

IBM TechXchange 2024

The Binary Brains



Ashutosh Kumar
Sarthak Kaushal
Shiv Vignesh Murthy

Agriculture Supply Chain Automation

IBM TechXchange 2024

Transforming Agriculture with Generative AI:

A Platform for Distributors and Producers

Deloitte.
Insights

According to a **Deloitte** report, distributors are under pressure to satisfy the fast and dependable delivery expectations of 84% of customers.

[Digital transformation | Deloitte Insights](#)

Gartner®

Sourcing & procurement becoming more critical

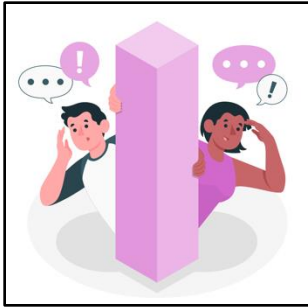
Not only are we more reliant on suppliers than ever, but also how we use suppliers is changing: More than 70% of sourcing & procurement professionals report using suppliers to tap into new-in-kind technology services or something outside of their organization's core business model. It's the role of sourcing & procurement to unlock new value from the supply base and protect the organization from future disruption.

[3 Principles for Inventory Excellence | Gartner](#)

Issues

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1. Fragmented Communication



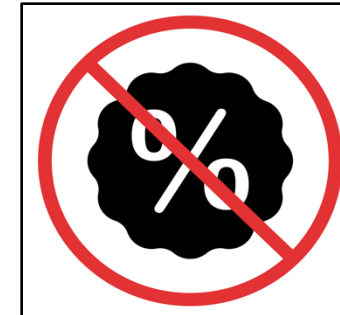
2. Demand Forecasting Challenges



3. Limited Access to Market Trends & Distributor Network



4. Lack of Price Transparency



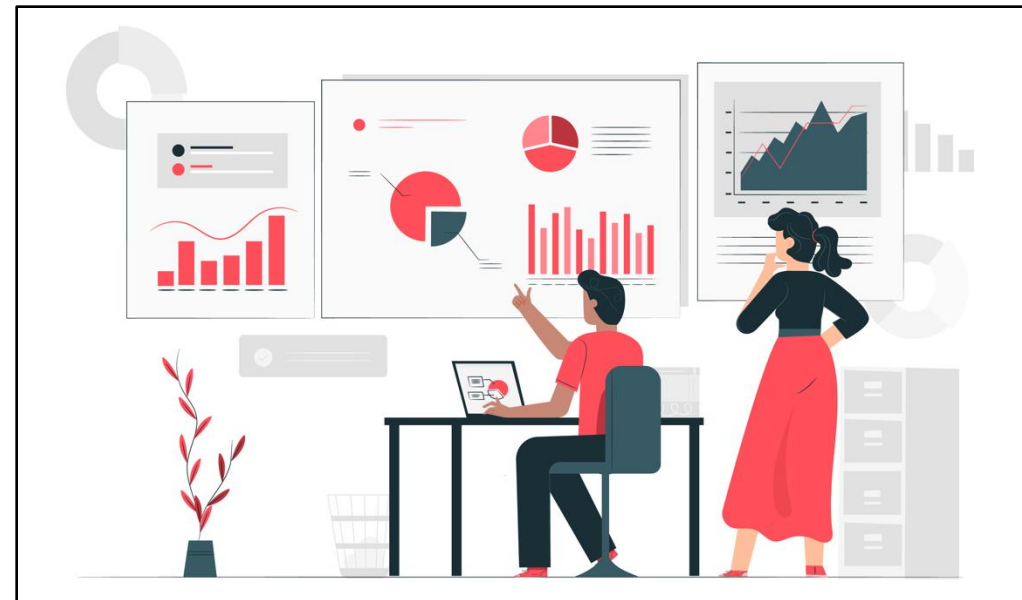
... And Consumer Trends are Evolving

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Increased Demand for Local Produce

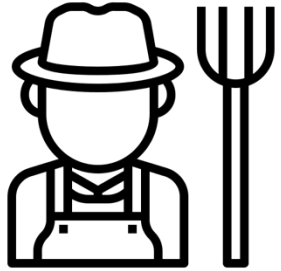


Limited Adoption of Data Driven Insights



User Persona

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Name : **Thompson**
Occupation : **Farmer**
Crops: **Apples, Wheat**

Pain Points

- Inaccurate market demand predictions, causing surplus or shortages.
- Limited distributor access, hindering market expansion and sales.
- Uncertainty in crop demand, risking mismatches with consumer preferences.



