

## Introduction

Techathon 6.0

Building tomorrow's solutions for today's India

Techathon is more than a competition—it is a launchpad for India's brightest young minds to drive change through bold ideas and breakthrough innovation. Since its inception in 2020, Techathon has grown into one of the country's most anticipated campus contests, inspiring students to push boundaries and reimagine possibilities.

Now in its sixth edition, this year's challenge invites participants to explore the frontier of **Agentic AI**, a transformative leap from automation to autonomous, goal-driven systems. The theme sets the stage for visionary solutions that could redefine industries and accelerate India's digital future.

Stay tuned as the action unfolds!

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## Problem statements

### Challenge I: Pharmaceuticals

**About the business:** A leading multinational generic pharmaceutical company, with significant business in the US and a broad product portfolio, seeks to diversify beyond the highly competitive, low-margin generics market. The company aims to develop value-added, innovative products by repurposing approved molecules for new indications, alternative dosage forms, or different patient populations—targeting unmet medical needs.

**Problem statement:** Identifying such opportunities requires extensive literature reviews, often taking two to three months and involving multiple iterations to uncover viable product concepts. To accelerate this process, the company plans to adopt an Agentic AI solution that integrates with various online sources and subscription-based databases.

This AI-driven tool will enable users to interactively explore potential innovation cases, significantly reducing research time and increasing throughput. By enhancing the speed and quality of early-stage product evaluations, the company aims to strengthen its pipeline with differentiated offerings that deliver greater clinical and commercial value.

**Goal:** Teams must design an Agentic AI solution where the Master Agent:

- Can be linked to various regulatory websites, clinical trial websites, scientific journals and paid databases (subscriptions provided by the client), along with any internal databases of the client
- Features a user interface that allows users to input prompts for finding information from the web, analyzing market data and summarize scientific journals
- Generates a summary report of the searches and save the report in an archival system

**Key deliverable:** A 5 slider PPT showcasing the end-to-end journey from the initial prompt of finding a molecule, identifying its unmet needs, checking for ongoing clinical trials, exploring its probable use in other diseases, and determining if any patents have been filed, leading to the development of an innovative product story.

### Agentic AI roles

1. Master Agent (conversation orchestrator)

- Interprets user queries and breaks them into modular research tasks
- Delegates tasks to domain-specific Worker Agents
- Synthesizes responses from Worker Agents into coherent summaries with references
- Responds with formatted text, tables, charts or PDF reports as needed

## 2. Worker Agents

### a. IQVIA Insights Agent

- Queries IQVIA datasets for sales trends, volume shifts and therapy area dynamics
- Outputs: Market size tables, CAGR trends, therapy-level competition summaries

### b. EXIM Trends Agent

- Extracts export-import data for APIs/formulations across countries
- Outputs: Trade volume charts, sourcing insights, import dependency tables

### c. Patent Landscape Agent

- Searches USPTO and other IP databases for active patents, expiry timelines and FTO flags
- Outputs: Patent status tables, competitive filing heatmaps, PDF extracts of relevant patents

### d. Clinical Trials Agent

- Fetches trial pipeline data from ClinicalTrials.gov or WHO ICTRP
- Outputs: Tables of active trials, sponsor profiles, trial phase distributions

### e. Internal Knowledge Agent

- Retrieves and summarizes internal documents (e.g., MINS, strategy decks, field insights)
- Outputs: Key takeaways, comparative tables or downloadable briefing PDFs

### f. Web Intelligence Agent

- Performs real-time web search for guidelines, scientific publications, news and patient forums
- Outputs: Hyperlinked summaries, quotations from credible sources, guideline extracts

### g. Report Generator Agent

- Formats the synthesized response into a polished PDF or Excel report
  - Outputs: PDF summaries with charts/tables, downloadable links in-chat
- ClinicalTrials.gov

## Data and system assumptions

- Synthetic queries: The team will simulate at least 10 strategic questions that pharma planners might ask (e.g., “Which respiratory diseases show low competition but high patient burden in India?”)

