Hugging Face    |
| NVIDIA        | Deepseek        |
| Google Gemini | AWS Bedrock     |

### Local models

- |           |                      |
|-----------|----------------------|
| Ollama    | ONNX                 |
| LM Studio | Phi SLM Model Family |

### Memory Services

- |                 |                |
|-----------------|----------------|
| Azure AI Search | Azure CosmosDB |
| Elasticsearch   |                |
| MongoDB         | Pinecone       |
| Qdrant          | Redis          |

### Agent Services

- |                        |                |
|------------------------|----------------|
| Azure AI Agent Service | Bedrock Agents |
| AutoGen                | Crew AI        |

### Plugins

- |         |            |
|---------|------------|
| OpenAPI | MCP        |
| A2A     | Logic Apps |

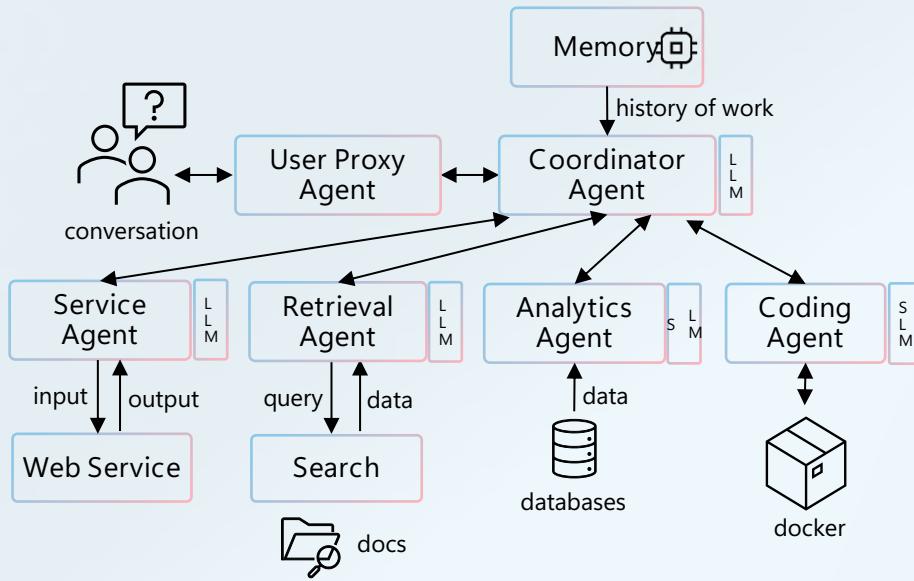
### Prompts

- |      |                 |
|------|-----------------|
| YAML | Semantic Kernel |
|------|-----------------|

### Filters and telemetry

- |                  |                         |
|------------------|-------------------------|
| OpenTelemetry    | Azure Monitor           |
| Aspire Dashboard | Azure AI Content Safety |

# Agent systems with Semantic Kernel

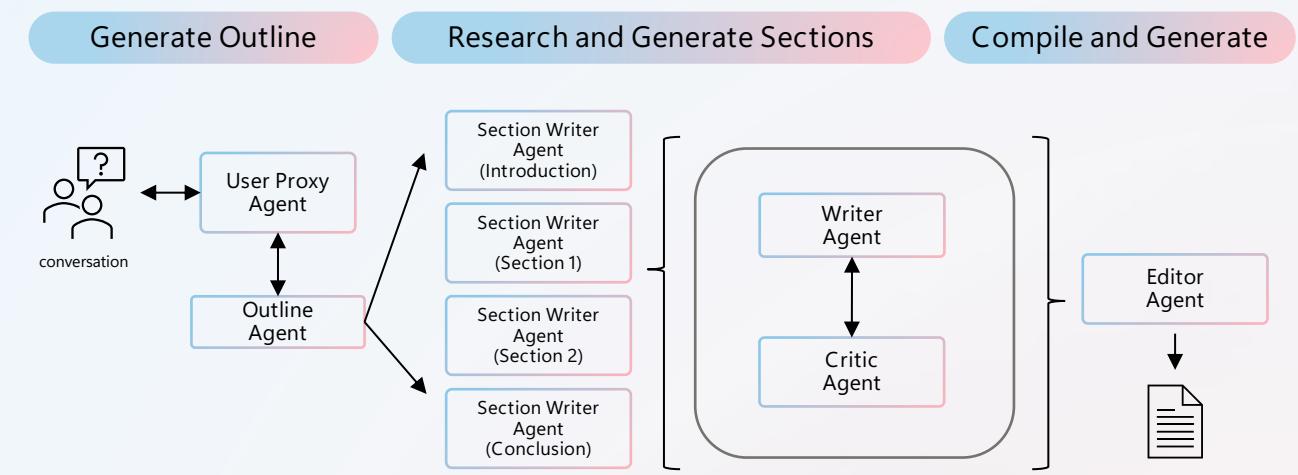


## Agent Framework

LLM-driven orchestration

Creative reasoning and decision-making

*Ex: Propose 2 Instagram marketing campaigns including assets that would leverage the top 2 recent trends in our past quarter US Sales to boost our mailing list user base and predict the impact of each campaign*



