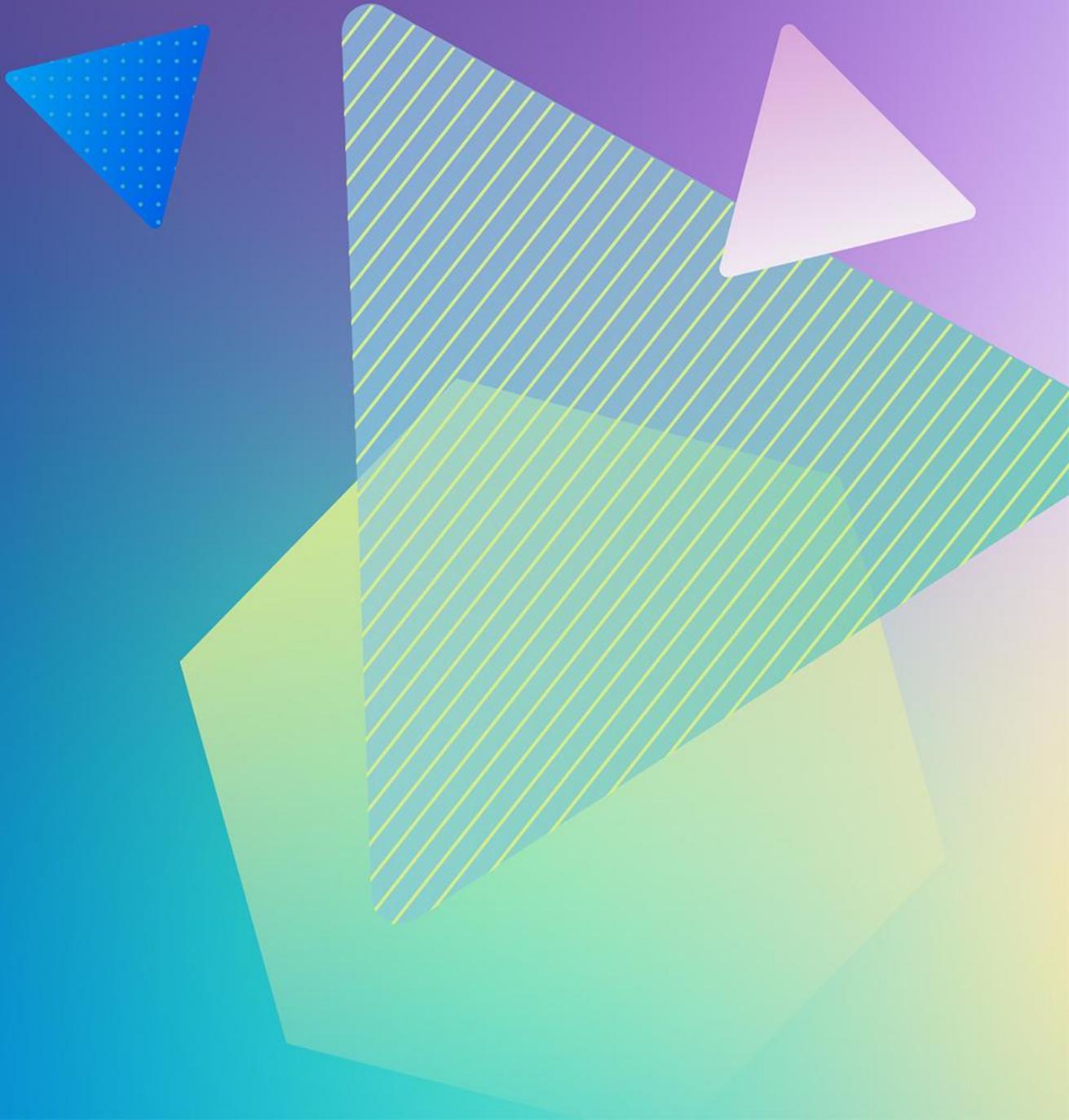
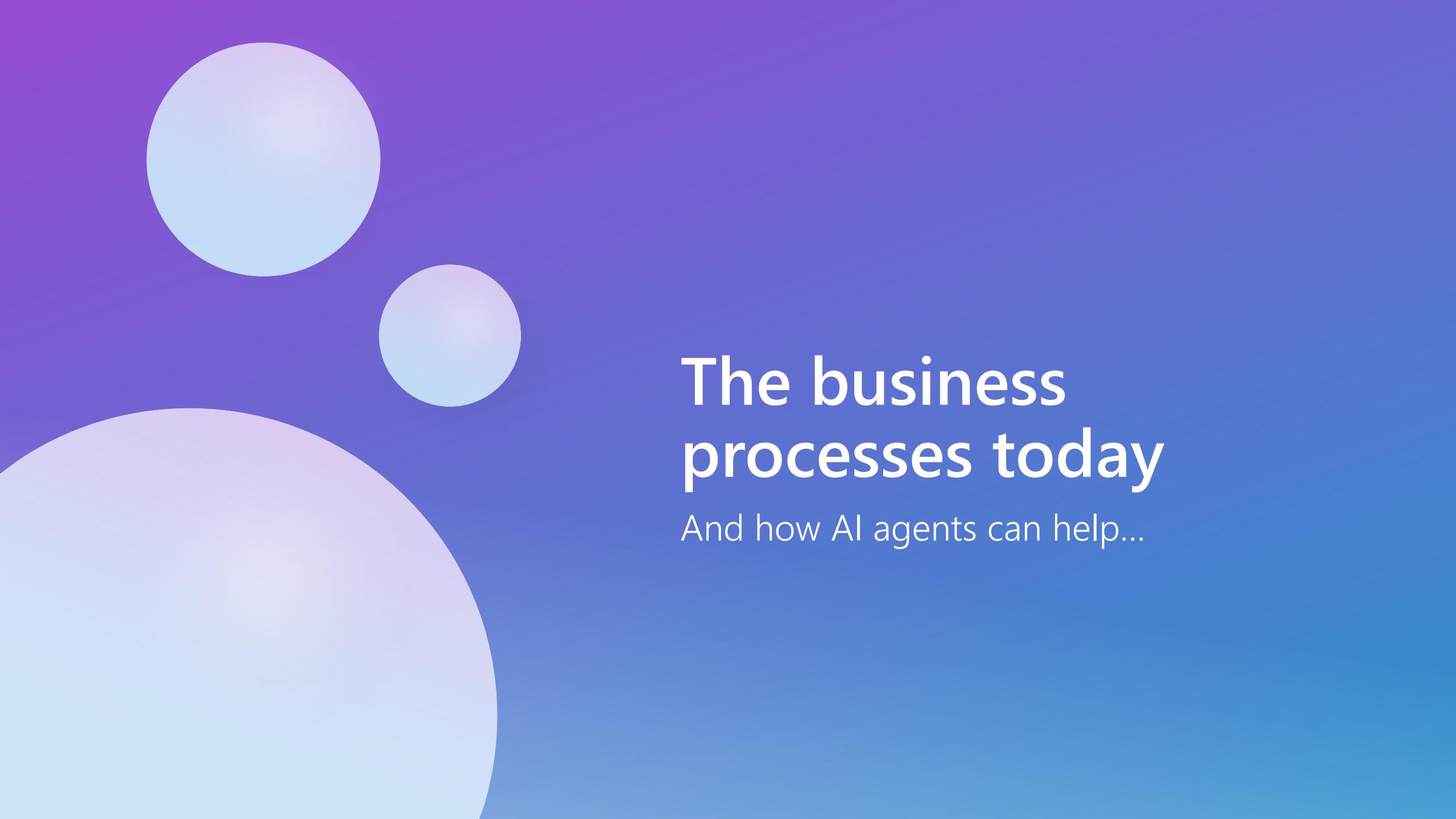


