



**Handbook**

---

# AI Agent Hackathon

*Syngenta at Paradox 2025*

# Table of Contents

<b>Syngenta AI Agent Hackathon</b>	<b>3</b>
1. Timeline	3
2. Registration	3
3. Challenge Overview	4
4. Technical Requirements	4
4.1 Functional Requirements	4
4.2 Non-Functional Requirements	5
4.3 Technology Stack	5
5. Business Scenarios	6
5.1 Document-Based Query	6
5.2 Data-Based Query	6
5.3 Hybrid Query	7
5.4 Permission-Restricted Query	7
6. Governance & Access Control	8
6.1 Geographic Access Control	8
6.2 Role-Based Access Control (RBAC)	9
7. Dataset	9
7.1 Supply Chain Database	9
7.2 Document Repository	9
7.3 Sample Questions	11
8. Evaluation	12
8.1 Business Value (60%)	12
8.2 Technical Execution (40%)	12
9. Submission	13
9.1 Video Presentation	13
9.2 Code Submission	14
10. Questions and Contact Information	14

# Syngenta AI Agent Hackathon

Welcome to the AI Agent Hackathon. This event challenges you to create intelligent agent applications to improve supply chain operations using AI. This handbook provides guidance to help you develop a good solution that meets all requirements.

This hackathon invites participants to design advanced AI applications that enhance supply chain operations. Your solution will link document repositories with database systems, ensuring proper governance and access controls. Participants will have the opportunity to showcase their technical skills in creating practical AI solutions for business benefits. Successful participants may receive recognition and interview opportunities for Data Scientist positions at Syngenta.

## 1. Timeline

- **Start Date:** May 19, 2025
- **Final Submission Deadline:** May 25, 2025

Finalists are expected to be announced approximately 5 to 7 days after the final submission deadline.

All deadlines are at 11:59 PM IST on the corresponding day unless otherwise noted. Syngenta reserve the right to update the contest timeline if we deem it necessary.

## 2. Registration

**Team Size:** 1-4 participants

**Institution:** Only students from IITM BS Degree are eligible to participate

How to Register:

- Form your team (1-4 members)
- Submit registration via [Syngenta AI Agent Hackathon Registration](#)
- Registration deadline: May 20, 2025 11:59PM IST
- Each participant may join only one team

### 3. Challenge Overview

The Objective of this hackathon is to build an intelligent agent system capable of revolutionizing how supply chain professionals interact with their information ecosystem. The system must seamlessly integrate multiple capabilities to provide a unified interface for complex business queries.

- **Document Processing:** The agent must extract key insights from internal documents like policies, procedures, and reports, understanding structure and context.
- **Database Interaction:** It should translate natural language into optimized SQL queries, understanding table relationships and schema.
- **Access Control \***: To ensure enterprise-grade security, the system must enforce role-based permissions, maintain audit trails, and manage access to sensitive information without disrupting user experience.
- **External Knowledge Integration \*:** The system should enhance internal insights by intelligently incorporating relevant and trustworthy external information using web, while ensuring consistency with internal policies.

\* Access Control and External Knowledge Integration would be nice to have but are not necessary.

### 4. Technical Requirements

The application you develop should function as a sophisticated intelligent assistant that to access information. The system should encompass:

#### 4.1 Functional Requirements

- **Natural Language Understanding:** Your application should be able to comprehend questions, including those with unclear requests and specialized terminology.
- **Intent Determination:** Accurately identify the type of request, whether it involves document-based knowledge, data analysis, or both.
- **Information Retrieval:** Find and pull relevant information from documents or databases, recognizing and combining information from multiple sources.

- **Governance Enforcement:** Ensure users access the correct information by applying access-control frameworks and clearly explaining any restrictions.
- **Insight Generation:** Turn raw data into useful insights through contextual analysis, identifying trends, and comparing information. Graphical visualizations would be a nice-to-have feature.
- **Memory:** The application should support short-term memory for subsequent questions in a chat, allowing it to remember context and provide coherent answers. Having long-term memory for retaining user preferences and interactions would be a nice-to-have feature.

## 4.2 Non-Functional Requirements

- **Performance:** The application should provide real-time responses with *minimal latency* and *optimized token usage*, ensuring a smooth user experience.
- **Security:** Robust security measures should be in place to protect sensitive and PII to ensure compliance with data protection regulations.
- **Usability:** The user interface should be intuitive and user-friendly, making it easy for users to interact with the application and access the information they need.
- **Maintainability:** It would be nice to have a system designed for easy maintenance and updates, allowing for the addition of new features and improvements over time.