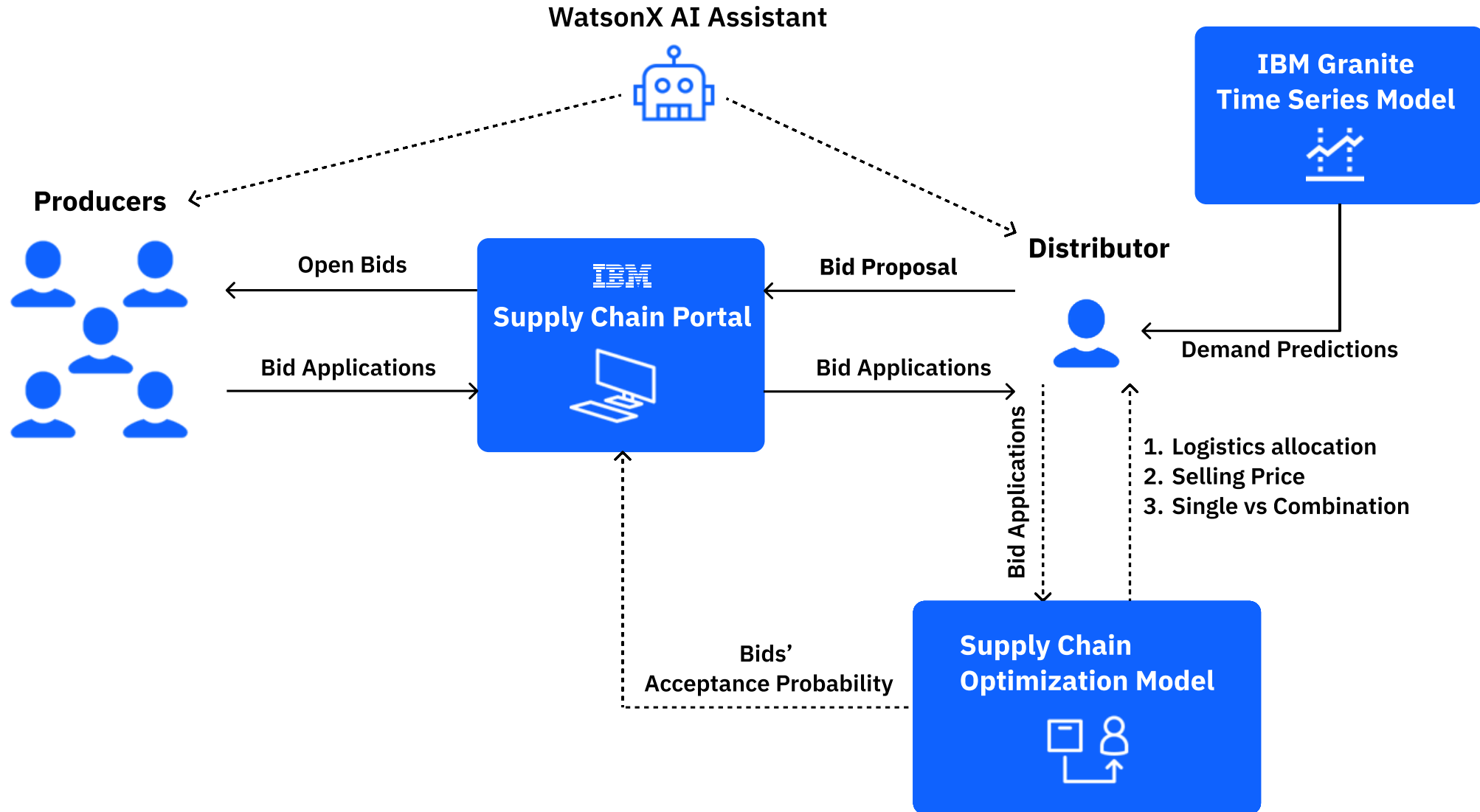
Name : **Ever-Fresh**
Occupation : **Distributor**

Goals

- Increase the number of producers and suppliers to diversify product offerings.
- Maintain optimal stock levels to meet fluctuating demand without overstocking.
- Streamline logistics and reduce logistics time