2.1 Introduction to Agentic Systems

Efe Sener - Cloud Solution Architect





The business processes today

And how AI agents can help...

Before AI Agents

Today, many customers use generative AI for knowledge retrieval (aka RAG)...



A customer is having an issue with their washing machine W100 making too much noise; can you help me diagnose the issue?

Search: W100 manual

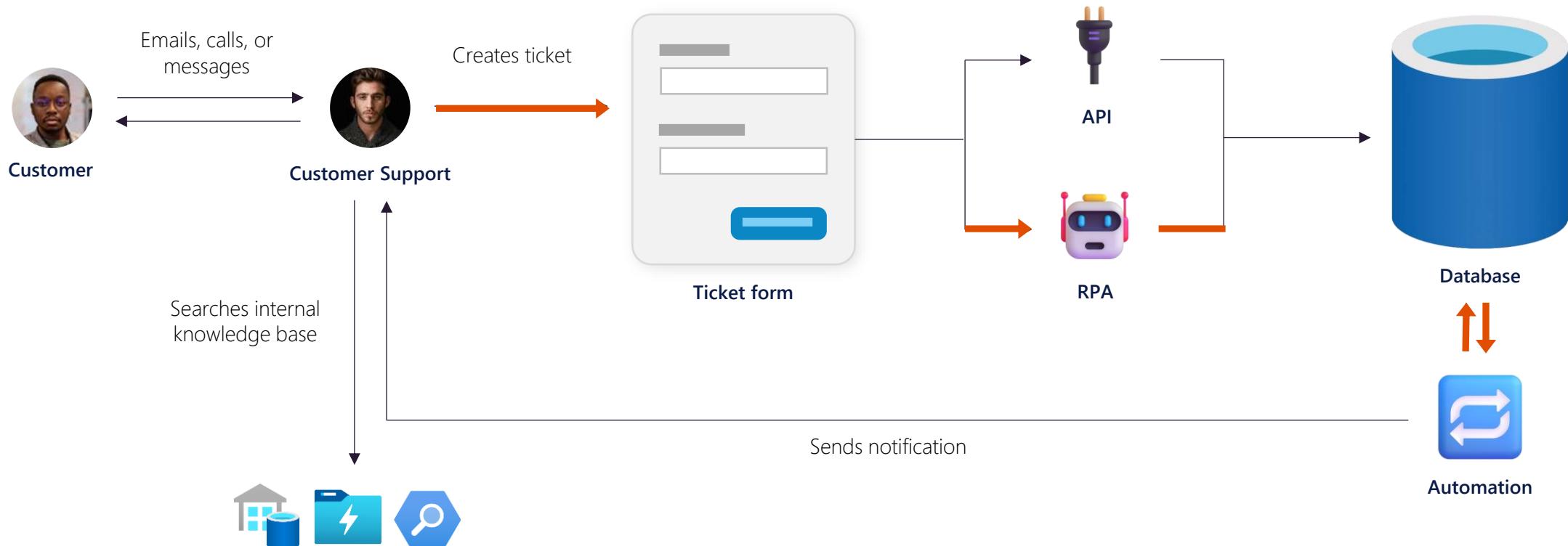
It looks like there might be three different issues that could lead to too much noise:

- Unbalanced Load**
If the clothes inside are unevenly distributed, especially during the spin cycle, the drum can wobble and cause loud banging or thumping sounds.
- Worn Drum Bearings**
Over time, the bearings that help the drum spin smoothly can wear out, leading to grinding or rumbling noises, particularly during spinning.
- Loose or Damaged Parts**
Items like shock absorbers, suspension springs, or drive belts can become loose or damaged, resulting in clunking, squealing, or rattling sounds.