### Mock data sources:

- IQVIA mock API: Returns market size, growth and competitor data per therapy area
- EXIM mock server: Simulated export or import volumes of APIs or formulations
- USPTO API clone: Mock API for patent filings, expiry timelines and innovation trends
- Clinical trials API stub: Simulated access to ongoing trials and their sponsors
- Internal documents repository: Synthetic PDFs of past strategy decks and field reports
- Web search proxy: Simulated web results for real-time signals and references
- Report generator: Converts chatbot responses into a downloadable PDF summary
- File upload (optional): Upload mock internal document PDFs to be summarized by the agent

## Agentic AI Framework (CrewAI/LangGraph)

### 1. Master Agent: Conversation orchestrator

- Understands portfolio planning queries from the user
- Decomposes questions and allocates subtasks to worker agents
- Gathers, summarizes and formats findings into cohesive responses

### 2. Worker Agents

Agent responsibilities output type

- IQVIA Insights Agent: Fetches market size, growth, competitor data (tables and graphs)
- EXIM Trade Agent: Summarizes import-export trends by molecule (tables, bullet insights)
- Patent Landscape Agent: Lists relevant patent filings, expiry and FTO risks (patent tables, risk flags)
- Clinical Trials Agent: Extracts trial pipeline information by indication or MoA (trial summary tables)
- Internal Insights Agent: Summarizes uploaded internal PDFs (key takeaways, PDF extracts)
- Web Intelligence Agent: Performs mock web search for guidelines, RWE, news (text responses with links)
- Report Generator Agent: Converts responses to PDF report (PDF download link in chat)

**Submission format: 5 slider PPT**

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## Challenge II: Banking, Financial Services, and Insurance (BFSI) Tata Capital

**About the business:** A large-scale Non-Banking Financial Company (NBFC) with a presence across India offers **personal loans, home loans, auto loans and more**. To increase revenue from existing customers, the NBFC aims to **sell personal loans** to prospects and its existing customers through a **web-based chatbot interface**.

The chatbot will serve as a **digital sales assistant**, where a **Master Agent (Agentic AI Controller)** coordinates multiple **Worker AI agents** to handle the end-to-end loan sales process — from conversation and verification to credit evaluation, and approval and generating a sanction letter.

**Problem statement:** The NBFC wants to improve its sales success rate for personal loans by using an AI-driven conversational approach. The solution must simulate a **human-like sales process**, where the **Master Agent** handles customer conversations, engages customers in a personalized manner and collaborates with multiple Worker AI agents to complete the loan process.

**Goal:** Teams must design an **Agentic AI solution** where the Master Agent:

1. Chats with customers landing on the web chatbot via digital ads or marketing emails
2. Understands the customer's needs and convinces them to take a personal loan
3. Orchestrates multiple Worker AI agents to complete all tasks—verification, underwriting and sanction letter generation—before closing the chat.

**Key deliverable:** A 5-slides PPT showcasing the **end-to-end journey** from the initial chat to sanction letter generation.

### Agentic AI roles

1. **Master Agent (main orchestrator):**
  - Manages the conversation flow with the customer

- Hands over tasks to Worker Agents and coordinates the workflow
- Starts and ends the conversation
- 2. **Worker Agents:**
  - **Sales Agent:** Negotiates loan terms, discusses customer needs, amount, tenure and interest rates
  - **Verification Agent:** Confirms KYC details (phone, address) from a **dummy CRM server**
  - **Underwriting Agent:**
    - Fetches a dummy credit score (out of 900) from a mock credit bureau API
    - Validates eligibility:
      - If the loan amount  $\leq$  **pre-approved limit**, approve instantly
      - If  $\leq 2\times$  **pre-approved limit**, request a salary slip upload. Approve only if **expected EMI  $\leq$  50% of salary**
      - Reject if  $> 2\times$  **pre-approved limit** or credit score  $< 700$
  - **Sanction Letter Generator:** Generates an automated PDF sanction letter if all conditions are met

#### Data and system assumptions

- **Synthetic customer data:** Teams must create dummy data for at least **10 customers** with details like name, age, city, current loan details, credit score and pre-approved personal loan limit
- **Offer mart server:** A mock server or API hosting pre-approved loan offers
- **CRM server:** Dummy customer KYC data
- **Credit bureau API:** Mock API to fetch credit scores
- **File upload:** Simulated salary slip upload (dummy PDF or image)
- Teams may make any reasonable assumptions as long as the solution feels **realistic**

#### Submission format

- 5 Slider PPT

#### Tips for participants

- Keep the chatbot **conversational and persuasive**, just like a human sales executive
- Focus on **orchestration logic**—how the Master Agent decides which Worker Agent to trigger
- Demonstrate **edge cases** (e.g., loan rejection or the need for additional salary slip verification)

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### Challenge III: Automotive [Hero + M&M]

**Use Case:** Autonomous Predictive Maintenance and Proactive Service Scheduling with Manufacturing Feedback loop

#### About the Business:

A leading automotive OEM and service network in India provides aftersales maintenance services to a large customer base across metros and tier-2 cities. The business aims to increase customer retention, reduce vehicle breakdowns, optimize service center utilization, and improve manufacturing quality by proactively predicting maintenance needs, autonomously scheduling service appointments, and feeding insights back to the manufacturing team.