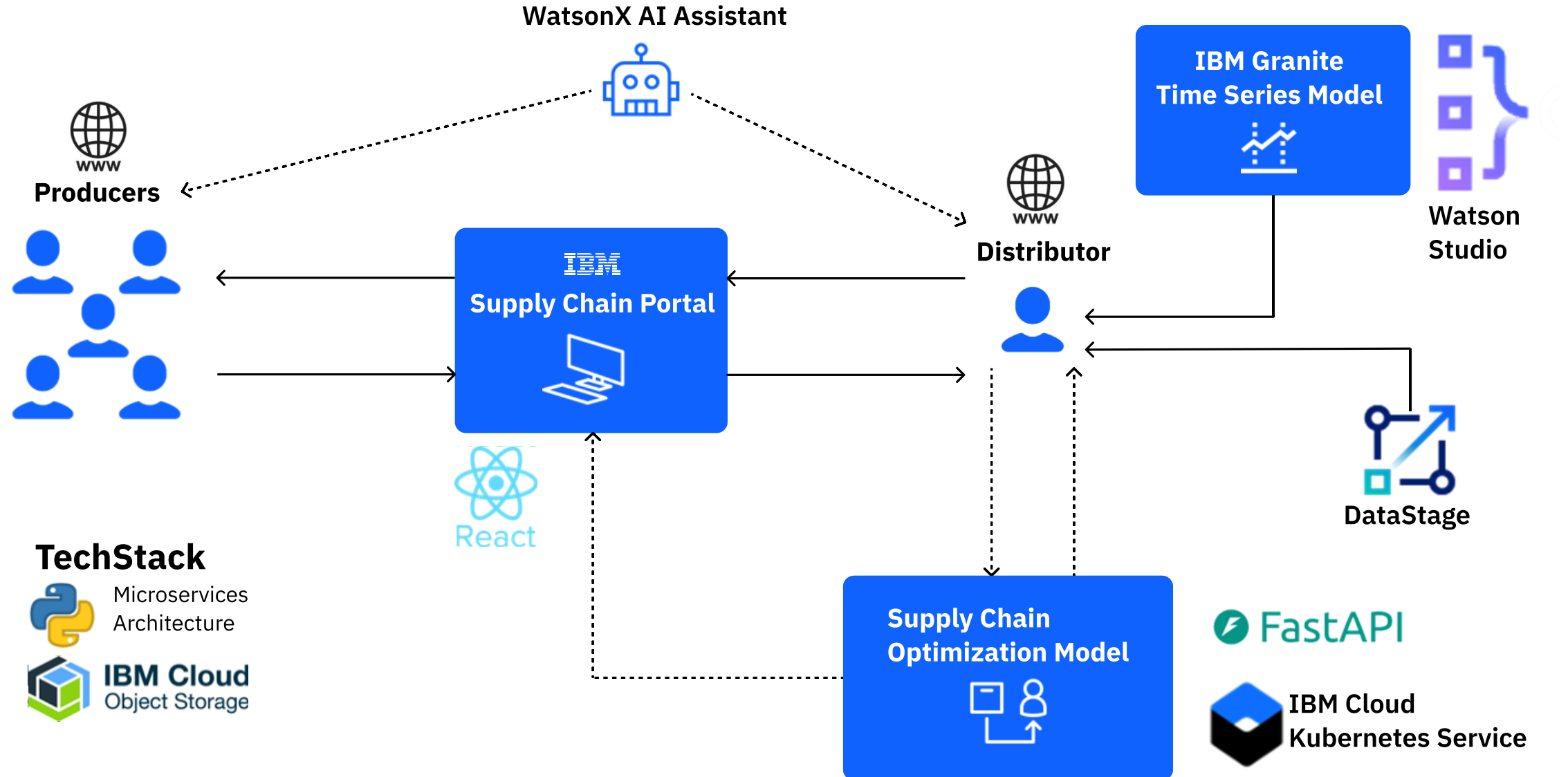
Platform Overview

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Platform Overview

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Key GenAI Features

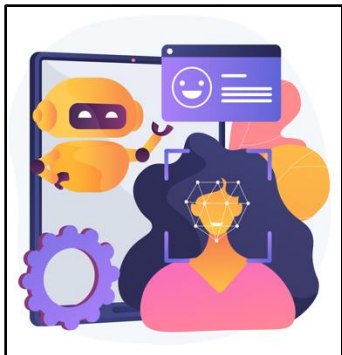
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Insights for producers to improve bid success probability without bid prices for fair market practices



Insights for distributors to improve tender fulfillment by adjusting the profit range according to market economy