You should create a ticket for a technician to take a look

Before AI Agents

But most downstream processes are still **brittle** and require meaningful human involvement



After AI Agents

With AI Agents, you can make your automation more **resilient** while removing the drudgery from work

LLMs spend little time structuring data

Convert the customer conversation into a JSON that looks like this...



Here you go!

```
{  
  "name": "John Clar  
  "issue": "Washing m  
}
```

Would you like me to submit the JSON to the API?

LLMs update RPAs if the UI updates or changes

Click on the submit button for the scheduling form



Looks like the ID of the order form is submit-order, I'll go ahead and click it now.



The form has been successfully submitted, is there anything else you need?

Tool calling LLMs can self-heal or handle novel cases

Assign technician



✗ Alex declined because they're on leave



Let me try again with an available technician.



✓ Successfully assigned Lindsay

After AI Agents

And when combined with system events, you can *fully* automate business processes with AI Agents

LLMs spend little time structuring data



Convert the customer conversation into a JSON that looks like this...

Transcript



Here you go!

```
{  
  "name": "John Clar  
  "issue": "Washing m  
}
```

Would you like me to submit the JSON to the API?

LLMs update RPAs if the UI updates or changes



Click on the submit button for the scheduling form



Looks like the ID of the order form is submit-order, I'll go ahead and click it now.



Submit form

The form has been successfully submitted, is there anything else you need?

Tool calling LLMs can self-heal or handle novel cases



Assign technician



Update work order

✗ Alex declined because they're on leave



Let me try again with an available technician.



Update work order

✓ Successfully assigned Lindsay

So far, building agents from scratch has been difficult to do



```
    e messages (chat history) from MongoDB using the thread ID and sort them by creation date
    chatHistory = new($"""
    You will be asked to upload the local ./disco.wav to the python tool. If the user forgets, go ahead and upload it for them
    You will then be given a command to run some python code, run it using the python-run tool.

    The first time you run it, it will fail, so tell the user you're going to fix it, but actually just run the code again.
    """);
    var messages = await _messagesCollection.Find(m => m.ThreadId == run.ThreadId).SortBy(m => m.CreatedAt).ToListAsync();
    foreach (var message in messages)
    {
        chatHistory.Add(message);
    }
    int messageCount = messages.Count;

    // Invoke the chat completion service
    var results = chatCompletionService.GetStreamingChatMessageContentsAsync(
        chatHistory,
        executionSettings: new OpenAIPromptExecutionSettings() {
            // Allow the AI to automatically choose and invoke functions from the kernel's plugins
            ToolCallBehavior = ToolCallBehavior.AutoInvokeKernelFunctions
        },
        kernel: kernel
    );

    // Return the results as a stream
    var completeMessage = new StringBuilder();
    await foreach (var result in results)
    {
        completeMessage.Append(result);
    }

    // Send the message events to the client
    var events = assistantEventStreamService.CreateMessageEvent(run.Id, result);
    foreach (var messageEvent in events)
    {
        yield return messageEvent;
    }
}
chatHistory.AddAssistantMessage(completeMessage.ToString());

// Get the new messages within the chat history
var newMessages = chatHistory.Skip(messageCount + 1).ToList();

Dictionary<string, Tuple<string, string>> functionCallNames = new();

foreach (var message in newMessages)
{
    // Save the new messages to MongoDB
    await _messagesCollection.InsertOneAsync(
        new AssistantMessageContent() {
            AssistantId = run.AssistantId,
            Role = message.Role,
            ThreadId = run.ThreadId,
            Items = message.Items
        }
    );
}
```

Tool Integration

Creating a cohesive system through complex integration of various tools and APIs that have different interfaces, data formats, and requirements.

Interoperability

Achieving interoperability between different tools and platforms to ensure that data can be shared and understood across different systems.

Scalability

Handling increased data volumes, more complex computations, and higher user loads without degrading performance.

Real-time Processing

Ensuring tools can handle real-time requirements without significant latency.

Maintenance

Making labor-intensive updates to integrated tools for compatibility with new versions and prevention of obsolescence and security vulnerabilities.

Flexibility

Modifying or customizing existing tools or developing new ones to meet unique requirements.

Error Handling

Ensuring errors are handled gracefully and continue functioning despite tool failures or unexpected inputs is critical for reliability.

Security

Implementing robust encryption, access controls, and compliance with privacy regulations to protect sensitive data.

Organizations need platforms that enable rapid development of performant, secure AI Agents

Current Frameworks

Lack of integrated tools, insecure data grounding, challenging orchestration

Ineffective deployment of AI across websites, applications, and production environments

Restrictive pre-defined models that are challenging to customize

Security and data privacy risks

What's Needed

Connected complex workflow automation grounded by seamless connection to enterprise data

Tools and APIs that seamlessly integrate across enterprise applications

Flexible models that enable processing and integration of information from multiple modalities or types of data

Secure, responsible AI that protects sensitive information and behaves compliantly



The background features a minimalist design with three overlapping circles. One large circle is positioned at the bottom left, another medium-sized circle is at the top left, and a smaller circle is located between them towards the center-left. All circles have a soft, blurred gradient from light purple to light blue.

A new frontier – Introducing...

Agentic AI

What is an AI agent?