To achieve this, the company plans to deploy a web-based Agentic AI system acting as a Master Agent orchestrating multiple Worker AI agents to handle end-to-end predictive maintenance, customer engagement, service scheduling, and manufacturing quality improvement—using real-time vehicle data, historical maintenance logs, and CAPA/RCA records.

## **The Problem Statement**

### **Business Problem:**

The company wants to improve vehicle uptime, enhance customer experience, and drive product quality improvements by:

1. Proactively predicting mechanical failures before they occur.
2. Autonomously scheduling service appointments to minimize unplanned downtime.
3. Leveraging RCA/CAPA insights from maintenance and manufacturing logs to improve design and reduce recurring defects.

### **Goal:**

Design an Agentic AI solution where a Master Agent orchestrates multiple Worker AI agents to autonomously:

1. Continuously analyze real-time vehicle sensor data and historical maintenance logs using vehicle telematics
2. Predict upcoming mechanical issues using advanced diagnostics and failure prediction models.
3. Proactively contact vehicle owners with personalized maintenance recommendations primarily via voice-based agents, with mobile app notifications as a secondary channel. .
4. Forecast general service demand from maintenance history and vehicle usage patterns to optimize service center workloads and appointment planning.
5. Manage appointment scheduling by coordinating service center availability and customer preferences.
6. Track service progress until completion and follow-up for customer feedback.
7. Perform RCA/CAPA-driven analysis by cross-referencing predicted failures with historical maintenance and manufacturing defect records to suggest preventive actions, best-practice solutions, and feed insights back to manufacturing teams for quality improvement.
8. Ensure security and compliance by implementing UEBA (User and Entity Behaviour Analytics) for Agentic AI to monitor autonomous agent interactions, detect anomalies, and prevent unauthorized actions during orchestration. (*Refer TIPS at the bottom for UEBA Understanding*)

### **Key Deliverable:**

A 5 slides PPT showcasing:

- Continuous vehicle monitoring and predictive failure detection.

- Forecasting general service demand and autonomous scheduling based on vehicle usage and maintenance patterns.
- Persuasive customer engagement via voice agent.
- RCA/CAPA-based insights generation and feedback to manufacturing for quality improvement.
- UEBA in action – detecting abnormal agent behavior or preventing unauthorized access.

## Agentic AI Roles

### 1. Master Agent (Main Orchestrator):

- Monitors vehicle health data streams and overall conversational flow.
- Coordinates Worker Agents in diagnosis, customer outreach, scheduling, and feedback collection and insight feeding to manufacturing team
- Ensures all agent interactions comply with security policies through UEBA-based anomaly detection
- Initiates and ends customer interactions.

### 2. Worker Agents:

- **Data Analysis Agent:** Continuously analyzes streaming vehicle telematics and sensor data plus maintenance history to detect early warning signs and forecast likely maintenance needs or service demand
- **Diagnosis Agent:** Runs predictive models to assess probable component failures and assigns priority levels.
- **Customer Engagement Agent:** Initiates personalized conversations with vehicle owners via chatbot to explain predicted issues and recommend service.
- **Scheduling Agent:** Checks service center capacity, proposes appointment slots, and confirms bookings with customers.
- **Feedback Agent:** Follows up post-service to capture customer satisfaction and update vehicle maintenance records.
- **Manufacturing Quality Insights Module :** Automatically generates actionable insights for the manufacturing team by analyzing predicted failures and historical CAPA/RCA data to improve product design and reduce recurring defects.

## Data & System Assumptions

- Synthetic Vehicle Data: Data for 10 example vehicles including sensor readings, usage patterns, maintenance history, and diagnostic trouble codes.
- Telematics API: Mock real-time sensor data feed.
- Maintenance Records Server: Dummy database of historical repairs and service visits (can leverage open-source automotive datasets from Kaggle, UCI Repository, HuggingFace, etc.).
- Service Center Scheduler: Mock API to retrieve available appointment slots and confirm bookings.

- Customer Interaction Layer: Simulated voice-based virtual agent as the primary interface for owner communication, supplemented by app notifications for reminders and confirmations
- Security Layer: UEBA integrated to monitor Master and Worker Agents for anomalous or malicious behaviours (e.g., unauthorized API calls or unexpected workflow changes).
- Forecasting & RCA Data: Historical maintenance, manufacturing CAPA, and RCA records.