Agentic AI

Producer: Monitors crop prices to trigger new bids if prices rise

Distributor: Monitors crop prices to trigger new tenders if prices fall

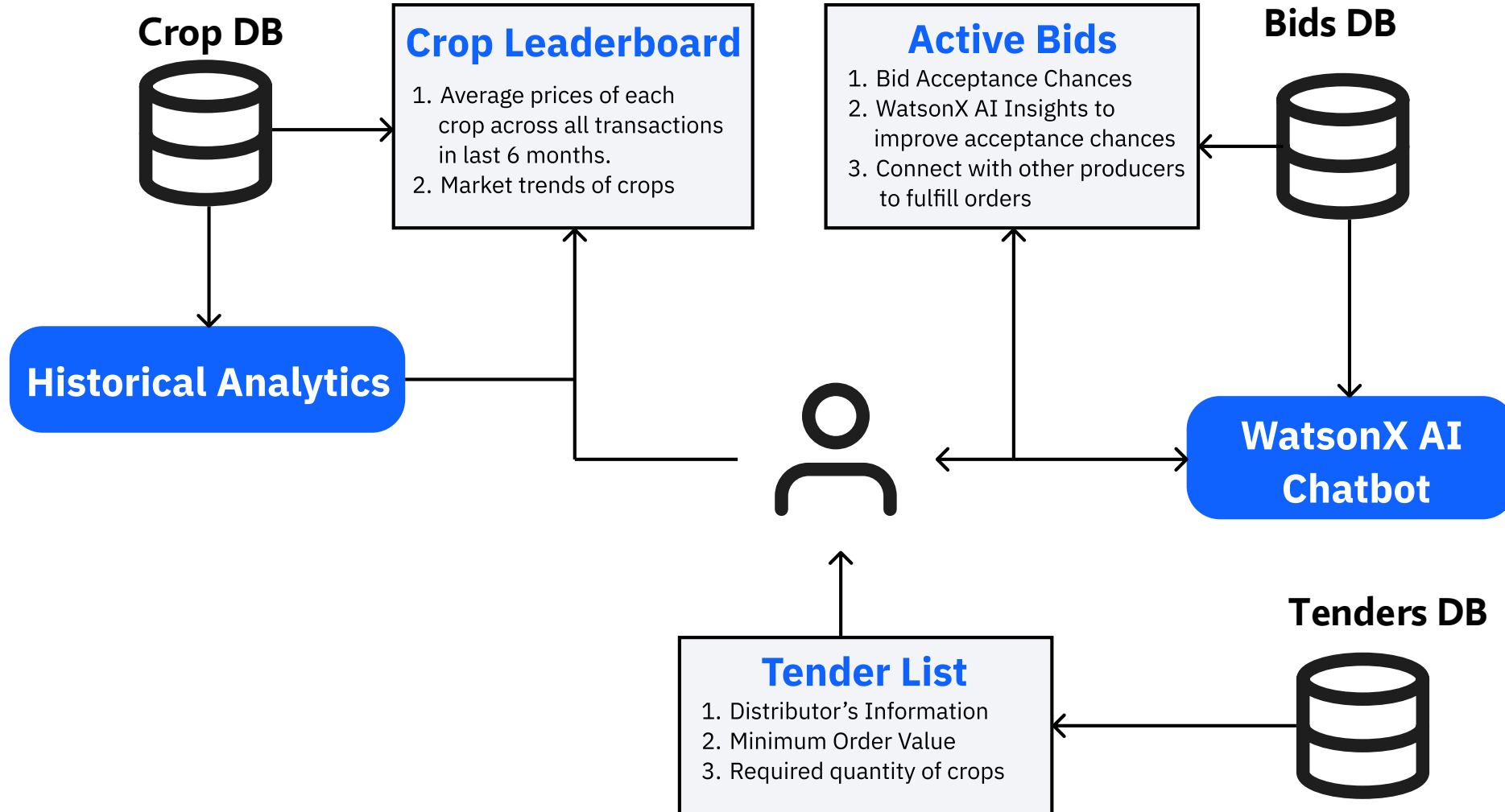
Producers

- Recommendations on next season's crop based on recent trends
- Promotional content generation for beginner producers
- Insights on competitive bids