## 4.3 Technology Stack

We encourage all participants to freely explore and choose their preferred tech stack. Your submission will be evaluated on creativity, innovation, and the effectiveness of your solution, not the specific tools you use.

Below are some commonly used technologies across different components of the application. You're welcome to go beyond these suggestions:

**API:** FastAPI<sup>^</sup>, NextJS, Flask, Fastify, Hono, Express.js

**Frontend:** NextJS<sup>^</sup>, VueJS, React

**Database:** Postgres<sup>^</sup>, MySQL, Oracle

**AI/Agent Frameworks:** Langchain<sup>^</sup>, AI SDK<sup>^</sup>, LlamalIndex

**Large Language Models (LLM):** GPT 4.1<sup>^</sup>, Claude 3.5 Sonnet<sup>^</sup>, Claude 3.7 Sonnet<sup>^</sup>, Llama 3.1

**Embedding Models:** Embed 4<sup>^</sup>, text-embedding-3-large

<sup>^</sup> These tools/models are either recommended or have special support (e.g., credits or access) for this hackathon.

All participants will receive API credits and access to OpenAI's **GPT-4o** for use during the hackathon. You're also welcome to use other models and providers — including open-source or hosted solutions — as long as your application meets the requirements.

More details on model access will be shared during the kick-off call.

## 5. Business Scenarios

This section illustrates real-world questions that users might ask the AI-powered application during supply chain operations. Each scenario demonstrates how the system should behave when handling queries involving documents, databases, or a mix of both—while also respecting organizational policies like access control. These examples are designed to help participants understand the range of use cases, system expectations, and how business logic can be operationalized through intelligent agents.

### 5.1 Document-Based Query

**User Query:** "What is our company policy on inventory write-offs?"

The system should interpret that the user needs information from internal policy documents. It must:

- Locate relevant policy documents.
- Extract the section covering inventory write-offs.
- Summarize the answer with references to the original content.
- Optionally, provide more detailed excerpts if the user asks.

### 5.2 Data-Based Query

**User Query:** "How much inventory do we currently have in the Southwest region?"

The system should:

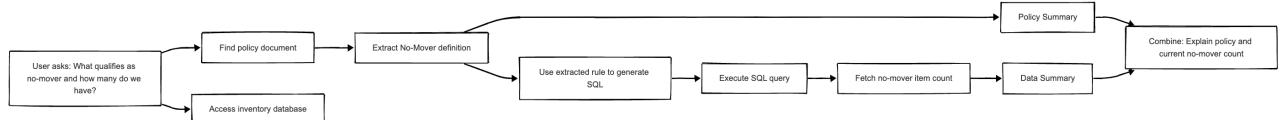
- Understand that this requires live data retrieval.
- Generate the correct SQL query to fetch inventory filtered by region.
- Run the query and return results in plain, human-readable form.

- Provide contextual information such as total units or percentage of total inventory.

### 5.3 Hybrid Query

**User Query:** "Which inventory items qualify as no-movers according to our policy, and how many do we currently have?"

This query involves both documents and data. The system should:

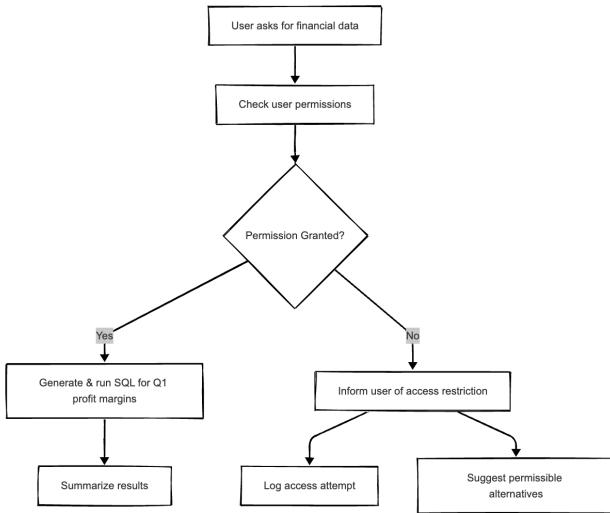


- Retrieve the definition of "no-mover" inventory from policy documents.
- Extract conditions (e.g., "no stock movement in 180 days").
- Generate a SQL query using those conditions.
- Run the query and report how many items qualify, along with an explanation of the criteria used.