## Process Framework

Workflow-driven orchestration

Deterministic and predictable execution pattern

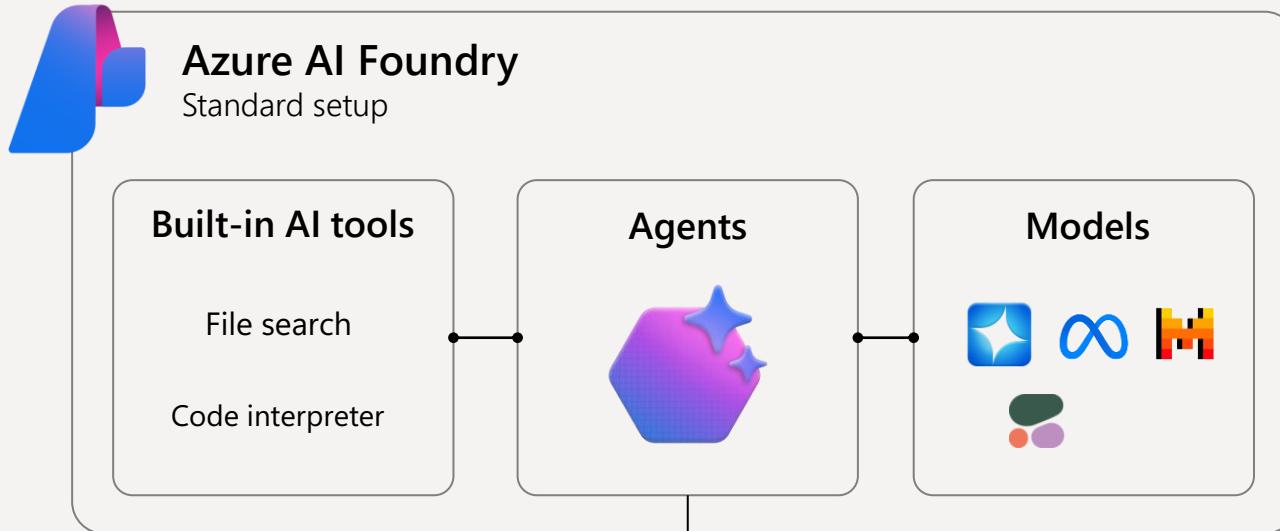
*Ex: Execution the Deep Research process to generate a document outline, write and refine section and synthesize into final document*

# Recommended “Golden Path” Architecture



## BYO resources

- Cosmos DB Thread storage
- Key vault Connections
- Azure Storage File storage
- Azure AI Search File search index



## AI tool resources

- Azure AI Search
- Grounding with Bing Search
- Logic Apps
- Azure Functions

**Semantic Kernel**  
Multi-agent orchestrator

Azure Container Apps



External APIs  
OpenAPI specs



MCP servers



A2A Servers

# Get started with Azure AI Agent Service today

Azure AI Foundry Agent Service:  
[\*\*Quickstart - Create a new agent\*\*](#)

[\*\*How to use Grounding with  
Bing Search\*\*](#)

[\*\*How to use OpenAPI defined tools\*\*](#)

Agent Service + Azure AI Search:  
[\*\*Quickstart - Import and vectorize  
documents\*\*](#)

[\*\*How to use an existing  
Azure AI Search index\*\*](#)

Agent Service + Semantic Kernel:  
[\*\*Exploring the Semantic Kernel\*\*](#)  
[\*\*AzureAIAgent\*\*](#)

Others:  
[\*\*Semantic Kernel Agent Orchestration\*\*](#)

Samples:  
Agent Service  
[\*\*C# Getting Started Samples\*\*](#)  
[\*\*Python Getting Started Samples\*\*](#)  
[\*\*Agent Catalog Bigger Samples\*\*](#)

Semantic Kernel - [\*\*C# / Python\*\*](#)

# Join our other Agentic AI sessions @ WeAreDevelopers

10<sup>th</sup> July, 16:50 – 17:20

**Building Blocks for  
Agentic Solutions  
in your Enterprise**

11<sup>th</sup> July, 09:00 – 09:30

**Rethinking Workflows  
in the Agentic Era**



# Thank You