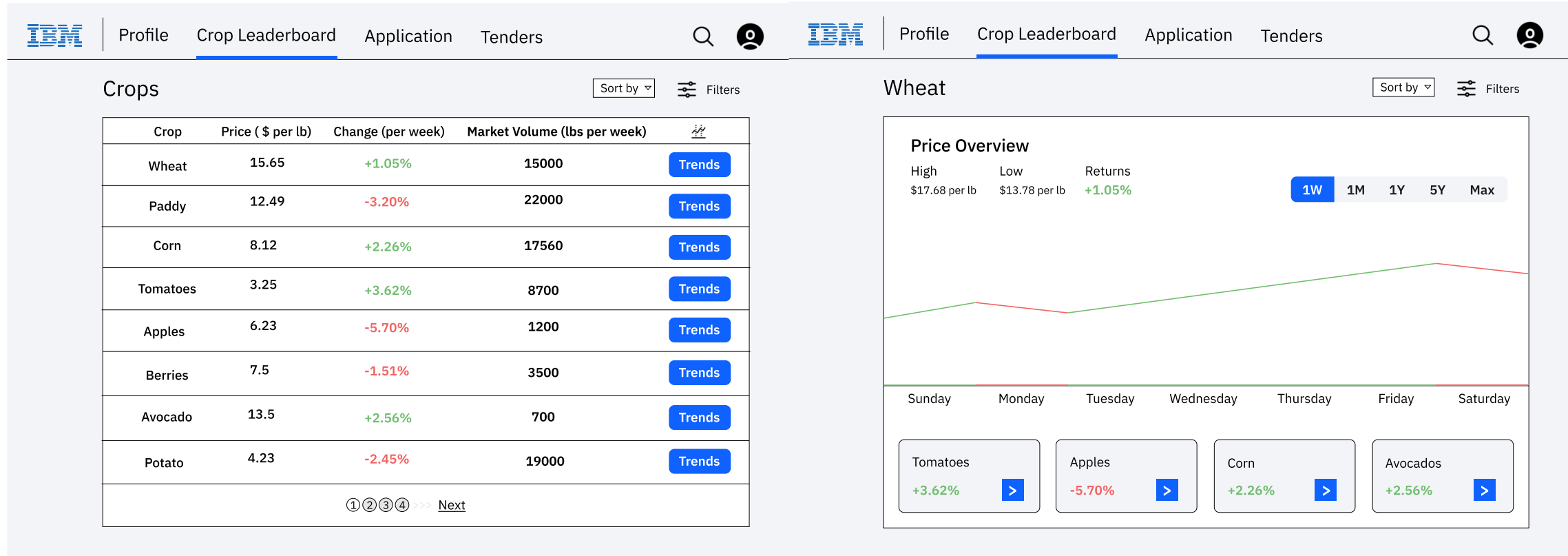
Distributor

- Elimination of spam bids based on quoted profit range
- In case of zero bids, auto-adjustment of profit range based on crop leaderboard
- Combination bids to fulfill order to maximize service level and profit

Producer Portal



Insights Driven Crop Leaderboard (Producer Portal)






Real-time Crop Prices Monitoring

Historical Price Analytics

Using the average crop prices from previous transactions over a 6-month period.

Connect, Bid, and Grow! (Producer Portal)

 | Profile | Crop Leaderboard | Application | **Tenders**

Tender List

Sort by ▾

Filters

Distributor's Name	Crops	Minimum Order Value (\$)	
ABC	Wheat, Paddy, Corn, Avocado, Barley	1000	<div>Bid</div>
DEF	Wheat, Tomatoes, Apple	1200	<div>Bid</div>
JKL	Berries, Tomatoes, Apple	1100	<div>Bid</div>
MNO	Berries, Avocados	1500	<div>Bid</div>
XYZ	Corn	2300	<div>Bid</div>
GHI	Pineapples, Apples, Barley	1600	<div>Bid</div>
TUV	Wheat, Barley, Corn	800	<div>Bid</div>
PQR	Avocado, Apples	3200	<div>Bid</div>
<div>①②③④ >>> Next</div>			

Application

[Help? WatsonX](#)

Demand

Crops	Wheat	Paddy	Corn
Amount (in lbs)	100	175	225

Need Logistics?

☐ YES

☐ NO (If NO, available: 12000 Oz)

Available Crops

☐ Wheat

☐ Paddy

☐ Corn

Crop Prices

Wheat

\$ per lbs

Paddy

\$ per lbs

Corn

\$ per lbs

Shipping Time

days (maximum shipping time: 120 days)


Add

Submit


Access to Verified Distributors Network

Fill Out and Submit Bids

Track and Improve Your Bids ! (Producer Portal)











 Profile Crop Leaderboard Application Tenders

Profile



Name: Ashutosh Kumar
Company Name: The Binary Brains
Crops: Wheat Apples Corn +


My Applications


S No.	AppId	Order Value (\$)	Chances of Acceptance	Status
1	AppId#3865	15000	35%  	Pending
2	AppId#2854	10150	73%  	Submitted
3	AppId#9715	9800	92%  	Accepted
4	AppId#1259	23000	15%  	Pending
5	AppId#9855	15000	46%  	Submitted

Billing Address


380 John St, West Henrietta, NY-14623

Billing Info.

Payment Info 


 Profile Crop Leaderboard Application Tenders

Chat




Hi! I am WatsonX AI. Please confirm your order: AppId#1259

YES NO



Improvement Suggestions
Order Fulfillment
Increase the quantity of potatoes offered to match the distributor's requirement of 1000 lbs and lower your prices by \$0.67 per lbs to improve your chances.
Potential Improvement Score
70.8 %

Edit & Resubmit Exit



Thank you! Your bid has been submitted with updated changes.