### 5.4 Permission-Restricted Query

**User Query:** "Show me the profit margins for all products in Q1."

This query accesses sensitive financial data. The system should:



- Check if the user has permission to view financial metrics.
- If access is granted, proceed with the SQL query and return results.
- If not, inform the user that access is restricted and suggest alternative queries.
- Log the access request for auditing purposes.

## 6. Governance & Access Control

While not mandatory, implementing governance and access control mechanisms demonstrates a strong understanding of enterprise-grade AI systems and significantly enhances your solution's credibility.

In real-world enterprise systems, sensitive information must be protected based on who the user is, what their role is, and where they are authorized to operate. Participants are encouraged to simulate or implement mechanisms that respect both geographic boundaries and functional roles.

### 6.1 Geographic Access Control

Users should only access data relevant to the countries or regions they are authorized for. For example:

- A user assigned to India should only be able to view Indian supply chain data.
- A Global Operations Manager can view data across all countries and regions.

## 6.2 Role-Based Access Control (RBAC)

Access should also be filtered based on organizational roles:

A user in the Planning department can access inventory, logistics, and forecasting data.

A user in Finance can access margin reports, cost breakdowns, and P&L data.

Cross-role access should be explicitly authorized, not implicit.

**Implementation Tip:** Maintain a user metadata profile with role and region. Apply filters queries or document retrieval logic based on this metadata. You can simulate this with a basic config or through API tokens.

# 7. Dataset

We have two distinct types of datasets that must be integrated in your intelligent agent solution:

- **Structured Database:** A relational database containing supply chain transaction data with interconnected tables showing orders, customers, products, and related information.
- **Document Repository:** A collection of policy documents, guidelines, and procedures that contain qualitative information about how supply chain operations should be conducted. These documents establish the rules, definitions, and processes that govern business decisions.

Your intelligent agent solution must be capable of working with both data types - extracting insights from structured database tables as well as unstructured policy documents - and intelligently combining information from both sources when necessary to provide complete answers to business questions.

## 7.1 Supply Chain Database

The database consists of roughly 180,000 transactions from supply chains used by DataCo Global over a 3-year period. This dataset represents a comprehensive view of supply chain operations across multiple dimensions.

Link: <https://www.kaggle.com/datasets/saicharankomati/dataco-supply-chain-dataset>

## 7.2 Document Repository

The document repository contains the following policy and procedure documents:

- Inventory Management
- Obsolete Inventory Handling
- Health, Safety, and Environment (HSE) in the Supply Chain
- Supplier Selection and Qualification
- Supplier Code of Conduct (Ethical Sourcing)
- Supplier Relationship Management
- Sourcing and Procurement Practices
- Capacity Planning
- Demand Forecasting and Planning
- Order Management
- Transportation and Logistics Management
- Warehouse and Storage Policy
- Returns and Reverse Logistics
- Risk Management and Mitigation
- Business Continuity and Disaster Recovery
- Trade Compliance and Regulatory Adherence
- Anti-Counterfeit and Product Authenticity
- Data Security and Cybersecurity
- Environmental Sustainability (Green Supply Chain)
- Circular Economy and Waste Reduction
- Performance Measurement and KPIs
- Technology Adoption (e.g., IoT, Blockchain)
- Change Management in Supply Chain Processes
- Cost Reduction and Efficiency
- Contract Management and Negotiation
- Communication and Crisis Management
- Labor Standards and Fair Labor Practices
- Diversity and Inclusion in Supplier Base
- Continuous Improvement and Innovation
- Product Quality Assurance and Control

Link: <https://www.kaggle.com/datasets/sghhim/dataco-global-policy-dataset>

### 7.3 Sample Questions

Here are some sample questions of varying complexity that users might ask the system:

