Software &
Digital Platforms

# AI Agent Workshop

# Building AI Agents with Azure

May 05 – May 12

# Contents



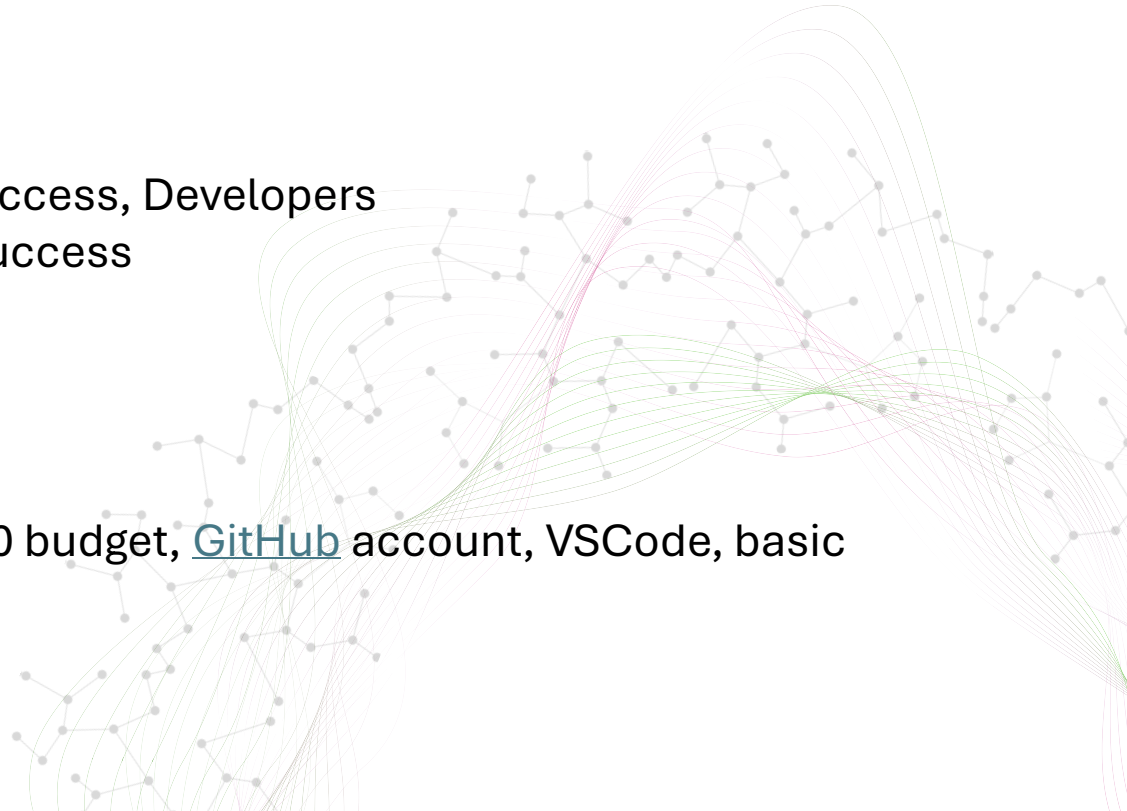
# Workshop Overview

- What you will learn
  - By the end of the workshop, you will learn
    - How to build an AI Agent and explore its tools
    - What are different AI Agent Platforms and how to use them
    - Hands-on experience building single and multi-agent systems

- Getting Started
  - README

- Target Audience
  - Day1: Executives, Product Management, Customer Success, Developers
  - Day2: Developers, Product Management, Customer Success
  - Day3: Developers

- Pre-requisites
  - Day1: Basic understanding of AI and LLMs
  - Day2 & Day3: Access to an Azure subscription with $50 budget, GitHub account, VSCode, basic familiarity with python



# Workshop Support Team

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# Day 2

## Workshop Assignments

Objectives | Business Scenario | Exercises | Solution Framework | Demo

https://github.com/microsoft/OpenAIWorkshop/blob/int-agentic

# Workshop Objectives

Hands-on exercises to build Agents using multiple platforms

Demonstrate using example use case / application scenario

Advance from single-agent setups to multi-agent architectures

The following cutting edge frameworks are used:

1. Azure AI Agent Service
2. Semantic Kernel
3. Autogen

https://github.com/microsoft/OpenAIWorkshop/blob/int-agentic

# Business Scenario

"Contoso Communications" provides telecom and internet services.