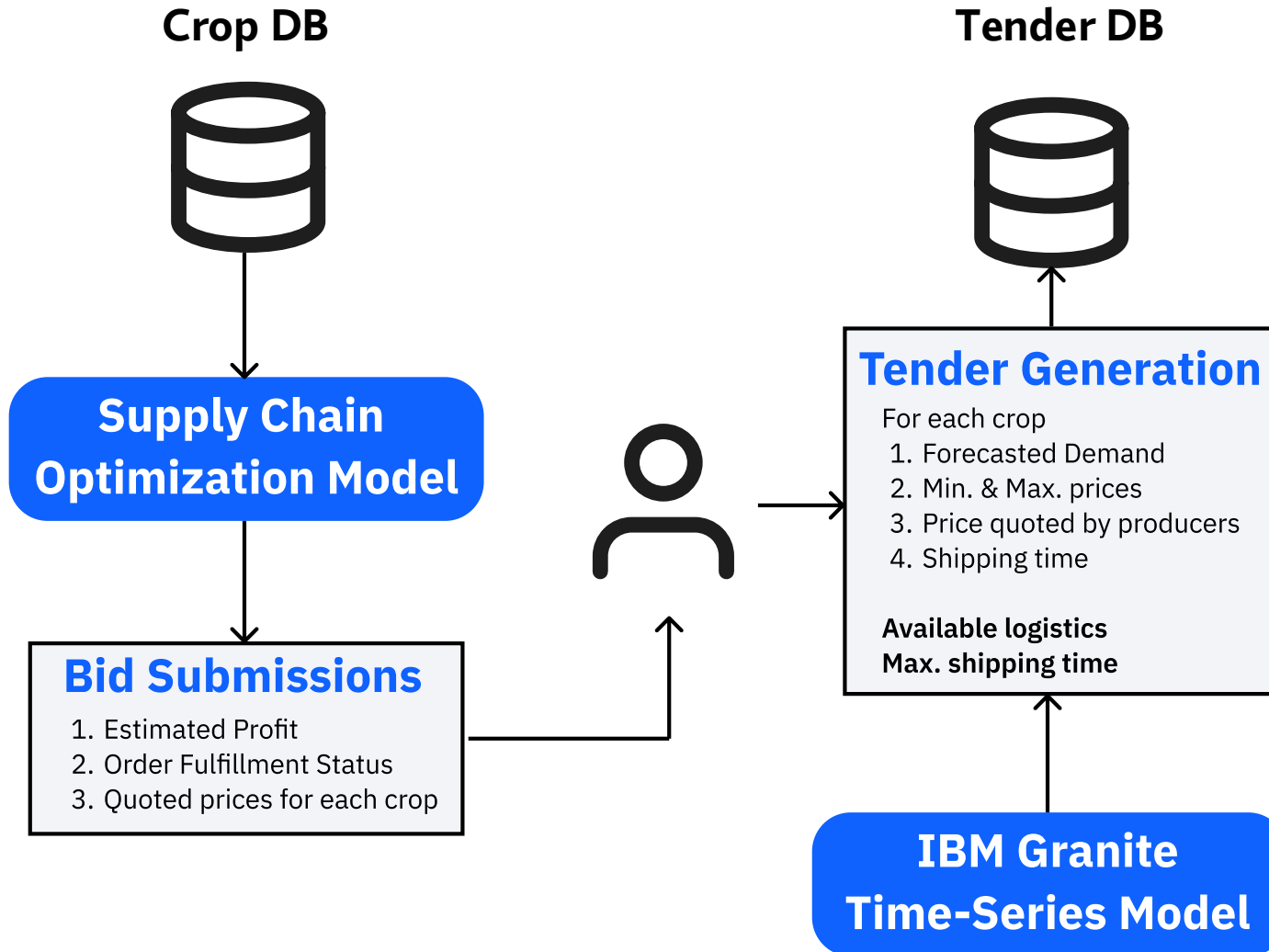
Withdraw Exit

Bids Application Tracker with Insights




WatsonX AI Insights

Based on the output from the OR Optimization and Probability Module

Distributor Portal



Tender Filing Form (Distributor Portal)




 Profile Crop Leaderboard **Tender Filing** Bids  

Proposal Form



Fill in the details			
Demand	Crop: <input type="text"/> ▾ ⊕	Quantity: <input type="text"/> lbs	Calculate Demand
Available Logistics	36000 Oz	Check vehicle details	
Acceptable Prices	Crop#1	Maximum \$ <input type="text"/> per lbs	Minimum \$ <input type="text"/> per lbs
	Crop#2	\$ <input type="text"/> per lbs	\$ <input type="text"/> per lbs
	Crop#3	\$ <input type="text"/> per lbs	\$ <input type="text"/> per lbs
Shipping Time	Crop#1	<input type="text"/> days	
	Crop#2	<input type="text"/> days	
	Crop#3	<input type="text"/> days	
Maximum Acceptable Shipping Time: <input type="text"/> days			
Generate Bid			













Tender Filing using forecasted demand for each crop




Bid Submissions (Distributor Portal)

 Profile Crop Leaderboard Tender Filing **Bids**  


Bids Database

Sort by   Filters

S. No.	Tender ID	Bid ID	Estimated Profit (\$)	Logistics	Fulfillment Status	
1	PropID#26	SubID#193	750		95%	Accept
2	PropID#26	SubID#167	165		73%	Accept
3	PropID#26	SubID#235	890	 	88%	Accept
4	PropID#13	SubID#168	613		96%	Accept
5	PropID#07	SubID#023	546		100%	Accept
6	PropID#07	SubID#007	568	 	46%	Accept
7	PropID#16	SubID#180	958	 	77%	Accept
8	PropID#16	SubID#205	26	 	81%	Accept
Combination Orders >						


 Profile Crop Leaderboard Tender Filing **Bids**  

Chat



Hi! I am WatsonX AI. Please confirm your order: **PropID#26**

[YES](#) [NO](#)



Bids Evaluation

Best Match
Bids #SubID193 and #SubID235 offer the best match for your needs.

Second Option
SubId#167 is also a good option, offering partial order capacity

Consideration
SubID#193 and SubID#167 offer free logistics, but SubID#167 offer relatively less order value.

