

Google Developer Groups



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Solution Challenge

AI for a better tomorrow



Team Details

- a. Team name: **Binerd**
- b. Team leader name: **Owen Prathama**
- c. Problem Statement:

Problem Statement 1: Optimizing Retail Inventory with Multi Agents

Challenge Overview:

In the rapidly evolving retail industry, maintaining an optimal balance between product availability and inventory costs is a key challenge. Retail chains often face issues of stockouts (running out of popular items) or overstocking (leading to higher holding costs). To address these challenges, we invite you to design a multi-agent AI system that collaborates between stores, warehouses, suppliers, and customers to optimize inventory management.

The goal is to create a multi-agent AI system that can predict demand, ensure product availability, reduce inventory holding costs, and improve supply chain efficiency. Your solution should enable seamless collaboration among different agents to manage inventory proactively, avoid stockouts, and minimize the excess holding of inventory, thereby maximizing sales and improving operational efficiency.

Current process:

- **Demand Forecasting:** Retail managers review historical sales data, market trends, and seasonal patterns. Manual calculations or basic forecasting models are used to estimate future demand for various products. These estimates are shared with warehouses and stores to prepare for anticipated demand.
- **Inventory Monitoring:** Retail managers regularly perform physical stock checks at stores and warehouses. Inventory records are manually updated in the system to reflect stock levels. Discrepancies between actual stock levels and the recorded inventory are investigated manually, often requiring manual audits.
- **Pricing Optimization:** Retail managers analyze stock levels and manually adjust prices on slow-moving inventory to encourage sales. Price changes are communicated to all stores and online platforms. Sales trends and customer feedback are periodically analyzed to assess the impact of pricing changes.

Expected Technical Output: Multiagent framework

Brief about your Solution

Our solution is an AI multi-agent system designed to optimize inventory management in the retail industry. The system will use AI technology to predict demand, manage inventory, and optimize product pricing. Using a multi-agent framework, our system will enable collaboration between stores, warehouses, suppliers, and customers to optimize inventory and reduce carrying costs.

Opportunities

- a. How different is it from any of the other existing ideas?

Our solution is different from other solutions because it uses AI multi-agent technology that allows collaboration between various entities in the supply chain. In addition, our solution also uses Gemini API to enhance prediction and optimization capabilities.

- b. How will it be able to solve the problem?

Our solution can solve inventory management problems in the retail industry by accurately predicting demand, effectively managing inventory, and optimizing product pricing. Thus, our solution can reduce carrying costs, increase sales, and improve operational efficiency.

- c. USP of the proposed solution

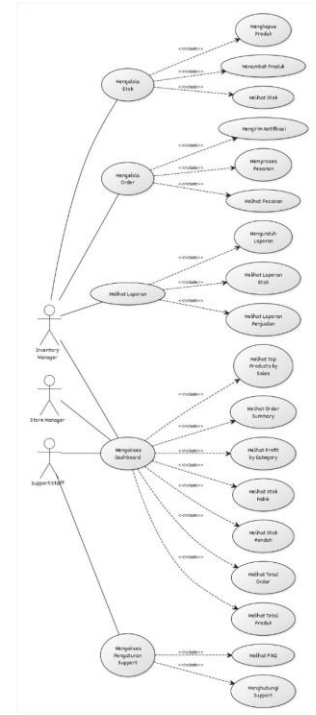
The USP (Unique Selling Point) of our solution is the ability to optimize inventory management in real-time using AI multi-agent technology and Gemini API. In addition, our solution can also improve collaboration between various entities in the supply chain, thereby increasing efficiency and reducing costs.