Agentic components



Reasoning aka planning

Create a JSON describing the user issues



I'll look at the logs to see what happened



✗ Machine is past due for maintenance



I've captured the underlying issue in the details

```
{  
  "name": "John Clar  
  "issue": "Washing m
```

Go beyond transcriptions and slot filling by allowing agents to deduce the why



Acting aka tool calling

Fill out and submit the workorder



Populate field: name



Populate field: issue

✓ Name field populated
✓ Issue field populated



Submit form

The form has been successfully

Agents can take a simple request and chain multiple tool calls to complete the ask



Learning aka memory

Assign technician



Update work order

✗ Alex is already booked at this same time
+ Saved memory: Alex is OOF next week



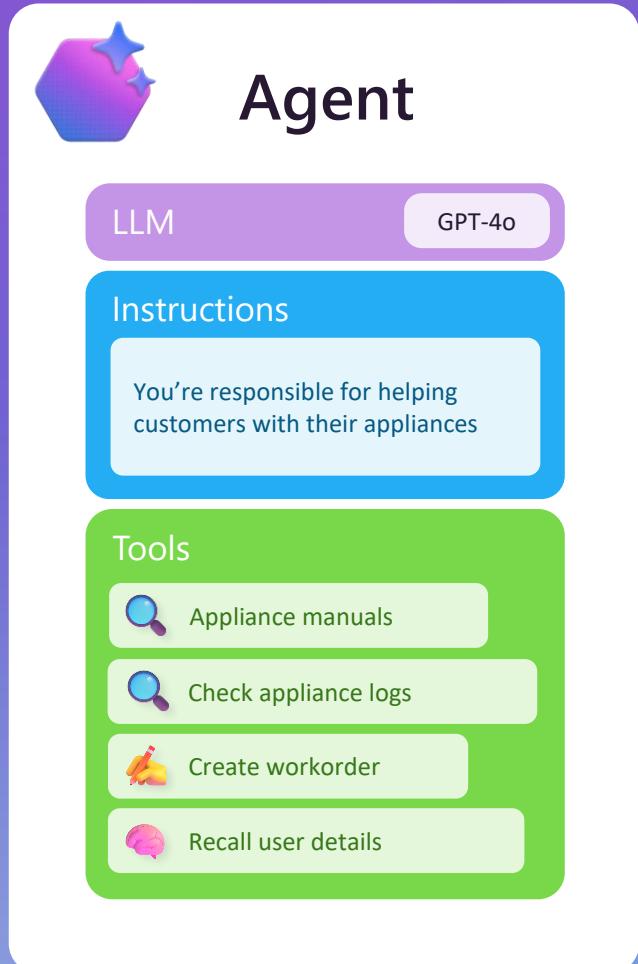
Let me try again with an available technician.

Update work order

✓ Successfully assigned technician

Only make a mistake once. With memory, agents can recall prior experiences

An AI agent in action...



User: My washer machine is making weird noises
Agent: *Recall user washing machine*
Tool: User has w100 with sn: 142352
Agent: I'll see what could be causing your w100 issues
Agent: *Search manuals*
Agent: It looks like there are three common reasons
Agent: I'll check your machine if it has any notices
Agent: *Check logs for 142352*
Agent: It looks like your machine is due for maintenance and is still under warranty.
Want me to schedule an appointment?
User: Sure! Let's target early next week
Agent: *Look for available times*
Agent: Would Monday at 1:00pm work?
User: Let's do it!
Agent: *Create workorder*
Agent: Done! Is there anything else I could help you with?

At the core are threads

User: My washer machine is making weird noises
Agent: *Recall user washing machine*
Tool: User has w100 with sn: 142352
Agent: I'll see what could be causing your w100 issues
Agent: *Search manuals*
Agent: It looks like there are three common reasons
Agent: I'll check your machine if it has any notices
Agent: *Check logs for 142352*
Agent: It looks like your machine is due for maintenance and is still under warranty.
Want me to schedule an appointment?
User: Sure! Let's target early next week
Agent: *Look for available times*
Agent: Would Monday at 1:00pm work?
User: Let's do it!
Agent: *Create workorder*
Agent: Done! Is there anything else I could help you with?

An agent platform not only helps manage agents, **but the underlying conversation state.** With threads, you can...



Secure conversation data



Observe agent behavior



Fine-tune agent models

Agents range from simple to complex

Tasks can vary in level of complexity and capabilities depending on your need

Simple



Chatbots

Answer questions for users with retrieval augmented generation

Knowledge tools



Copilots

Performs actions on-behalf-of a user with human supervision

+ Action tools



Advanced

Automated agents

Automatically complete tasks as background jobs on-behalf-of users

+ Triggers



Customer success stories

Where agents are used today

10,000+ customers are using Foundry Agent Service

★ **Heineken®**

FUJITSU



TOYOTA



COMMERZBANK

MOODY'S

citrix



freshworks

core42
A G42 company

 **PLAID**



LayerX



Bristol Myers Squibb®

NTT DATA



Customer:

Fujitsu

Industry:

Professional Service

Size:

Corporate (10,000+ employees)

Country:

Japan

"What I liked about Azure AI Agent Service is its seamless integration with Azure AI Search, which significantly streamlined the process of building a knowledge-grounded agent"

Hirotaka Ito,
Lead Developer,
Fujitsu Limited

Business goal

Fujitsu aimed to revolutionize its internal sales operations by developing a sales assistant capable of automating repetitive daily tasks, enabling its sellers to focus on high-value activities.

Technology solution

Leveraging Azure AI Agent Service, Fujitsu developed an AI agent named **Role AI**, designed to incorporate the expertise of top sales professionals. Role AI helps sellers prioritize customer leads, focus their efforts effectively, and craft personalized proposals tailored to each lead's specific needs.