**Submission Format:** A 5 slider PPT

### **Tips for Participants**

- Emphasize persuasive and human-like chatbot/Voice agent conversations explaining the vehicle's condition and convincing owners to book services.
- Showcase how the Master Agent coordinates real-time data analysis, predictive modeling, service demand forecasting, customer engagement, and appointment scheduling seamlessly, while integrating manufacturing feedback loops.
- Demonstrate edge cases like declined appointments, urgent failure alerts, or multi-vehicle fleet scheduling, and recurring defects. Show how RCA/CAPA analysis informs better decision-making in these cases.
- What is UEBA - UEBA uses advanced analytics and machine learning to establish behavioural baselines for users and entities (including AI agents) and detect anomalies that indicate potential threats or unauthorized activities.

Example of UEBA: “In the predictive maintenance system, UEBA can monitor the Master Agent and Worker Agents for unusual activities—for instance, if the Scheduling Agent suddenly tries to access vehicle telematics data (which it normally doesn’t need), UEBA will flag this as anomalous behaviour and trigger an alert.”

- Show how predicted failures and RCA/CAPA patterns are fed back to manufacturing teams to improve product design, reduce recurring defects, and close the loop between aftersales and production.

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### **Challenge IV: FMCG [Asian paints]**

#### **Executive Summary**

This challenge focuses on optimizing the B2B RFP response process for a leading industrial manufacturer using Agentic AI. Participants must design a multi-agent system that automates RFP identification, product matching, and pricing estimation to improve response speed and accuracy.

## **'About the Business**

A large Industrial products manufacturing firm (client) with a business across Fast moving electrical goods (FMEG), Wires and Cables has seen considerable growth over the last 5 years. The growth has been driven by large Business to business (B2B) Request for proposals (RFPs) and tenders from infrastructure build out in India. The client wishes to further develop the B2B business by increasing the number of RFP qualifications and responses.

## **Context on B2B RFPs**

Typically, large projects – e.g., government projects are launched by government departments or public sector undertakings (PSUs). These projects are executed by lumpsum turnkey (LSTK) project executors (PSUs or private enterprises). The LSTK project executors in raise RFPs for material supplies – e.g., wires, cables, other materials as RFPs to be supplied by Original Equipment Manufacturers (OEM) vendors.

A typical RFP consists of technical scope of supply (quantity of wires / cables), technical specification (for wires and cables), test requirements and acceptance tests to be conducted before accepting the delivery of wires and cables (refer sample RFP). OEM vendors bid for these tenders and lowest priced tender is awarded the contract. The client is one of the large wires and cables OEM in India, who regularly bid for such RFPs.

## **B2B RFP response process**

- Once the RFP is received to the client **Sales Team**, they qualify the RFP based on the date for submission, past experience and product coverage.
- Qualified RFPs are passed on to the **Product Technical Team** to match the client product SKUs to RFP product requirements. Refer sample of product specs.
- The **Product Technical Team** finalizes the client product SKUs, which are the closest matches.
- This is then worked on by the **Pricing Team**, which estimates the price of the products and additional costs required to meet the testing and acceptance test requirements at project site.
- The **Sales Team** consolidates the inputs from Product Technical Team and Pricing Team to submit the RFP response to the LSTK project executor.
- In case the client product SKUs has a low match for RFP product requirement, an internal request for new made to order SKUs is prepared to meet the RFP product requirements.

## **Bottlenecks in the B2B RFP Response**

- The entire RFP response process is manually driven – with manual handoff between each team.
- In many cases the Sales Team may not be aware of the release of RFPs by LSTK project executors on time. These are typically released on LSTK project executor's website, received on emails. Delay in initiating response to RFPs would certainly mean lower chances of winning.
- The technical matching of RFP requirements to Product SKUs is manually done. This requires knowledge of technical standards, specifications, and product knowledge.
- While standards, specifications and product details are well documented, the technical team is often concurrently managing multiple RFPs and takes a lot of lead time to turn around



their response. The Pricing Team can work on the price only after technical team's responses.

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## The Problem Statement

### Business Problem:

#### The goal is to scale RFP responses using AI.

The client wants to further drive of the B2B business channel. Given that their past growth has been on B2B RFPs, they have now significant credentials and see their team having the "right to win" in this segment. Given the rapid growth in the past few years, they are now facing bottlenecks in RFP response process which are impacting their ability to respond to RFPs on time.

Upon analyzing the past wins and losses on large RFPs, the client has identified the following.