Recommendation
It would be best to pursue SubID#193

[Explore combination orders](#) [Place Order](#)

Estimated Profits from Submitted Bids

Evaluation of Bids using WatsonX AI

Based on the output from the OR Optimization and Probability Module

Supply Chain Optimization Model

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Distributor's Parameters

1. d_i : Known demand for crop i (in lbs)
2. L_{total} : Total available logistics capacity (in Oz)
3. c_l : Cost of logistics per unit volume (\$/Oz)
4. ρ_i : Density of crops i (lbs/Oz)
5. t_{max} : Maximum acceptable shipping time (in days)
6. t_i : Shipping time for crop i (in days)
7. m_{min} : Minimum acceptable profit margin (as a percentage)
8. m_{max} : Maximum acceptable profit margin (as a percentage)
9. D_{total} : Total demands to be met (in lbs)

Decision Variables

1. y_i : Binary variable, 1 if crop i is selected from a producer, 0 otherwise
2. l_i : Logistics capacity allocated to crop i (in Oz)
3. s_i : Selling price of crop i to retailers (per lbs)

Objective Function

Maximize total profit

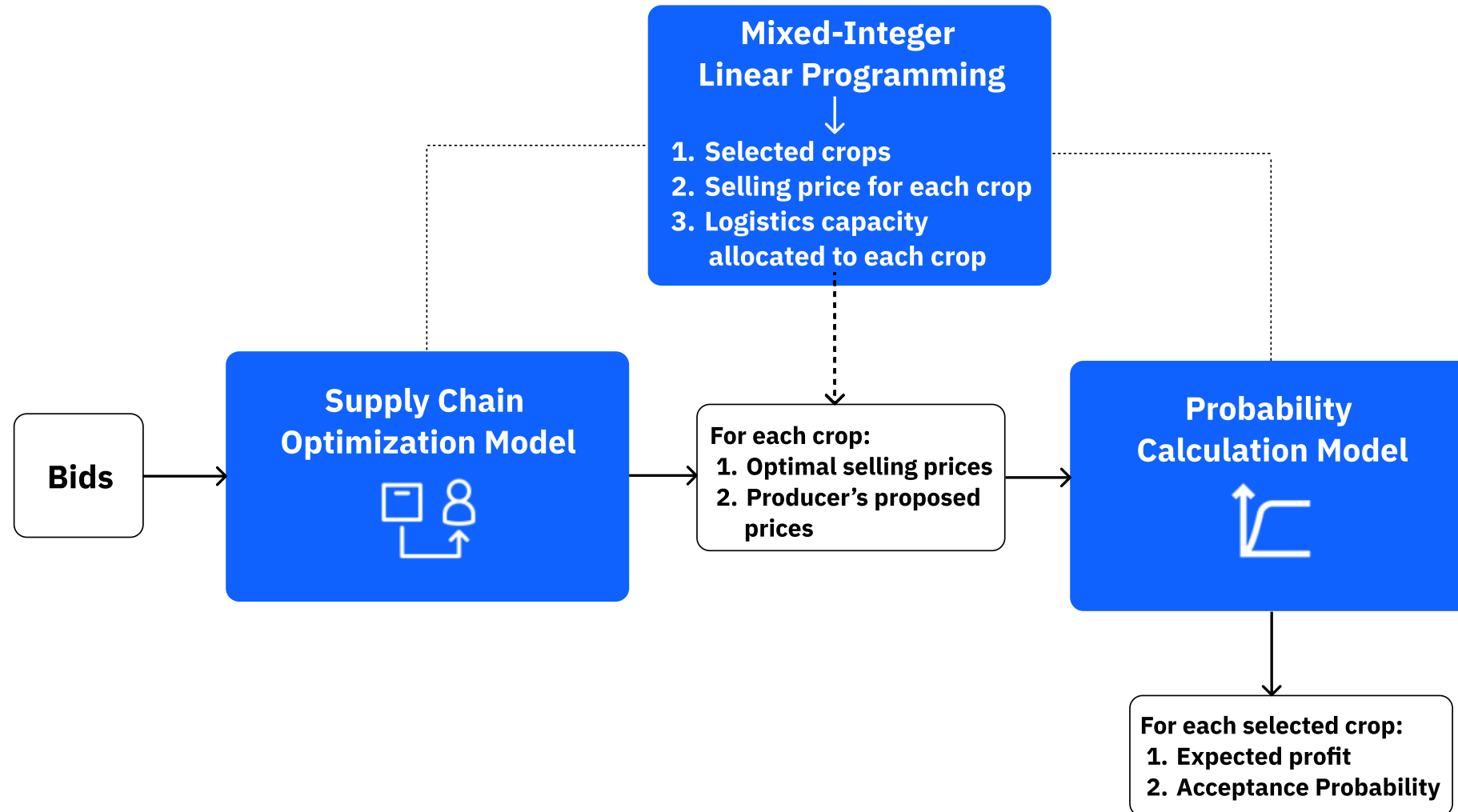
$$\text{Max } Z = \sum_i (s_i - p_i - c_l l_i / d_i) d_i y_i$$