Customers frequently submit requests about billing, account management, service status, and promotions.

Requests range from simple queries (single data source) to complex questions requiring multiple backend systems interactions.

Source systems

- **CRM System (e.g., Salesforce or Dynamics CRM)**
  - Central repository for customer profiles, subscriptions, contract details, and interaction history.
  - Customer account data, subscription plans, contract dates, customer identification data.
  - Structured API queries (REST API).
- **Billing Database System**
  - Containing structured invoice and subscription data
  - Invoice amounts, billing history, plan details, payment status.
  - Structured SQL-style queries or REST API.
- **Product and Promotion Database**
  - Contains structured data about available products, upgrades, promotions, discounts, and eligibility criteria.
  - Promotion details, eligibility criteria, product/service details.
  - Structured API queries (REST API).
- **Security & Authentication Database**
  - Manages structured information about account security status, login attempts, and authentication issues, Account lockout reasons, authentication logs, security flags, Structured API queries or REST API.
- **Knowledge Base (Confluence or SharePoint-like system)**
  - Centralized repository for documentation, FAQs, troubleshooting guides, internal policies, and procedural guidelines.
  - Unstructured/semi-structured text documents, policy documents, troubleshooting procedures.
  - Semantic search API, keyword-based or embedding-based retrieval.

# Technical Problem

By using AI Agents, "Contoso Communications" will significantly improve their customer service

Some scenarios can be sufficiently addressed using Single-agents

Other scenarios are better served using multi-agents

Workshop participants will try using single and multi-agents with different AI Agentic platforms to evaluate which scenarios and platforms provide the best customer experience

https://github.com/microsoft/OpenAIWorkshop/blob/int-agentic

## Agentic Platforms

- **AI Agent Service**
  - Central repository for customer profiles, subscriptions, contract details, and interaction history.
  - Customer account data, subscription plans, contract dates, customer identification data.
  - Structured API queries (REST API).
- **Semantic Kernel**
  - Containing structured invoice and subscription data
  - Invoice amounts, billing history, plan details, payment status.
  - Structured SQL-style queries or REST API.
- **Autogen**
  - Contains structured data about available products, upgrades, promotions, discounts, and eligibility criteria.
  - Promotion details, eligibility criteria, product/service details.
  - Structured API queries (REST API).
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  - Manages structured information about account security status, login attempts, and authentication issues, Account lockout reasons, authentication logs, security flags, Structured API queries or REST API.
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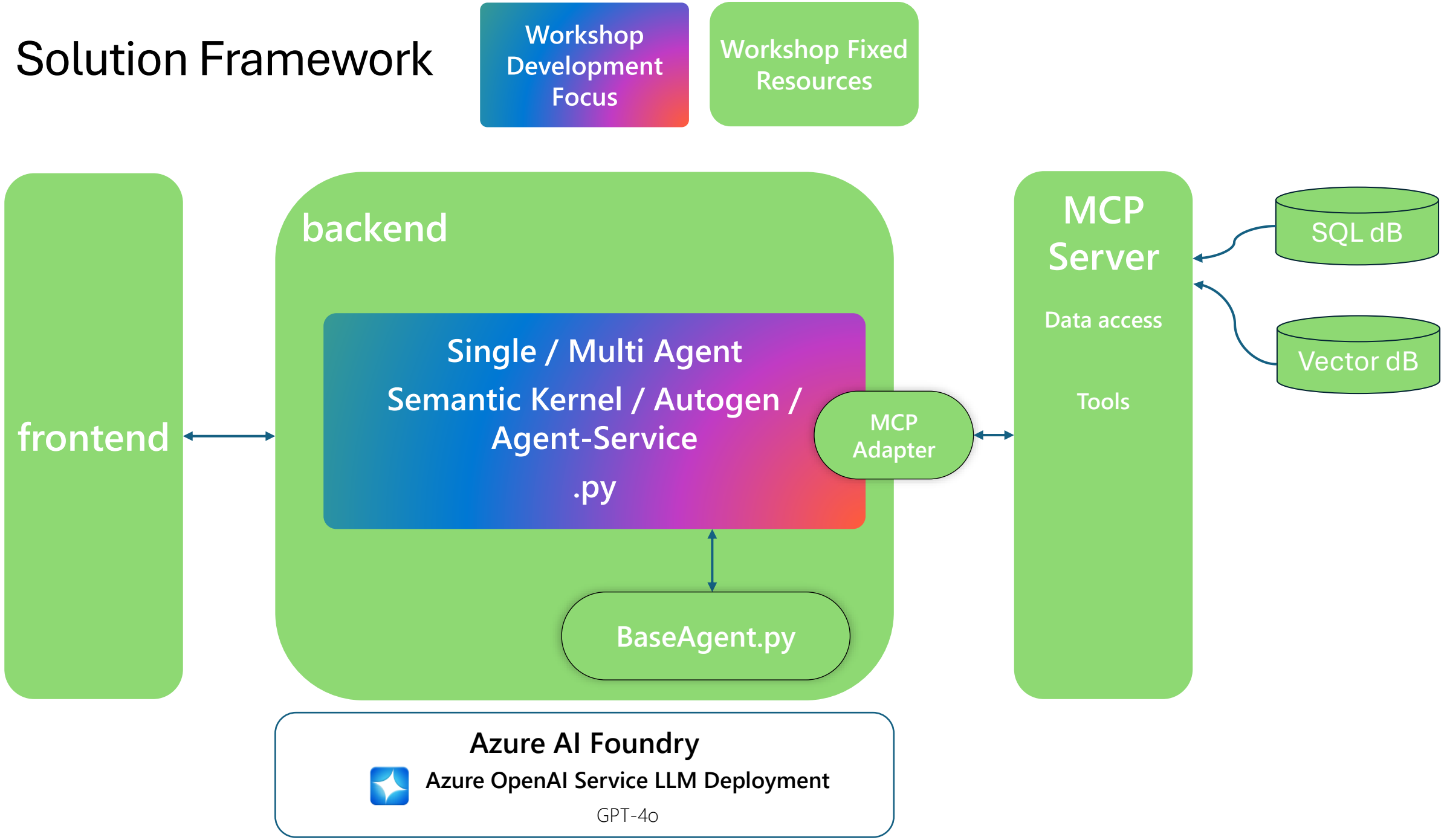
# Exercises – Sample customer queries to try with your Agent