- 90% of the wins correlated to RFPs which were received and actioned on time.
- 60% of the wins correlated to RFPs where adequate time was provided for the technical team to match product requirements with RFPs.
- Technical product SKU matching RFP requirements takes the most time in the process.
- Delays in RFP submission significantly reduced the chances of winning.

The client wants to improve the number of RFPs responses (per year) and the timely response by using an Agentic AI approach. The solution must simulate the B2B RFP response process through a Sales agent and Technical Agent which automates the process of identifying an RFP on time and maps the right SKUs with the RFP.

### Goal:

Teams must design an **Agentic AI solution** where the Sales Agent:

1. Scans a set of predefined URLs to identify the RFPs which are due to be submitted in the next 3 months.
2. Summarizes the requirement of the RFP in terms of products to be shared with Technical Agent
3. Summarizes the testing and acceptance requirement to be shared with the Pricing Agent

### Key Deliverable:

A) showcasing the **end-to-end journey** from RFP identification to collating the RFP response from technical and pricing agents.

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## Agentic AI Roles

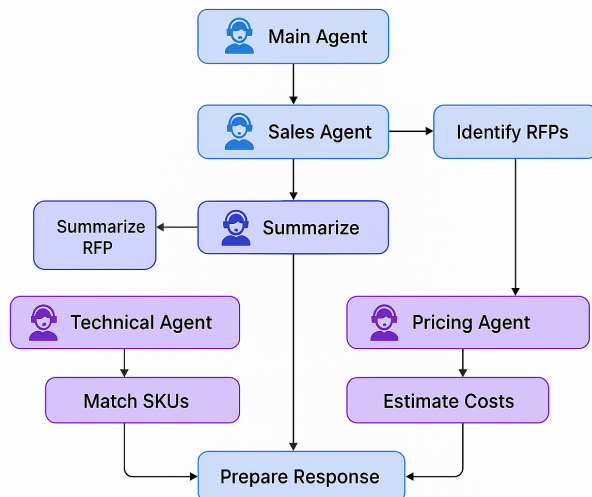
### 1. Main Agent (Main Orchestrator)

- Prepares a summary of an identified RFP to be shared with Technical and Pricing Agent
- Summary shared with technical and pricing agent needs to be contextual to their role.
- Receives the response from the Technical and pricing agent to consolidate the overall response of the RFP.

- The overall response of the RFP needs to contain the OEM product SKUs suggested, their price and the costs for tests required in the RFP.
- Starts and ends the conversation.

## 2. **Worker Agents:**

- **Sales Agent:**
  - Identifies the RFPs which are due for submission in the next 3 months.
  - Scans identified web URLs to summarize RFPs with their due dates.
  - Identifies 1 RFP to be selected for response and sends this to the Main agent.
- **Technical Agent:**
  - Receives the summary of RFP and RFP document from the main agent.
  - Summarizes the products in Scope of supply.
  - Recommends top 3 OEM products which match each of the product in Scope of supply, show a "Spec match" metric (in %) for each of OEM product recommendations.
  - Recommendation of top 3 OEM products come from a repository of product datasheets. Refer sample of product specs.
  - The spec match metric should reflect the closeness with which the recommended OEM product matches the RFP product specs considering that all the required specs have an equal weightage.
  - Prepares a comparison table of RFP spec parameters requirements, spec values for Top 1,2 and 3 OEM product recommendations for each RFP product.
  - Select the top OEM product which closely matches the RFP products for all items in scope of supply based on the spec match metric.
  - Final table of products in Scope of Supply and recommended OEM product SKUs
  - Send this table to main agent and the pricing agent.
- **Pricing Agent:**
  - Receives the summary of the tests and acceptance tests to be done for the product from the main agent.
  - Receives the product recommendation table from the technical agent.
  - Pricing agent assigns a unit price for each product based out of a dummy pricing table and price for each test based out of a dummy services price table.
  - Consolidates the total material price and services price for every product in scope of supply.
  - Send the consolidated price table to Main agent.



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## Data & System Assumptions

- **RFP Data** – Teams can download the RFPs from internet. 2 sample RFPs have been provided as a reference.
- **OEM product data sheets** – Teams can download the cables datasheets for any of the leading cable manufacturer websites – a few sample URLs have been provided as a reference.
- **Product and Tests pricing data:**  
Teams must create synthetic data for price of products, type of tests and the price of each of the tests.
- **Scanning RFP from websites** – The teams can stand up sample web pages which show the RFPs for the sales agent to scan and summarize.

