MICHIGAN STATE UNIVERSITY

Project Plan Presentation

Multi-Agent AI Ecosystem to Optimize Purchasing

The Capstone Experience

Team Kohler Co.

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From Students…
…to Professionals

Project Sponsor Overview

- Global leader in kitchen and bath design, and luxury hospitality
- Originated from entrepreneurial passion and the drive to bring innovation and modern convenience to people's everyday lives
- Currently, Kohler's goals are to streamline the way they access information and interact with transactional systems- most importantly their Enterprise Resource Planner (ERP).

Project Functional Specifications

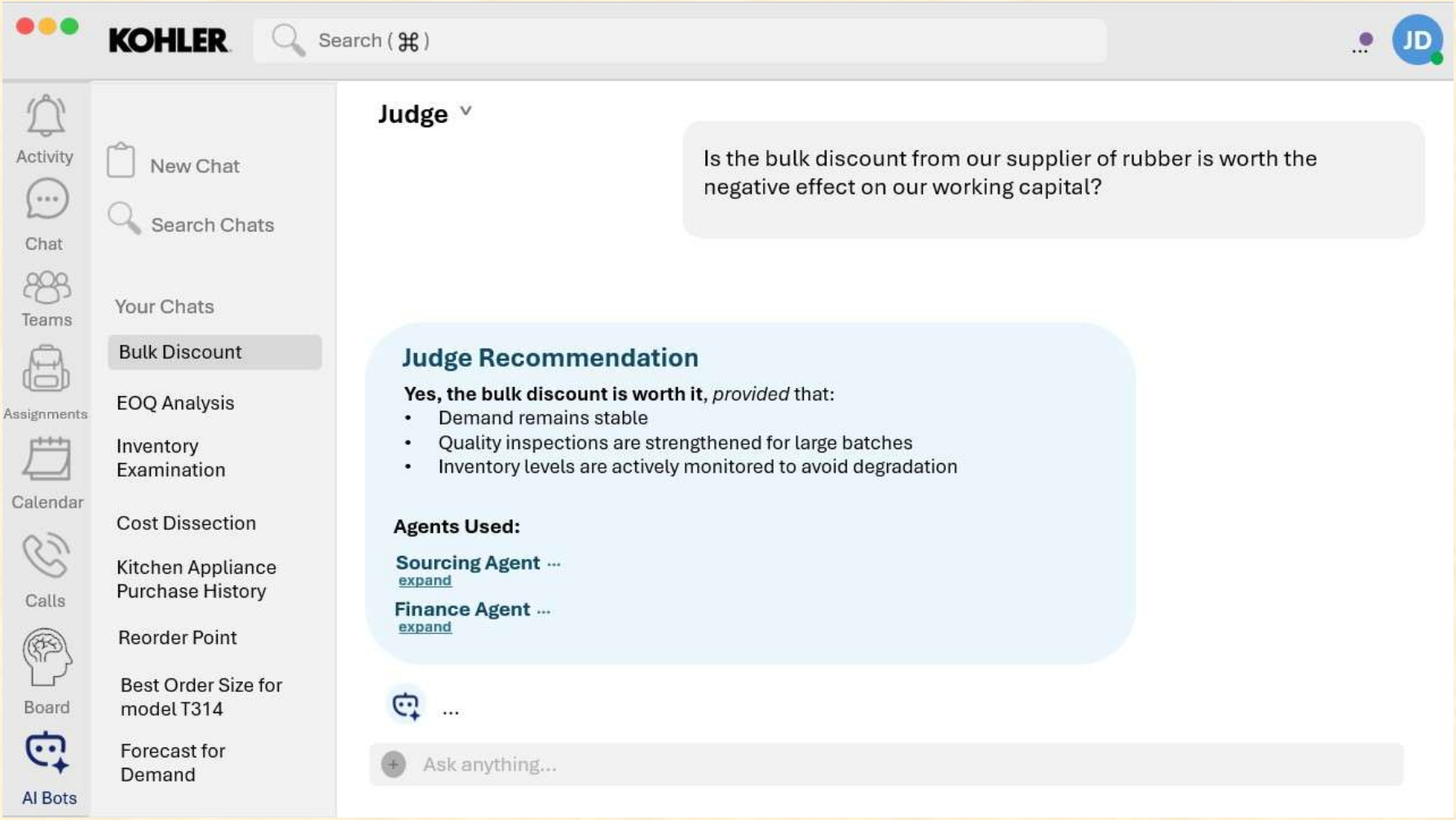
- Our ecosystem is designed to support purchasing managers' decision-making by coordinating multiple specialized AI agents that analyze a multitude of factors that contribute to EOQ
- Through a centralized CoPilot experience, users can query the entire supply chain ecosystem using natural language instead of manually referencing spreadsheets and databases
- Each agent functions on its assigned task, producing a calculated result based on its data analysis
- These outputs are then passed to the Judge Agent, which behaves as the system orchestration and governance layer
- The ecosystem will provide a structured approach to supporting procurement decisions by utilizing a centralized governance