| No. | Customer Query | Agent Analysis & Plan | Systems Accessed |
|---|---|---|---|
| 1 | I noticed my last invoice was higher than usual—can you help me understand why and what can be done about it? | • Check billing history and recent changes in subscriptions or charges.<br>• Review policy for invoice adjustments | CRM<br>Billing Database<br>Knowledge Base |
| 2 | My internet service seems slower than before—can you check what's happening? | • Review the customer's current subscription plan and service status.<br>• - Check for recent service incidents or network usage history.<br>• - Search knowledge base for troubleshooting guidance or policies on service quality guarantees. | CRM<br>Service Monitoring and Diagnostic Systems<br>Knowledge Base |
| 3 | I'm traveling abroad next month. What should I do about my phone plan? | • Check the customer's current mobile subscription, roaming capabilities, and international charges.<br>• - Search knowledge base for suitable international roaming options or temporary international plans.<br>• - Update the plan after verifying eligibility and availability. | CRM (Current Subscription).<br>- Product & Service Database (Available Plans).<br>- Knowledge Base (International Roaming Policies). |
| 4 | | | |
| 5 | | | |

# Solution Framework



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# Model Context Protocol (MCP) Benefits & Tools Used

## MCP Benefits

- Make agent development accessible to more people
- Reduce the cost and complexity of integrating data sources
- Simplify adapting to changes made in data sources
- Standardize security and access control for data sources

**The following services are exposed as tools for AI Agents:**

- `get_all_customers` : List all customers with basic info.
- `get_customer_detail` : Get a full customer profile including their subscriptions.
- `get_subscription_detail` : Detailed subscription view including invoices (with payments) and service incidents.
- `get_invoice_payments` : Return invoice-level payments list.
- `pay_invoice` : Record a payment for a given invoice and get new outstanding balance.
- `get_data_usage` : Daily data-usage records for a subscription over a date range (optional aggregation).
- `get_promotions` : List every active promotion (no filtering).
- `get_eligible_promotions` : Promotions eligible for a given customer (evaluates basic loyalty/date criteria).
- `search_knowledge_base` : Semantic search on policy/procedure knowledge documents.
- `get_security_logs` : Security events for a customer (newest first).
- `get_customer_orders` : All orders placed by a customer.
- `get_support_tickets` : Retrieve support tickets for a customer (optionally filter by open status).
- `create_support_ticket` : Create a new support ticket for a customer.
- `get_products` : List or search available products (optional category filter).
- `get_product_detail` : Return a single product by ID.
- `update_subscription` : Update one or more mutable fields on a subscription.
- `unlock_account` : Unlock a customer account locked for security reasons.
- `get_billing_summary` : What does a customer currently owe across all subscriptions?