Impact

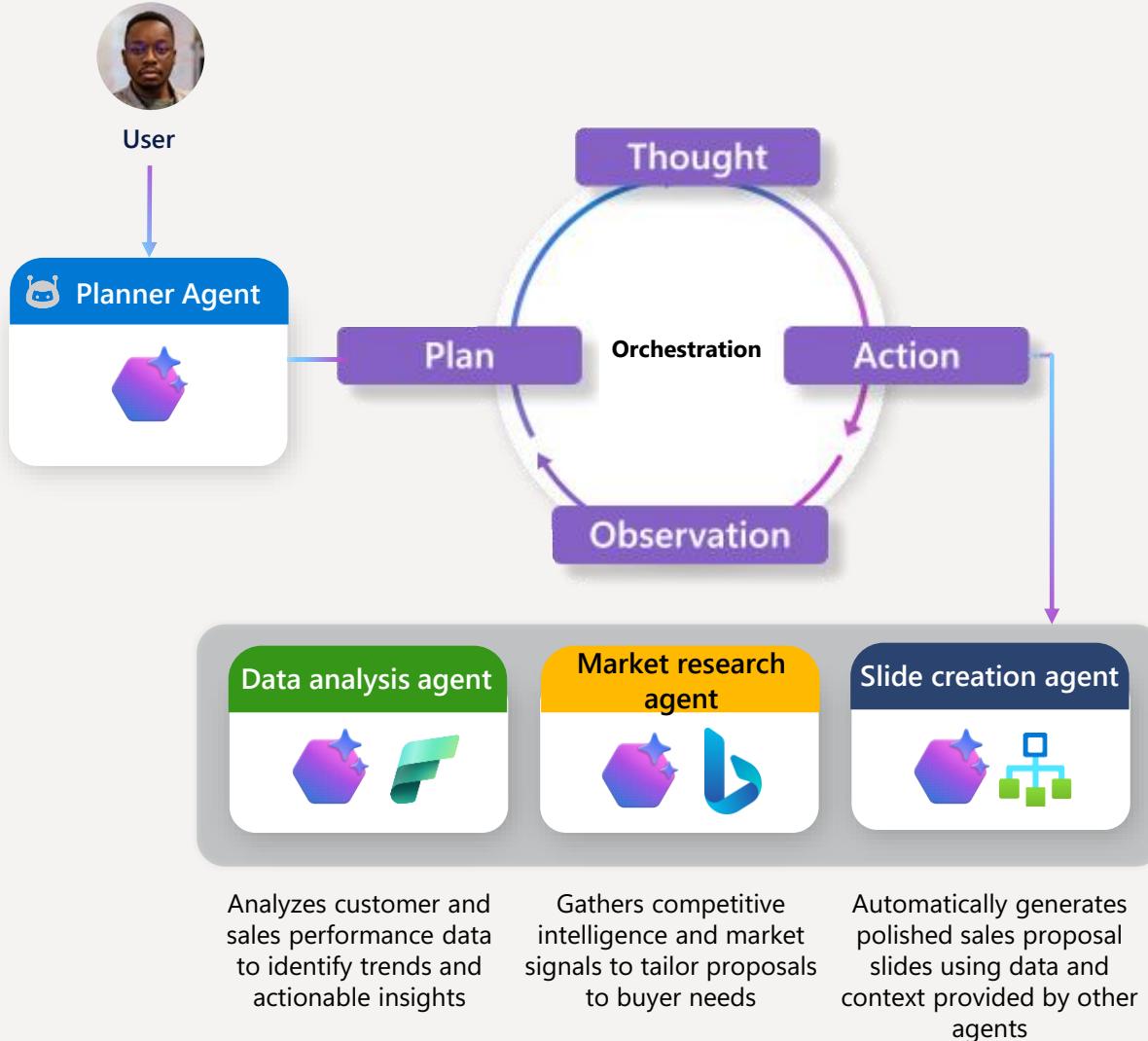
The Role AI Agent drove a 67% increase in productivity for sales proposal creation.