Project Design Specifications

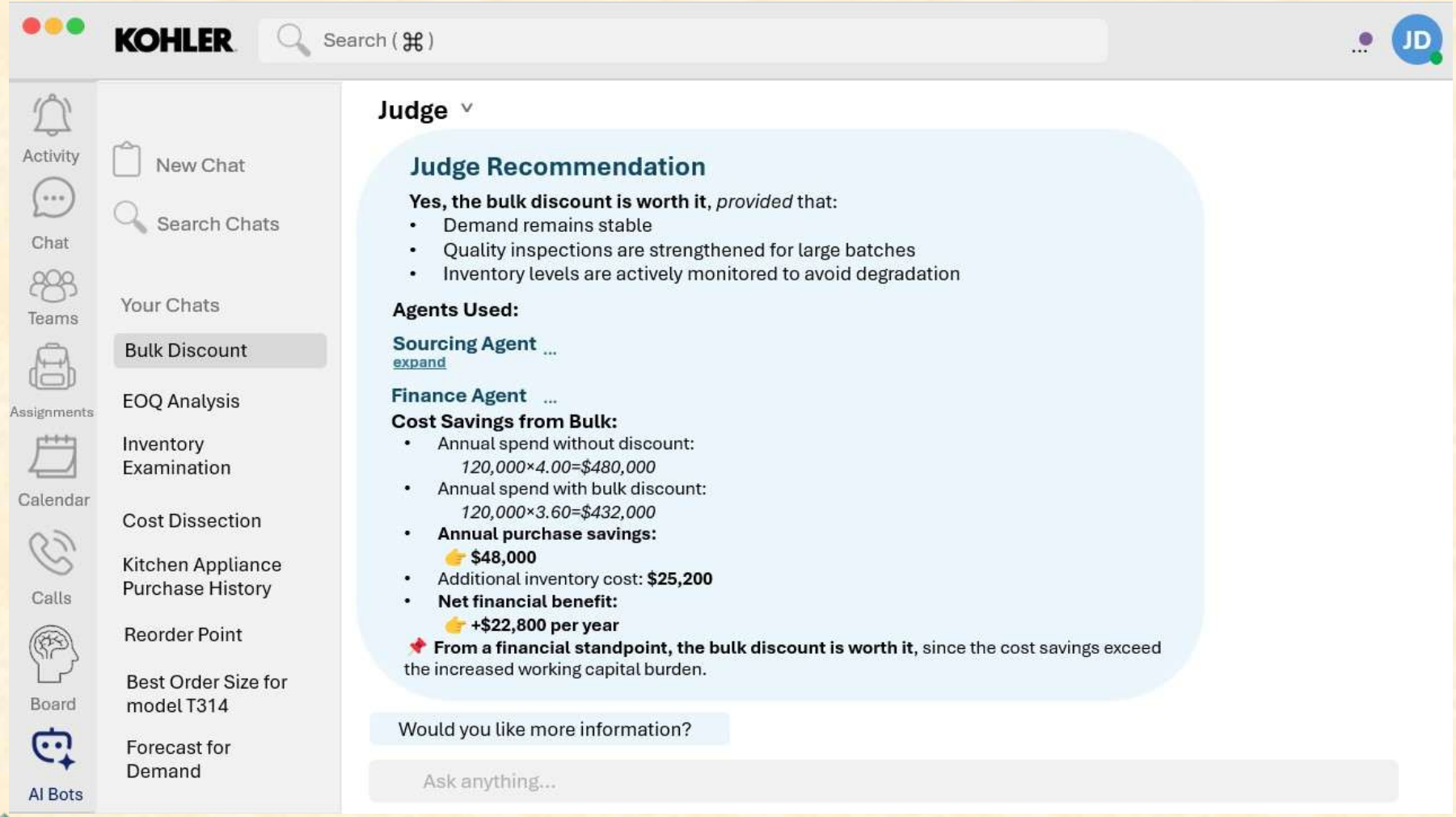
- Our Microsoft Teams app, Multi-Agent Buying Assistant, streamlines the inventory stocking process by supplying clients with real time data analysis to aid in the decision making that comes with filling inventory
- Kohler will also have access to a Teams-based Chat Bot, where they can collaborate and communicate with the Judge Agent
- The application embedded in the Teams App will have numerous pathways for designated employees to explore around; upon asking the agent a question, Kohler will be presented with the Judge's final recommendation