List of features offered by the solution

- Accurate demand prediction using AI technology
- Effective inventory management using a multi-agent framework
- Real-time product price optimization
- Collaboration between stores, warehouses, suppliers, and customers
- Analysis of sales data and customer feedback
- Integration with Gemini API to enhance prediction and optimization capabilities

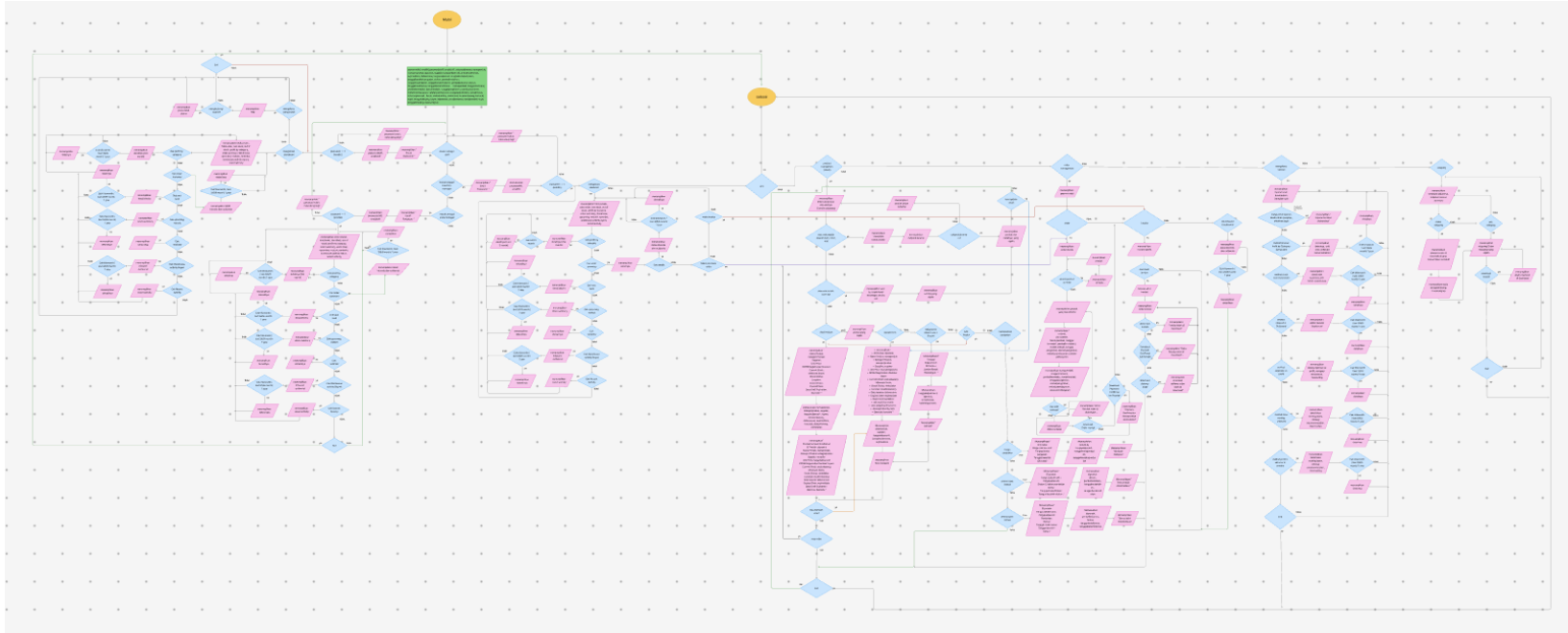
Process flow diagram or Use-case diagram

Link : <https://yuml.me/owenpi28/preview/usecaseBINERDMART>



Wireframes/Mock diagrams of the proposed solution

Link: <https://www.figma.com/board/ThxoSHuqLmqHG6B7OfG6Hc/Untitled?node-id=0-1&p=f&t=B0ZAm2xXGLflbFqe-0>



Technologies to be used in the solution (Mandatory to integrate Gemini APIs)

- AI multi-agent framework (e.g. JADE, Repast)
- AI technologies for demand prediction and price optimization (e.g. machine learning, deep learning)
- Gemini API to enhance prediction and optimization capabilities
- Python or Java programming language for solution development
- Database to store sales and inventory data (e.g. MySQL, MongoDB)

Estimated implementation cost (optional)