- What is the total sales amount for all orders?
- What is our company's definition of slow-moving inventory according to the Inventory Management policy?
- What are the required steps for handling obsolete inventory write-offs?
- What sustainability practices should our logistics partners follow according to our Environmental Sustainability policy?
- What criteria do we use to qualify new suppliers based on our Supplier Selection policy?
- How does our Returns and Reverse Logistics policy handle customer claims for damaged products?
- What are the key performance indicators for measuring supplier performance as defined in our Performance Measurement policy?
- What cyber security measures must be implemented to protect supply chain data according to our Data Security policy?
- What was the total sales amount for the Southwest region in the last quarter?
- Which products have the highest profit margin across all categories?
- Which shipping mode has the lowest rate of on-time deliveries?
- Who are our top 10 customers by total order value?
- What is the average time between order date and shipping date by country?
- Which product categories have shown declining sales over the past three quarters?
- What is the distribution of orders by customer segment and region?
- Which inventory items qualify as "no-movers" according to our policy, and what is their total current value?
- Are there any suppliers who don't meet our minimum ethical sourcing requirements as defined in our Supplier Code of Conduct, and what percentage of our total spend do they represent?
- Based on our Product Quality Assurance standards, which products had the highest number of quality-related returns in the past year?
- According to our Transportation and Logistics policy, are we using the optimal shipping modes for high-value orders to international destinations?
- Which products that are classified as "hazardous materials" according to our HSE policy are currently being stored in facilities not certified for such materials?

- Based on our Risk Management framework, which supply chain disruptions occurred in the past year that exceeded our defined risk tolerance thresholds, and what was their financial impact?

## 8. Evaluation

Solutions will be evaluated based on a combination of business value and technical execution. The primary focus will be on how effectively your solution addresses real-world business needs while maintaining technical excellence.

### 8.1 Business Value (60%)

- **Answer Quality and Accuracy (20%):** Solutions must provide correct, relevant information that precisely addresses user queries. Answers should demonstrate deep understanding of both the question intent and business context.
- **Actionable Business Insights (15%):** Responses should offer clear, actionable intelligence that enables better decision-making. The system should not just answer questions but provide contextual information that adds business value.
- **User Experience (15%):** The interface should be intuitive and business-friendly, requiring minimal technical knowledge to operate effectively. Solutions should demonstrate a smooth conversation flow with appropriate follow-up capabilities.
- **Business Scenario Coverage (10%):** Solutions will be tested against various supply chain scenarios outlined in section 5, evaluating how comprehensively they handle different query types and complexity levels.

### 8.2 Technical Execution (40%)

- Query Processing (15%):
  - SQL queries must be syntactically correct, optimized, and produce accurate results
  - Document retrieval must select only relevant documents and summarize them accurately
  - Hybrid queries should seamlessly integrate information from both sources
- Performance Metrics (15%):
  - Response latency and processing time
  - Token efficiency and resource utilization
  - Handling of complex queries within reasonable time frames

- Implementation of Governance (10%):
  - Effective role-based and/or geographic access controls
  - Clear communication of access restrictions
  - Proper handling of sensitive information

The evaluation team will use internal benchmarks and parameters to assess technical performance aspects including but not limited to information retrieval depth, response coherence, and system robustness.

Solutions that demonstrate exceptional business value while maintaining strong technical performance will be ranked highest.

## 9. Submission

Participants are required to submit their solutions through multiple channels to ensure comprehensive evaluation. Please follow these guidelines carefully to ensure your submission is considered for the hackathon.

### 9.1 Video Presentation

Create a 10-minute video presentation with the following structure:

- Team Introduction (2 minutes)
  - Introduce team members and their roles
  - Brief background and relevant experience
- Solution Explanation (3 minutes)
  - Technical architecture overview
  - Key features and innovations
  - Challenges faced and solutions implemented
- Live Demonstration (3 minutes)
  - Working demonstration of your AI agent
  - Showcase key functionalities across different query types
  - Highlight any special features or innovations
- Performance Metrics Showcase (2 minutes)

- Demonstrate performance metrics for:
- Document-based queries (response time, accuracy)
- Database queries (SQL execution time, result accuracy)
- Hybrid queries (total processing time, integration efficiency)
- Show logging/monitoring implementation
- Present token usage statistics
- Compare metrics across different query types

## 9.2 Code Submission

- **GitHub Repository:** Host your entire project codebase on a GitHub repository with clear documentation.
- **Nice to have:** A hosted/deployed version of your application for easy evaluation.

Submit your project through this form: [Syngenta AI Hackathon Submission](#)

## 10. Questions and Contact Information

For any questions regarding the hackathon, please feel free to email: [himanshu.singh-4@syngenta.com](mailto:himanshu.singh-4@syngenta.com)

\*\*\*\*



**Syngenta**

[www.syngenta.com](http://www.syngenta.com)

**syngenta**