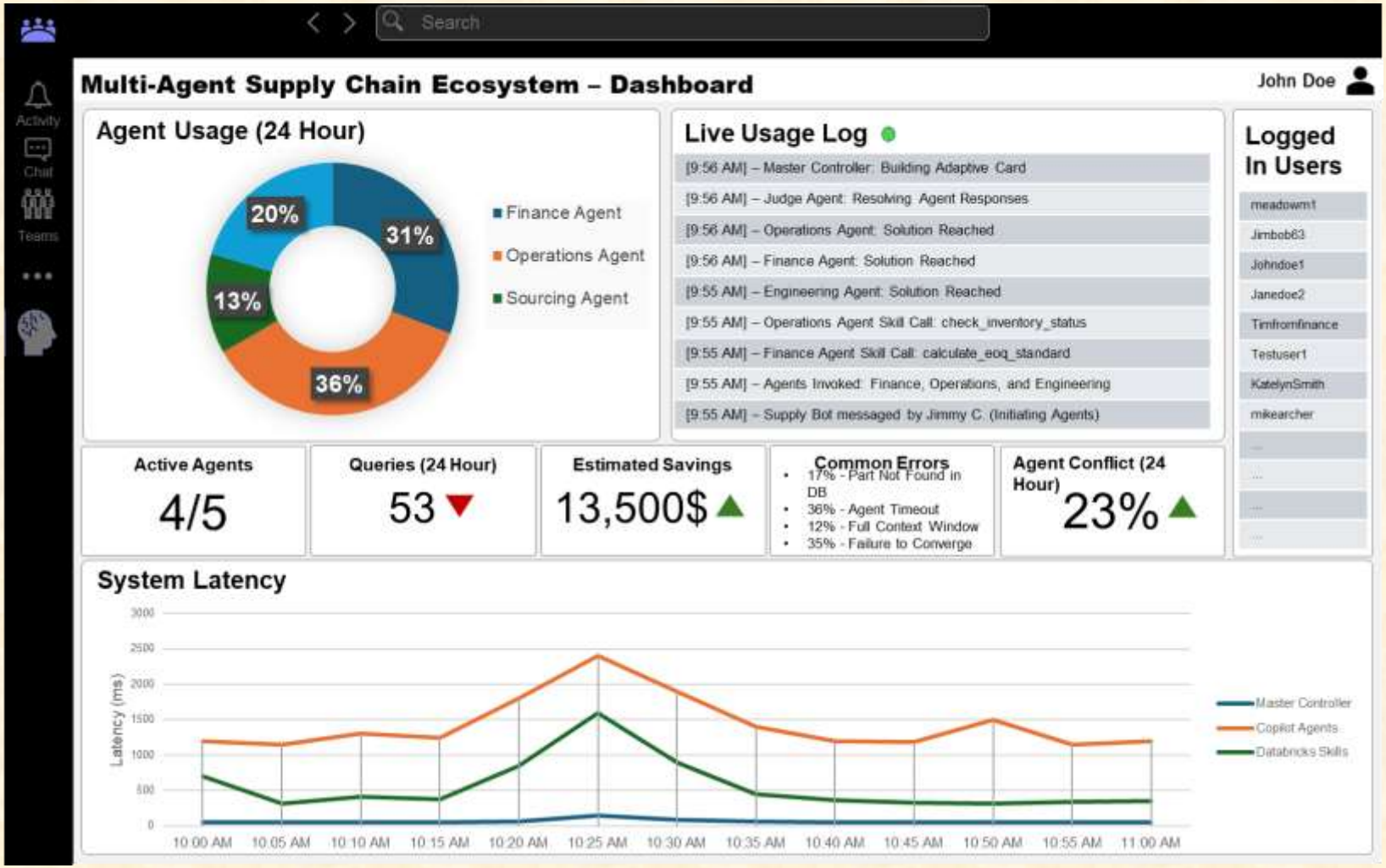
Screen Mockup: Chat System



Screen Mockup: Expansion Feature



Screen Mockup: Kohler Dashboard



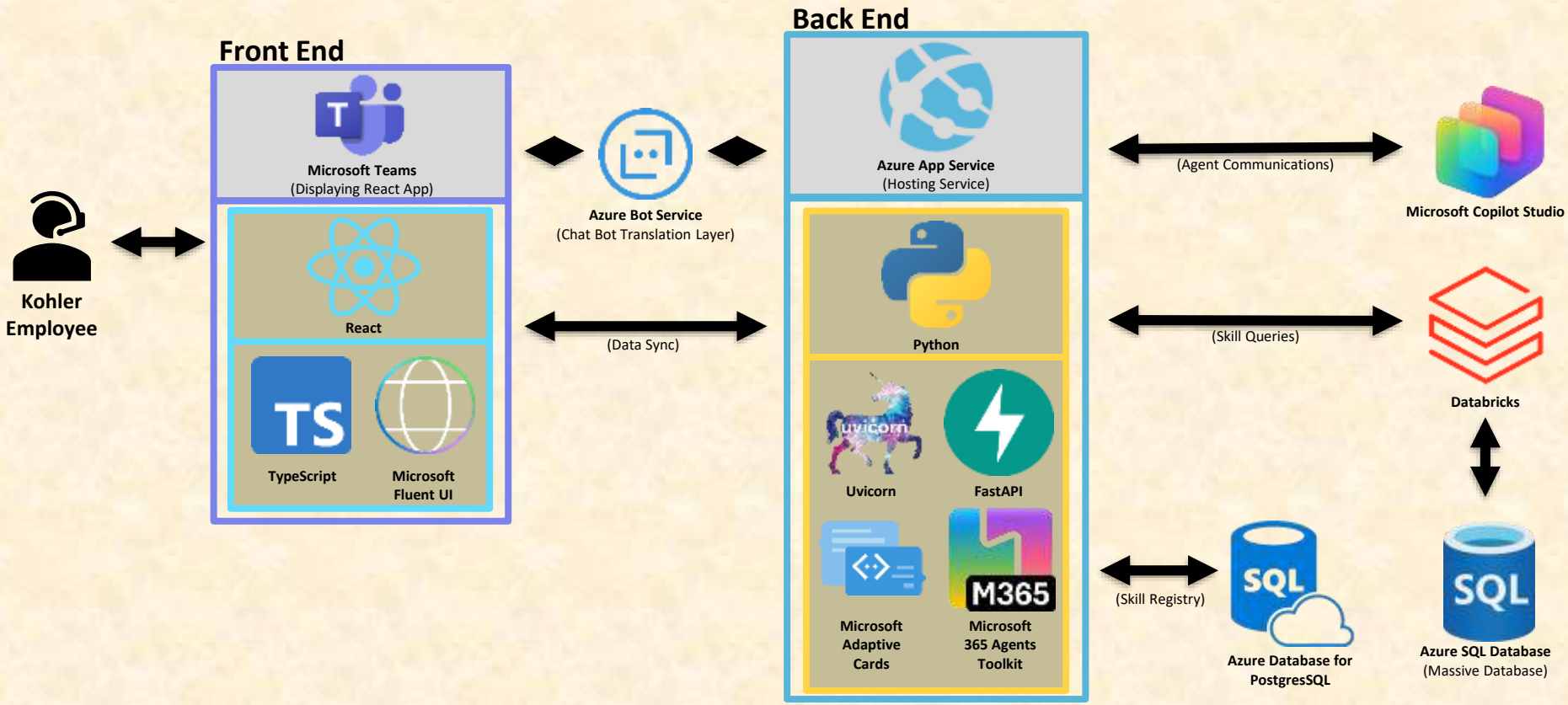
Screen Mockup: Skills Registry



Project Technical Specifications

- The system is designed as a scalable, event-driven multi-agent AI system that supports purchasing decisions by combining enterprise data, AI-assisted reasoning, and human oversight into a single workflow. The goal is to help buyers evaluate tradeoffs faster without removing them from the decision-making process.
- The platform runs on Microsoft Azure to provide scalability, reliability, and secure access to enterprise data. Data is centralized in OneLake so that all agents reference the same datasets and variables.
- AI agents are built using CoPilot Studio, with each agent responsible for a specific part of the purchasing decision. For example, one agent focuses on stock out risk based on production schedules, while another evaluates holding cost. All agents share results using structured outputs, making it easier for comparisons of recommendations.
- A final judge agent coordinates the system by reviewing agent outputs, resolving conflicts, and producing a final recommendation.