Key features

Azure AI Search
Grounding with Bing Search

Agent Use Case #1

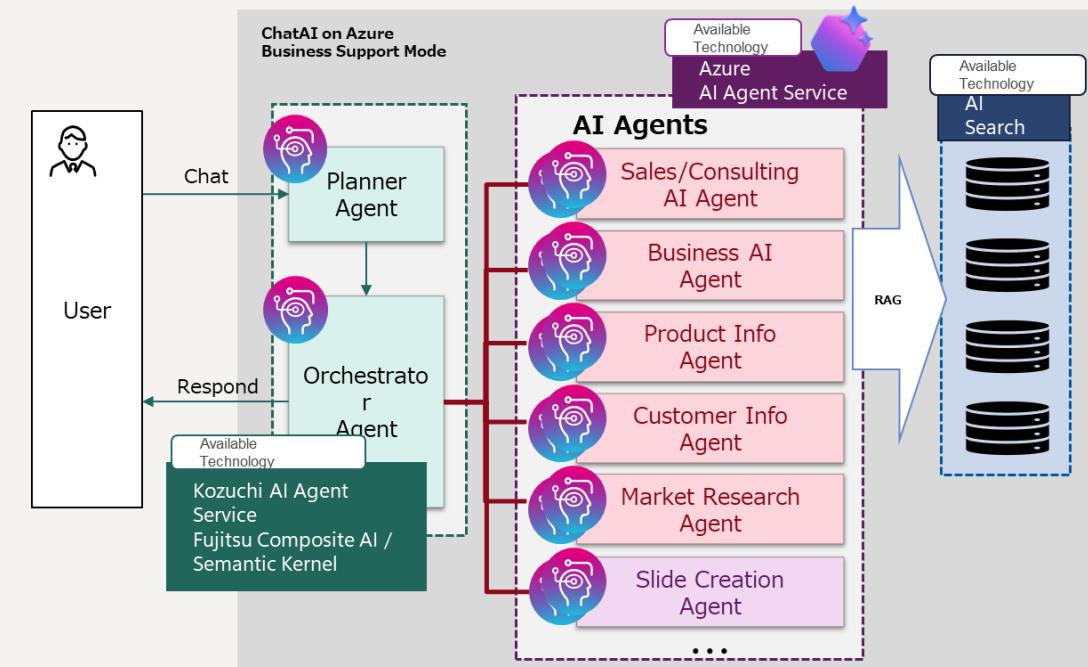
Sales and marketing support agent



Customer story



Fujitsu developed an AI agent, designed to incorporate the expertise of top sales professionals. It helps sellers prioritize customer leads, focus their efforts effectively, and craft personalized proposals tailored to each lead's specific needs. Their **AI Agent** drove a **67% increase in productivity** for **sales proposal creation**.





Customer:

NTT Data

Industry:

Professional Service

Size:

Corporate (10,000+ employees)

Country:

Global

"We see data agents in Microsoft Fabric and Azure AI Agent Service as the future beyond dashboards—enabling us to talk to our data, uncover actionable insights, and accelerate AI adoption faster, better, and easier."

Maureen Tan,
Head of AI CoE,
NTT Data

Business goal

NTT DATA aimed to unify data and AI capabilities to drive faster, more intuitive business outcomes. Their focus was on simplifying AI adoption, bridging data silos, and delivering measurable results across HR, finance, sales, and operations.

Technology solution

By leveraging **Data Agents** in Microsoft Fabric for conversational data insights, and integrating **Azure AI Agent Service**, NTT DATA built autonomous AI solutions. This included an **AI Sales Coach** that speeds proposal creation, surfaces client insights, and scales AI usage across the organization.

Impact

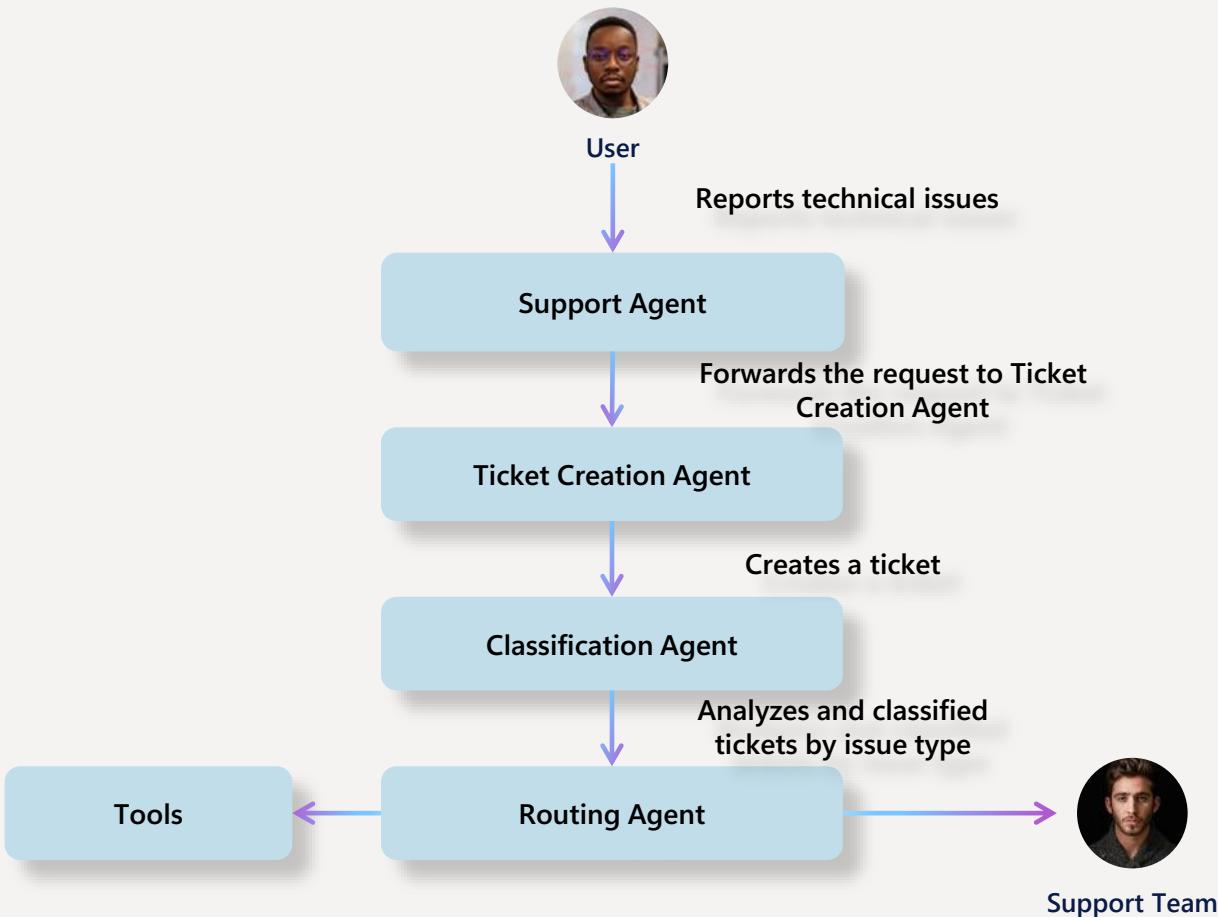
Accelerated AI deployment by transforming static dashboards into real-time insights that drive smarter, data-driven decisions.