Kategori	Komponen	Rincian	Estimasi Biaya
1. Pengembangan Aplikasi	Tim Pengembang	1 PM, 2 Backend, 1 Frontend, 1 ML Engineer, 1 UI/UX	Rp 150 – 250 juta
	Desain UI/UX	Mockup, wireframe, user testing	Rp 10 – 20 juta
	Integrasi Gemini API & Multi-Agent System	JADE/Repast + API Implementation	Rp 20 – 40 juta
	Testing & QA	Manual + automated testing	Rp 10 – 15 juta
	Subtotal		Rp 190 – 325 juta
2. Infrastruktur & Teknologi	Server & Database Cloud	AWS/GCP, MySQL/MongoDB	Rp 5 – 10 juta / bulan
	Gemini API	Estimasi kueri & pemakaian API	Rp 2 – 5 juta / bulan
	ML Pipeline & Storage	Model training & deployment	Rp 3 – 7 juta / bulan
	Domain & SSL	Domain + sertifikat keamanan	Rp 500 ribu – 1 juta / th
	Subtotal (6 bulan)		Rp 60 – 120 juta
3. Operasional & Training	Support & Maintenance	1 DevOps + 1 Support Engineer	Rp 10 – 20 juta / bulan
	Pelatihan Pengguna	Materi training admin/gudang/toko	Rp 5 – 10 juta
	Promosi Awal / Go-to-Market	Sosial media, kampanye distributor	Rp 10 – 25 juta
	Subtotal (6 bulan)		Rp 80 – 150 juta
TOTAL BIAYA 6 BULAN			Rp 330 – 595 juta

Snapshots of the prototype

Binerd's Mart

DISCOVER

Dashboard

Stores

INVENTORY

Stocks

Order

Report

Shipping

SETTINGS

Support

Settings

Dashboard

Search Items, orders, etc

Sarah Johnson
sarahjohnson@gmail.com

Total Products

3,724

Total Order

195

Low Stock

1,310

Out of Stock

178

Profit by Category

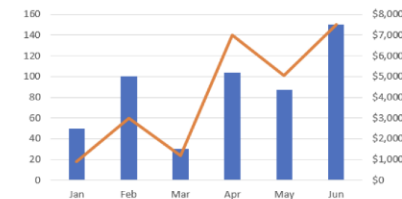
This Month

Total Ammount
Rp 4,718,926,339

Staple Foods	Rp 263,252,153
Household	Rp 210,252,692
Personal Care	Rp 104,468,310
Medicine	Rp 97,135,359

Order Summary

This Month



Stock Level

Total Stock 225 / 359

Details

SF2362 - Golden Rice	98 of 350 remaining
SN4610 - Bread Star Chocolate Cheese	142 of 500 remaining
FV5031 - Baby Carrot California	103 of 450 remaining
IF2309 - Indomie Curry	121 of 350 remaining
HP4682 - Sunlight Dishsoap	91 of 250 remaining

Upcoming Restock

Order

SF6149 - Super Rice 5kg	200 pcs	June, 21 2025
SF5170 - Harum Cooking Oil 1L	100 pcs	June, 10 2025
HP8354 - Fresh Room Diffuser 150ml	150 pcs	May, 30 2025
IF4187 - OceanFresh Canned Sardines 425gr	90 pcs	May, 10 2025
IF1409 - Yummy Chicken Instant Noodles	200 pcs	June, 1 2025
HP1463 - SoftTouch Tissue	500 pcs	June, 10 2025
MD6190 - Mom&Kids Paracetamol	130 pcs	June, 19 2025

Reminder

- SF2363 - Golden Rice will be expired in 1 week
- FV5031 - Baby Carrot California will be expired in 1 week
- FV5039 - Cherry Tomato will be expired in 1 week

Warehouse Activity Report

Details

April, 30th 2025

Product Name	In	Out
PC1456 - Baby Toothbrush	100	50
SN4179 - Himalayan Sea Salt	200	70
SN4236 - Chocochip Cookies	150	40
HP1298 - Laundry Detergen	230	70
SF2511 - Olive Oil	90	30