Constraints

1. Logistics capacity constraints: $\sum_i l_i \leq L_{total}$
2. Crop Volume Constraint: $l_i \geq \frac{d_i}{\rho_i} y_i, \forall i$
3. Maximum Shipping Time Constraint: $t_i \leq t_{max}, \forall i$
4. Demand Satisfaction Constraint: $\sum_i d_i y_i \geq D_{total}$
5. Profit Margin Constraints: $p_i(1 + m_{min}) \leq s_i \leq p_i(1 + m_{max}), \forall i$
6. Binary Constraint: $y_i \in \{0, 1\}$
7. Non-negativity Constraint: $l_i, s_i \geq 0, \forall i$

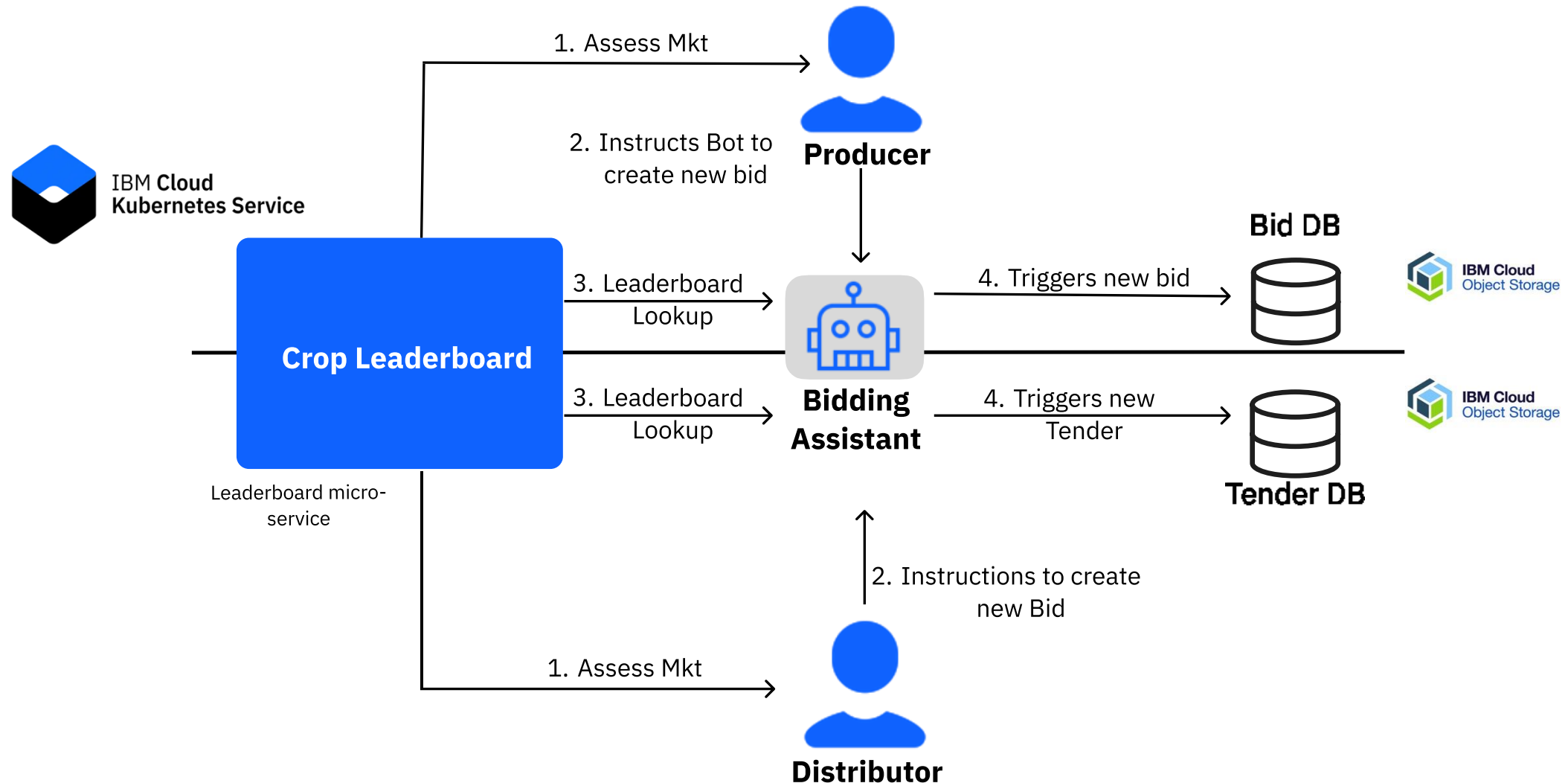
Solution Approach

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Always a step ahead with Agentic AI

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Next up– Demos!