# Solution Framework
## your-agent.py

Workshop participants will need to modify this file

- Agent file template
- Provided for different scenarios
- Create session store
- Which agent is being called is configured in .env file
- Uses FastAPI to
  - post ChatResponses

https://github.com/microsoft/OpenAIWorkshop/blob/int-agentic

```python
sys.path.insert(0, str(Path(__file__).resolve().parent.parent))
agent_module_path = os.getenv("AGENT_MODULE")
agent_module = importlib.import_module(agent_module_path)
Agent = getattr(agent_module, "Agent")
```

```python
SESSION_STORE = {}

app = FastAPI()
```

```python
@app.post("/chat", response_model=ChatResponse)
async def chat(req: ChatRequest):
    # Lookup or create agent for this session
    agent = Agent(SESSION_STORE, req.session_id)
    # Run chat
    answer = await agent.chat_async(req.prompt)

    return ChatResponse(response=answer)
```

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# Solution Framework

## backend.py

Workshop participants do not need to modify this file

- Common backend that calls “Agent”
- Create session store
- Which agent is being called is configured in .env file
- Uses FastAPI to
  - post ChatResponses
  - get ConversationHistory

```
sys.path.insert(0, str(Path(__file__).resolve().parent.parent))
agent_module_path = os.getenv("AGENT_MODULE")
agent_module = importlib.import_module(agent_module_path)
Agent = getattr(agent_module, "Agent")
```

```
SESSION_STORE = {}

app = FastAPI()
```

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@app.post("/chat", response_model=ChatResponse)
async def chat(req: ChatRequest):
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    # Run chat
    answer = await agent.chat_async(req.prompt)

    return ChatResponse(response=answer)
```

# Solution Framework
## frontend.py

Workshop participants do not need to modify this file

- Common app frontend
- Uses streamlit
- BACKEND_URL setup in .env file
- Communicates with backend and presents chat interface to user

AgenticWorkshop/scenarios/contoso_internet/run/frontend.py

```
BASE_BACKEND_URL = os.getenv("BACKEND_URL", "http://localhost:7000")
CHAT_URL = f"{BASE_BACKEND_URL}/chat"
HISTORY_URL = f"{BASE_BACKEND_URL}/history"
SESSION_RESET_URL = f"{BASE_BACKEND_URL}/reset_session"
```

```
# ──────────────── Chat interaction ─────────────
prompt = st.chat_input("Type a message...")
if prompt:
    with st.chat_message("user"):
        st.markdown(prompt)

    with st.spinner("Assistant is thinking..."):
        r = requests.post(
            CHAT_URL,
            json={"session_id": st.session_state["session_id"], "prompt": prompt},
        )
        r.raise_for_status()
        answer = r.json()["response"]


    with st.chat_message("assistant"):
        st.markdown(answer)
```

https://github.com/microsoft/OpenAIWorkshop/blob/int-agentic

# Solution Framework
## basemodel.py

Workshop participants do not need to modify this file

- Common tools definition
- Uses streamlit
- BACKEND_URL setup in .env file
- Communicates with backend and presents chat interface to user

```python
BASE_BACKEND_URL = os.getenv("BACKEND_URL", "http://localhost:7000")
CHAT_URL = f"{BASE_BACKEND_URL}/chat"
HISTORY_URL = f"{BASE_BACKEND_URL}/history"
SESSION_RESET_URL = f"{BASE_BACKEND_URL}/reset_session"
```

```python
# ———————————— Chat interaction ————————————
prompt = st.chat_input("Type a message...")
if prompt:
    with st.chat_message("user"):
        st.markdown(prompt)

    with st.spinner("Assistant is thinking..."):
        r = requests.post(
            CHAT_URL,
            json={"session_id": st.session_state["session_id"], "prompt": prompt},
        )
        r.raise_for_status()
        answer = r.json()["response"]


    with st.chat_message("assistant"):
        st.markdown(answer)
```

# DEMO & SETUP

# Team Assignments

| Name | Contact | 1 | 2 | 3 |
|---|---|---|---|---|
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