Recent Activity



Tiffany H. processed a return for a Toothpaste adjusting the inventory. 3:45 PM



Andrew P. updated total stock for Lays Seaweed, Lays Barbeque, Lays Original for sales. 1:00 PM



Andrew P. made an order stock for SuperMilk Chocolate, SuperMilk Strawberry. 10:25 AM

Snapshots of the prototype

Binerd's Mart

DISCOVER

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INVENTORY

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SETTINGS

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Stocks

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Search items, orders, etc

Sort by [Add Product](#)[Sheets](#)

Product ID	Product Name	Category	Status	Total Stock	Minimum Stock	Date Received	Expired Date	Location	Supplier
SF001	White Rice	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF002	Organic Brown Rice	Staple Food	Low Stock	21	100	20-04-2025	25-05-2025	A1	Supplier A
SF003	Whole Wheat Flour	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF004	All-Purpose Flour	Staple Food	Close to Exp	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF005	Cornmeal	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF006	Basmati Rice	Staple Food	Low Stock	12	100	20-04-2025	25-05-2025	A1	Supplier A
SF007	Jasmine White Rice	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF008	Whole Wheat Bread	Staple Food	Close to Exp	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF009	Barley Grains	Staple Food	Out of Stock	0	100	20-04-2025	25-05-2025	A1	Supplier A
SF010	Spaghetti Pasta	Staple Food	Expired	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF011	Elbow Macaroni	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF012	Egg Noodle	Staple Food	Close to Exp	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF013	White Sandwich	Staple Food	Expired	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF014	Sticky Rice	Staple Food	Defective	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF015	Sago Pearls	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF016	Corn Frits	Staple Food	Out of Stock	0	100	20-04-2025	25-05-2025	A1	Supplier A
SF017	Tortilla Wraps	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF018	Flatbread	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A
SF019	Cereal	Staple Food	Available	198	100	20-04-2025	25-05-2025	A1	Supplier A



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1:00 PMAndrew P. made an order stock for SuperMilk Chocolate, SuperMilk Strawberry.
10:25 AM

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Binerd's Mart

DISCOVER

 Dashboard Stores

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 Stocks Order Report Shipping

SETTINGS

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Order

 Search items, orders, etc

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Make Purchase Order

Make Invoice

Inbound

Details

PO ID	Product Name	Supplier	Quantity	Status
ORD-20250425-INV0089	Sweet Soy Sauce	IndoFresh Distribution	100	Pending
	Soy Sauce		100	
	Fish Sauce		100	
ORD-20250425-INV0090	Mayonnaise	Nusantara Food Supply	100	Canceled
	Thai Sweet Chili Sauce		100	
ORD-20250425-INV0091	Laundry Detergent	Prima Utama Supplier	100	Completed
	Clorox Bleach		100	
	Bathroom Cleaner		100	

Outbound

Details

Invoice No.	Product Name	Destination	Quantity	Status
ORD-20250425-INV0242	Low Fat Milk	Citra Swalayan, North Jakarta	100	Pending
	Strawberry Milk		100	