Key features

Microsoft Fabric data agent
Semantic Kernel
AutoGen

Agent Use Case #2

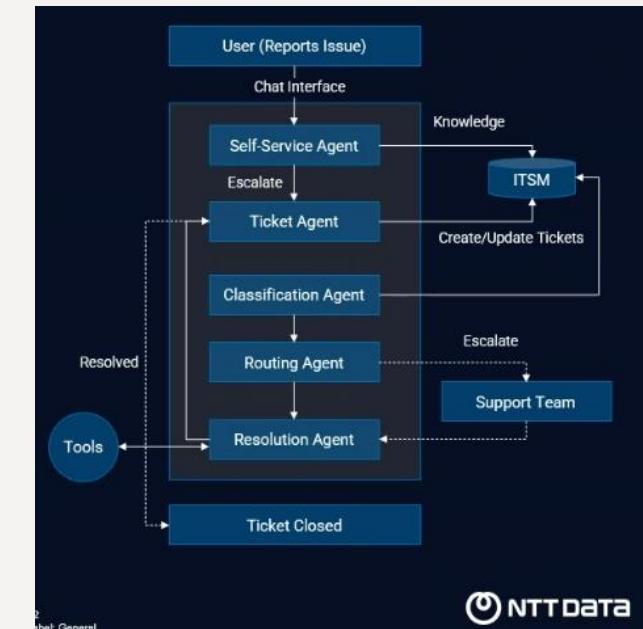
Internal IT ticket management



Customer story

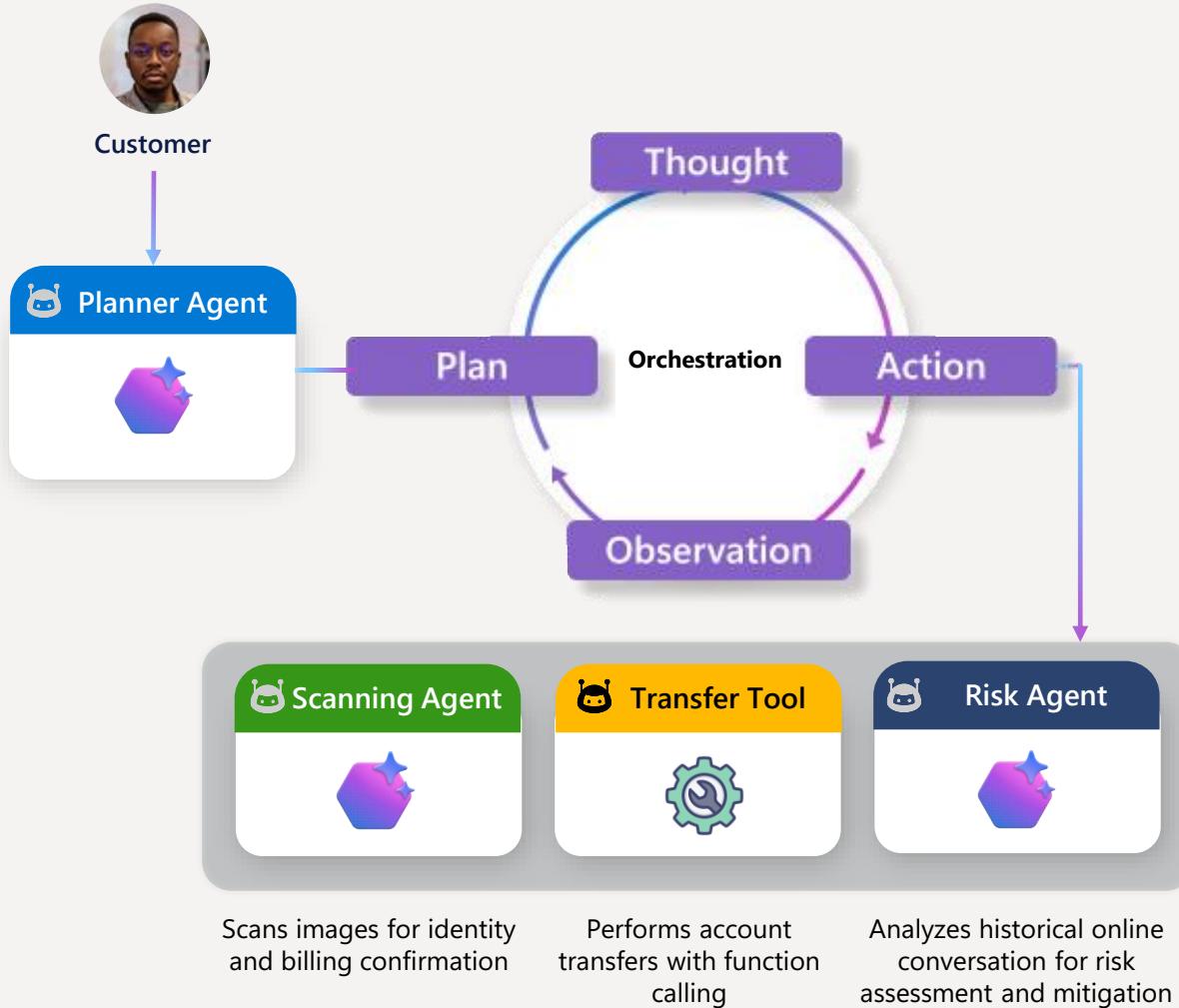
NTT DATA

NTT Data uses a multi-agent system to automate internal IT ticketing. Agents handle self-service, ticket creation, classification, routing, and resolution—integrating with ITSM and escalating to support teams when needed. This streamlines issue resolution and reduces manual workload.