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## Submission Format: 5 slider PPT

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## Tips for Participants

- Provide outputs in structured summary (bullets rather than long paragraphs) and structured tables.
- Focus on the logic for matching RFP requirements with OEM product recommendations.
- Detail out the logic for scoring Spec match metric for RFP products and OEM products.
- Emphasize more on the process of matching requirements rather than accuracy of matching.

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## Challenge V: Retail [ABFRL]

**About the business:** A leading retail brand seeks to revolutionize its sales experience by deploying an AI-driven Conversational Sales Agent that seamlessly operates across online and physical channels. This Agent must emulate a top-tier sales associate—guided by natural, personalized dialogue—while orchestrating specialized Worker Agents to handle tasks from product discovery through checkout and post-purchase support.

**Problem statement:** Customers face fragmented experiences when moving between online browsing, mobile app shopping, messaging apps, and in-store interactions. Limited bandwidth among sales associates leads to missed up-sell and cross-sell opportunities. The goal is to increase Average Order Value (AOV) and conversion rates by offering a unified, human-like conversational journey that anticipates needs, provides tailored recommendations and facilitates sales across all channels.

**Goal:** The team should design an Agentic AI solution where the **Sales Agent**:

1. **Engages** customers via web chat, mobile app, WhatsApp/Telegram, in-store kiosk or voice assistant
2. **Understands** preferences and context (e.g., past purchases, store location, current promotions) and guides customers toward relevant products
3. **Coordinates** multiple Worker Agents to handle inventory checks, personalized recommendations, promotions lookup, payment processing and order confirmation—culminating in a seamless purchase or booking (e.g., “reserve in-store for try-on”)

**Key deliverable:** 5 slider PPT

A customer initiating a conversation on one channel (e.g., mobile app)

- The Sales Agent adapting the conversation when the customer switches to an in-store kiosk or messaging app
- End-to-end orchestration: recommendation → inventory check → payment → digital/physical fulfillment → post-purchase follow-up

### Agentic AI roles

Role	Responsibilities
Sales Agent	<ul style="list-style-type: none"><li>• Manages multi-channel conversation flow</li><li>• Routes tasks to Worker Agents</li><li>• Handles context switching and session continuity</li></ul>
Worker Agents	

• <b>Recommendation Agent</b>	<ul style="list-style-type: none"> <li>• Analyzes customer profile, browsing history and seasonal trends</li> <li>• Suggests products, bundles and promotions</li> </ul>
• <b>Inventory Agent</b>	<ul style="list-style-type: none"> <li>• Checks real-time stock across warehouses and stores</li> <li>• Offers “ship to home,” “click &amp; collect,” or “in-store availability”</li> </ul>
• <b>Payment Agent</b>	<ul style="list-style-type: none"> <li>• Processes payments via saved cards, UPI, gift cards or in-store POS</li> <li>• Manages payment failures and retries</li> </ul>
• <b>Fulfillment Agent</b>	<ul style="list-style-type: none"> <li>• Schedules delivery or reserve-in-store slots</li> <li>• Notifies logistics or store staff for pickup orders</li> </ul>
• <b>Loyalty and Offers Agent</b>	<ul style="list-style-type: none"> <li>• Applies loyalty points, coupon codes and personalized offers</li> <li>• Calculates final pricing and displays savings</li> </ul>
• <b>Post-Purchase Support Agent</b>	<ul style="list-style-type: none"> <li>• Handles returns/exchanges, tracks shipments and solicits feedback</li> </ul>

#### Data and system assumptions

- **Synthetic customer profiles:** ≥ 10 customers with demographics, purchase history, loyalty tier, device preferences
- **Product catalog API:** Mock endpoint with SKUs, categories, attributes, pricing, images
- **Inventory server:** Simulated real-time stock levels for online and multiple store locations
- **Payment gateway stub:** Dummy API for authorizations, captures and declined transactions
- **Loyalty and promotions service:** Mock rules engine for loyalty points and timed promotions
- **POS integration:** Simulated in-store terminal interactions for barcode scan and payment

#### Submission format: 5 slider PPT

#### Tips for participants

- **Omnichannel consistency:** Maintain session continuity when moving between channels (e.g., chat → in-store kiosk)
- **Sales psychology:** Use persuasive, consultative language—ask open questions (“What occasion are you shopping for?”), suggest complementary items (“These shoes pair well with...”) and handle objections gracefully
- **Edge-case demonstrations:** Show how the Agent recovers from scenarios like payment failures, out-of-stock items or a request to modify an order
- **Modular orchestration:** Keep Worker Agents loosely coupled so new capabilities (e.g., Gift-wrapping Agent) can be added easily

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## Challenge VI: IT/BPM [Firstsource]

### Provider Data Validation and Directory Management Agent for Healthcare Payers

#### Business Context

Healthcare payers struggle with maintaining accurate provider directories, with studies showing 80%+ of provider entries contain errors like incorrect addresses, phone numbers, professional details, license details. Manual validation processes are time-intensive, requiring staff to call providers, verify credentials, and update multiple systems. This creates frustration among members when they can't reach providers, regulatory compliance risks, and wasted operational resources. A simplified AI solution focused on automating basic provider data validation and directory updates can demonstrate significant value while being feasible for hackathon development using publicly available data sources.