- Users interact with the system through a Microsoft Teams application, where they can ask questions, review recommendations, and approve outcomes.

Project System Architecture



Project System Components

- Hardware Platforms
  - N/A
- Software Platforms / Technologies
  - Microsoft CoPilot Studio
  - Microsoft Azure OneLake
  - Microsoft Azure AI Bot Service
  - Microsoft Azure PostgreSQL
  - Microsoft Azure App Service
  - Microsoft Teams
  - Databricks

Project Risks

- Risk 1: Agent Conversational Context
  - Since a custom CoPilot Studio is being developed via API calls, maintaining conversational context is a massive deal breaker if we are unable to create a feasible strategy to address it.
  - We will have a custom/dynamic "context object" (JSON) system that's included in agent prompts. This will help make sure agents stay on track in the conversation and remember past prompts when decisions are made.
- Risk 2: Agent Communication
  - Agents all create solutions based on their personalities and personal parameters with little communication between agents. If one agent assumes a certain variable (such as supplier), another agent could possibly be using a different one that will ruin directly comparable opinion. This can lead to inaccuracy with the final resolution.
  - We will develop a system with multiple passes between agents. This will allow the conflict to be resolved internally before the final result is judged and presented to the user.
- Risk 3: Judge Agent Context Window
  - Copilot agents have a 128k token context window with a large part being reserved for Microsoft functionality. Trying to merge 4 agent responses with text, reasoning, and data will lead to an overload of input for a final decision-making agent, where all the information is present, but it will miss or hallucinate parts of it.
  - We will build a strict JSON schema for agent responses allowing agents to parse dictionaries with defined keys instead of searching walls of text for reasoning and data.
- Risk 4: AI Accuracy
  - Since our agents have small context windows and will be working with mass amounts of data and business context/logic, they could be very prone to missing key data or logic in responses. Even the smallest miss could vastly change the correct output.
  - Our agents will use a vast "skill" system that we build ourselves, giving them access to business logic functions and data that is broken down in a way it can handle flawlessly.

Questions?