Agent Use Case #3

Customer support and engagement

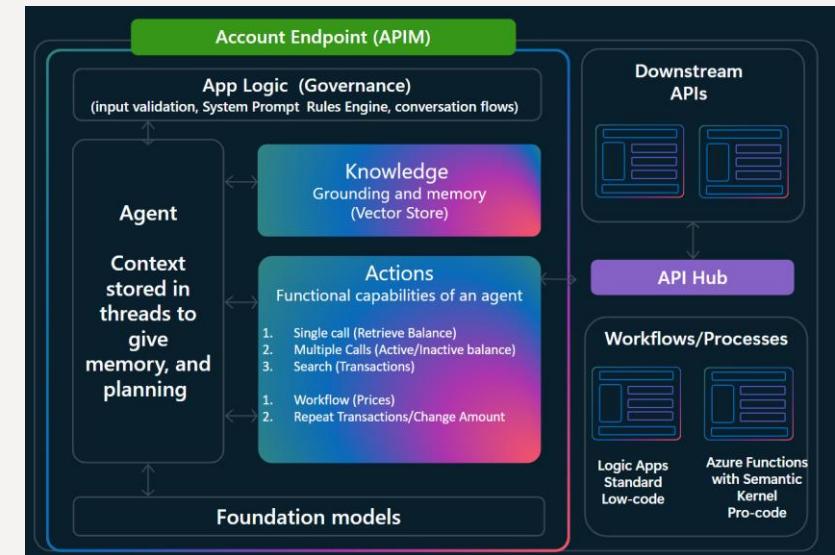


Customer story



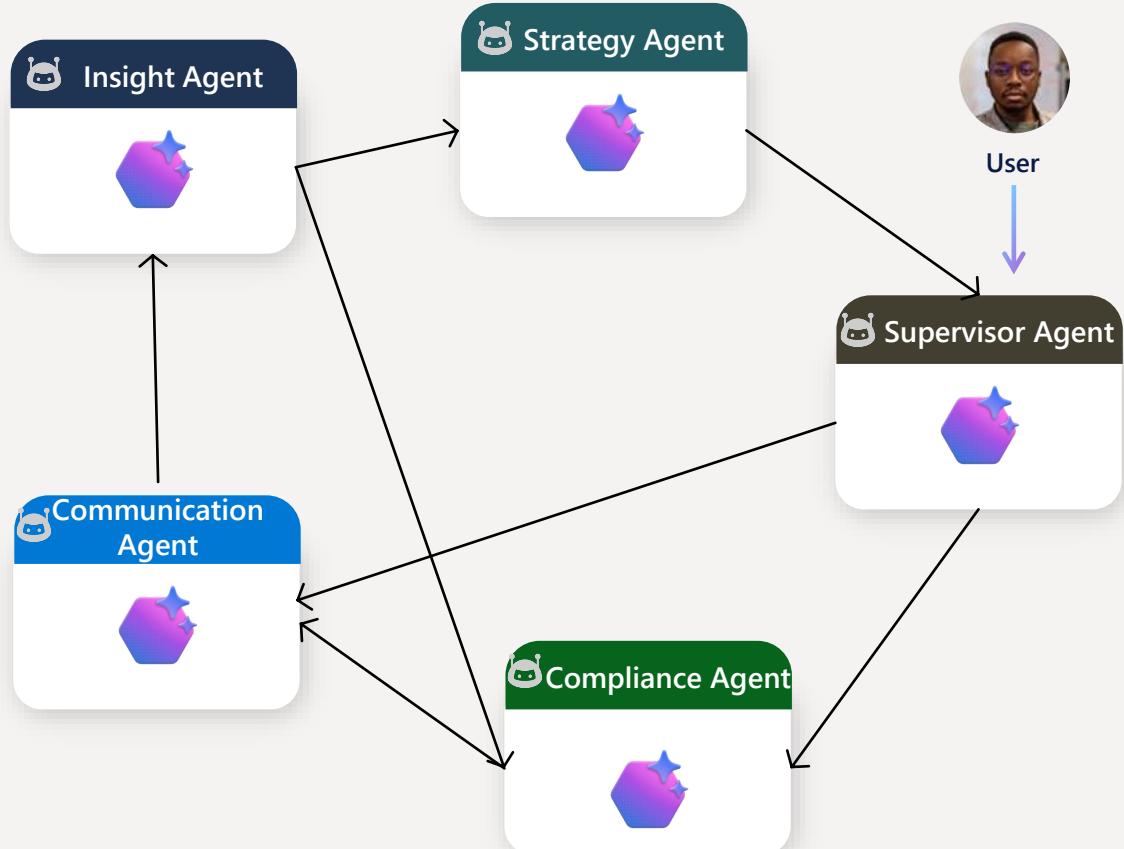
COMMERZBANK

Commerzbank developed a banking avatar that allows customers to get the questions answered in natural spoken language. The avatar can provide information about the customer's banking products and enables the digital execution unblocking a current credit card or changing limits.



Agent Use Case #4

Multi-agent renewal automation



Agents coordinate to assess renewal risk, generate strategies, ensure compliance, and automate customer communications—streamlining the entire license renewal process.

Customer story



Gainsight developed a multi-agent solution that involves several agents working together to manage customer license renewals. The orchestration agent initiates the process, followed by the insight agent assessing the client's renewal likelihood by connecting to Dynamics 365, and the strategy agent creating a renewal plan. Finally, the supervisor and communication agent ensure compliance and send the renewal email.