#### 1) Business Problem - Current Challenges, Desired Outcomes

##### Current Challenges:

- Provider directories contain 40-80% inaccurate contact information causing member frustration and access issues
- Manual verification processes requiring staff to call hundreds of providers monthly for basic updates
- Multiple data entry points creating inconsistencies between online directories, mobile apps, and printed materials
- Regulatory requirements demanding frequent provider data updates with limited automation capabilities
- Time-consuming credential verification processes delaying provider network additions by weeks or months
- Member complaints about outdated provider information leading to unsuccessful appointment attempts

##### Desired Outcomes:

- Automate provider data validation through intelligent web scraping and API calls
- Reduce manual verification time through AI assistance
- Achieve target provider contact information accuracy through continuous automated validation
- Create unified provider data management reducing inconsistencies across member-facing platforms
- Demonstrate reduction in provider directory maintenance costs through intelligent automation

#### 2) Goal

Develop a simplified Agentic AI system that automates basic provider data validation using publicly available sources, demonstrates intelligent data quality improvement, and showcases the potential for full-scale provider data management automation with synthetic and public data sources.

Provider data includes

- Demographics: Name, contact information
- Professional Details: Specialties, licenses, certifications
- Network Affiliations: Insurance networks, affiliations with other providers or groups
- Services Offered: Clinical focus, appointment availability
- Location and Facilities: Addresses, medical imaging facilities

### 3) Key Deliverable

**Demonstration Scenario:** Automated validation and updating of 200 provider profiles using publicly available data sources

- **Input:** Sample provider dataset with names, addresses, phone numbers, specialties, and basic credential information. Must include scanned pdf (unstructured data) formats.
- **Process:** AI agent automatically validates contact information via web scraping, checks credentials against public databases, identifies inconsistencies, and flags providers needing manual review
- **Output:** User interface to show updated provider profiles with confidence scores, actions status reports, prioritized list of providers requiring human attention, and generate communication email.
- **Timeline:** Complete validation cycle in under 30 minutes versus traditional manual work

### 4) Agentic AI Roles (Suggested / Illustrative)

**Data Validation Agent:**

- Performs automated web scraping of provider practice websites to verify current contact information and services
- Cross-references provider information against public databases including NPI registry and state licensing boards
- Conducts intelligent phone number and address validation using publicly available verification services
- Generates confidence scores for each data element based on source reliability and cross-validation results

**Information Enrichment Agent:**

- Searches public sources for additional provider information including education, board certifications, and specialties
- Analyzes provider websites and online profiles for updated practice information and service offerings
- Identifies potential network gaps by analyzing geographic distribution and specialty coverage
- Creates standardized provider profiles with enriched data from multiple public sources

**Quality Assurance Agent:**

- Compares provider information across multiple sources to identify discrepancies and inconsistencies
- Flags providers with suspicious or potentially fraudulent information for manual review

- Tracks data quality metrics and generates reports on validation success rates and common error patterns
- Prioritizes providers for manual verification based on member impact and data confidence levels

#### **Directory Management Agent:**

- Generates updated provider directory entries in multiple formats (web, mobile app, PDF)
- Creates automated alerts for providers requiring immediate attention or manual verification
- Produces summary reports showing validation results, data quality improvements, and recommended actions
- Manages workflow queues for human reviewers with prioritized tasks and supporting documentation

### **5) Data & System Assumptions**

#### **Publicly Available Data Sources:**

- **NPI Registry (CMS):** Free API access for provider basic information, credentials, and practice locations
- **State Medical Board Websites:** Public license verification and disciplinary action information (can be scraped)
- **Hospital/Health System Websites:** Provider directory pages with current practice information and contact details
- **Google My Business/Maps API:** Practice location verification, phone numbers, and patient review data
- **Medicare Provider Utilization Database:** Public claims data showing provider specialties and practice patterns

#### **Synthetic Data Generation:**

- **Provider Profile Generator:** Create realistic provider datasets with names, addresses, specialties, and credential information
- **Validation Scenario Creator:** Generate common data quality issues like outdated phone numbers, moved practices, and credential changes
- **Member Impact Simulator:** Create synthetic member complaint data related to provider directory accuracy
- **Network Coverage Generator:** Generate geographic and specialty distribution data for network adequacy analysis

### **6) Submission Format: 5 Slider PPT**

### **7) Tips for Participants**

- **Guardrails First:** Enforce content moderation/PII redaction and **grounded** (SOP/KB) before enabling sensitive actions (rejection).
- **Fast Wins:** Target top 5-8 high-volume intents/properties for **AHT** reduction.