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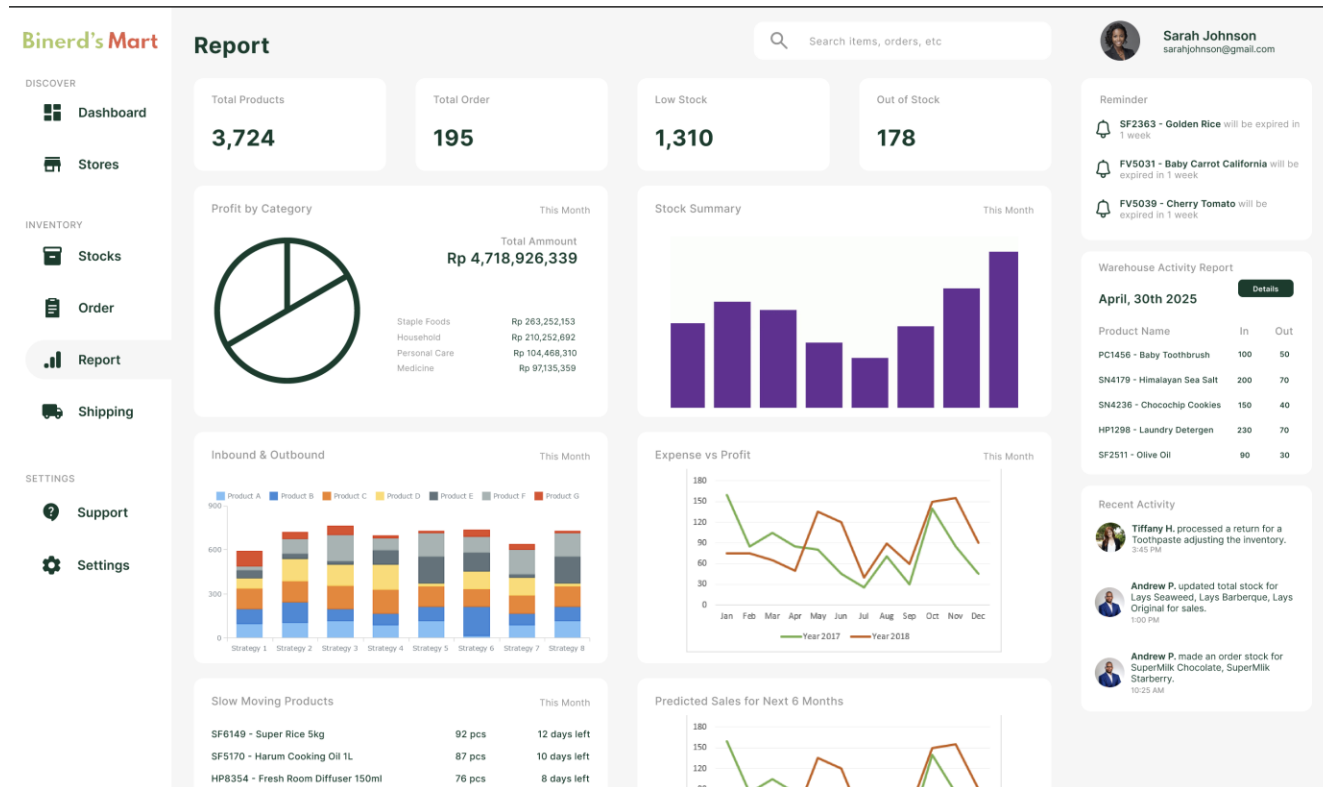


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Snapshots of the prototype



Snapshots of the prototype

Binerd's Mart

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[Dashboard](#)[Stores](#)

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[Stocks](#)[Order](#)[Report](#)[Shipping](#)

SETTINGS

[Support](#)[Settings](#)

Shipping

Total Products

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Make Shipping

All Shipping

Scheduled Shipments

Shipping Date	Shipping ID	Buyer	Driver	Status
April, 30th 2025	SHP-001-2432	Pelita Abadi	Andoko	On Deliver
April, 27th 2025	SHP-001-2428	GlobalMart	Stephen	On Deliver
April, 26th 2025	SHP-001-2422	EverGreen	Stephen	On Deliver
April, 29th 2025	SHP-001-2442	BluSky	Andoko	Completed
April, 26th 2025	SHP-001-2424	AquaPure	Andy	Canceled
April, 25th 2025	SHP-001-2420	GoldenGrain	Andy	Canceled

Shipment Status Summary



Completed : 198
On Deliver : 132
Pending : 95
Canceled : 2

Map Overview



Jakarta : 23
Alam Sutera : 18
Depok : 11
Bekasi : 9

Reported Delivery Issue



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Provide links to your:

1. Demo video link (3 minutes) :

https://drive.google.com/file/d/1wqe7Wh_h8XvoybRu28LZxCzFZN-iE4yr/view?usp=share_link

2. Working prototype link :

<https://www.figma.com/design/9WI1I6LMi8sSNVf6u5UPeG/BINERD-S-MART?node-id=0-1&p=f&t=5QH3wk8qH3YbonGs-0>



Solution Challenge

Thank you