- **Edge-Case Rigor:** Demonstrate behavior for ambiguous/handwritten content, fuzzy match, missing data, and source failure scenarios.
- **Modular Orchestration:** Keep Worker Agents loosely coupled so new programs (clients) and tasks can be added safely.

## 8) Target KPIs (for pilot)

- **Validation Accuracy:** 80%+ success rate in identifying outdated provider contact information
- **Processing Speed:** Complete validation of 100 providers in under 5 minutes versus hours of manual effort
- **Information extraction:** Achieve 85%+ accuracy during information extraction from unstructured documents/scanned PDFs with 95% right confidence score
- **Processing Throughput:** Handle 500+ provider validations per hour through automated pipeline

## 9) Example Flows to Implement (Pick 2–3)

### Flow 1: Automated Provider Contact Information Validation

**Trigger:** Daily batch processing of 200 provider profiles for contact information accuracy

#### Process Steps:

1. Data Validation Agent extracts provider practice information from synthetic dataset including names, addresses, and phone numbers
2. Agent performs web scraping of provider practice websites and Google My Business listings to verify current contact information
3. Cross-validation against NPI registry API to confirm provider identification and basic practice details
4. Quality Assurance Agent compares information across sources and generates confidence scores for each data element
5. Directory Management Agent creates validation report showing confirmed updates, discrepancies, and providers needing manual review
6. Automated prioritization of providers for human verification based on member impact and data confidence levels

### Flow 2: New Provider Credential Verification and Onboarding

**Trigger:** 25 new providers applying for network inclusion with basic credential documentation

#### Process Steps:

1. Information Enrichment Agent extracts provider information from application forms and searches NPI registry for verification
2. Automated lookup of provider licenses through state medical board websites and public credential databases
3. Data Validation Agent performs background research on provider education, board certifications, and practice history
4. Quality Assurance Agent cross-references information across multiple sources and identifies any red flags or inconsistencies
5. Automated generation of provider profiles with enriched information and confidence ratings for credentialing decisions

6. Directory Management Agent creates summary reports for credentialing committee with recommendations and supporting documentation

### **Flow 3: Provider Directory Quality Assessment and Improvement**

**Trigger:** Weekly quality assessment of entire provider directory database (500 providers) for accuracy and completeness

**Process Steps:**

1. Quality Assurance Agent analyzes all provider profiles to identify missing information, outdated data, and potential inconsistencies
2. Data Validation Agent performs selective verification of providers identified as high-risk for accuracy issues
3. Information Enrichment Agent attempts to fill data gaps through public source research and web scraping
4. Automated generation of data quality metrics showing improvement trends and areas needing attention
5. Directory Management Agent creates prioritized action lists for staff including specific providers and data elements requiring manual update
6. Production of executive dashboard showing overall directory quality scores and improvement recommendations

### **11) Minimal Tech Stack (Reference/Illustrative)**

- **Programming Language:** Python with libraries including BeautifulSoup, Requests, Pandas, and Scikit-learn for web scraping and data processing
- **AI/ML Framework:** OpenAI API (free tier) or Hugging Face Transformers for natural language processing and data matching
- **Data extraction:** VLM based data extraction for maximum performance
- **Database:** SQLite or PostgreSQL for local provider data storage and validation tracking
- **Web Framework:** Flask or FastAPI for creating simple dashboard and API endpoints
- **NPI Registry API:** Free CMS API for provider verification and basic information lookup
- **Web Scraping Tools:** Selenium or BeautifulSoup for automated provider website data extraction
- **Google Maps API:** Free tier for location verification and contact information validation
- **State License APIs:** Public APIs where available or web scraping for license verification
- **Task Scheduling:** Python Cron jobs or Celery for automated validation cycles
- **Data Processing:** Pandas and NumPy for data manipulation and quality analysis
- **Confidence Scoring:** Custom algorithms using data source reliability and cross-validation results
- **Report Generation:** Python libraries like ReportLab or Matplotlib for creating validation reports and dashboards

