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Unified Vendor Control Platform for ONDC Q-Commerce

Team Algorithm Avengers

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Problem Statement



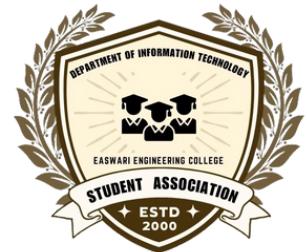
Fragmented Vendor Operations in ONDC Q-Commerce

- Vendors operate on multiple ONDC seller apps simultaneously
- Inventory is maintained separately per seller app
- Sale on one app does not reflect instantly on others
- Leads to:
 - Overselling and order cancellations
 - Manual stock reconciliation
 - Missed high-priority orders
 - Poor vendor experience during peak demand
- Vendors lack:
 - Central control over orders
 - Visibility across outlets and seller apps
 - Decision support for accept/reject actions



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Solution



Unified Vendor Control Platform for ONDC Q-Commerce

- Our vendor-centric web app acting as a control layer
- Sits between:
 - ONDC seller apps
 - Vendor operations
- Key Capabilities:
 - Real-time inventory reservation across all seller apps
 - Centralized order acceptance / rejection
 - Order prioritization and partial fulfillment
 - Multi-outlet & dark store routing
 - Seller app health monitoring
 - Predictive replenishment alerts
 - Offline order handling (SMS / WhatsApp)
 - Vendor performance & reputation tracking



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Novelty of the Solution

What Makes This Solution Unique

- Vendor-first architecture
 - Unlike seller apps, this system is built exclusively for vendors
- Inventory authority at vendor level, not seller app level
- Real-time reservation engine preventing cross-app overselling
- Intelligent order decision engine (priority, partial, routing)
- Network-agnostic layer:
 - Works with multiple seller apps simultaneously
- Offline operability for small vendors
- Reputation-driven vendor leverage within ONDC ecosystem

What Makes This Solution Unique

- Transforms vendors from passive order receivers into active decision-makers in ONDC Q-Commerce.



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Technical Approach

Core Idea

- A vendor-centric middleware platform acting as the single control layer between ONDC seller apps and vendors.

How It Works

- Centralized inventory & reservation engine maintains a single source of truth across seller apps.
- Order management & decision engine prioritizes, accepts, rejects, or partially fulfills orders.
- Multi-outlet routing selects the optimal store based on distance, load, and SLA.
- Seller app health monitoring ensures reliable routing and decision-making.
- Forecasting engine predicts demand and triggers replenishment alerts.

Interfaces

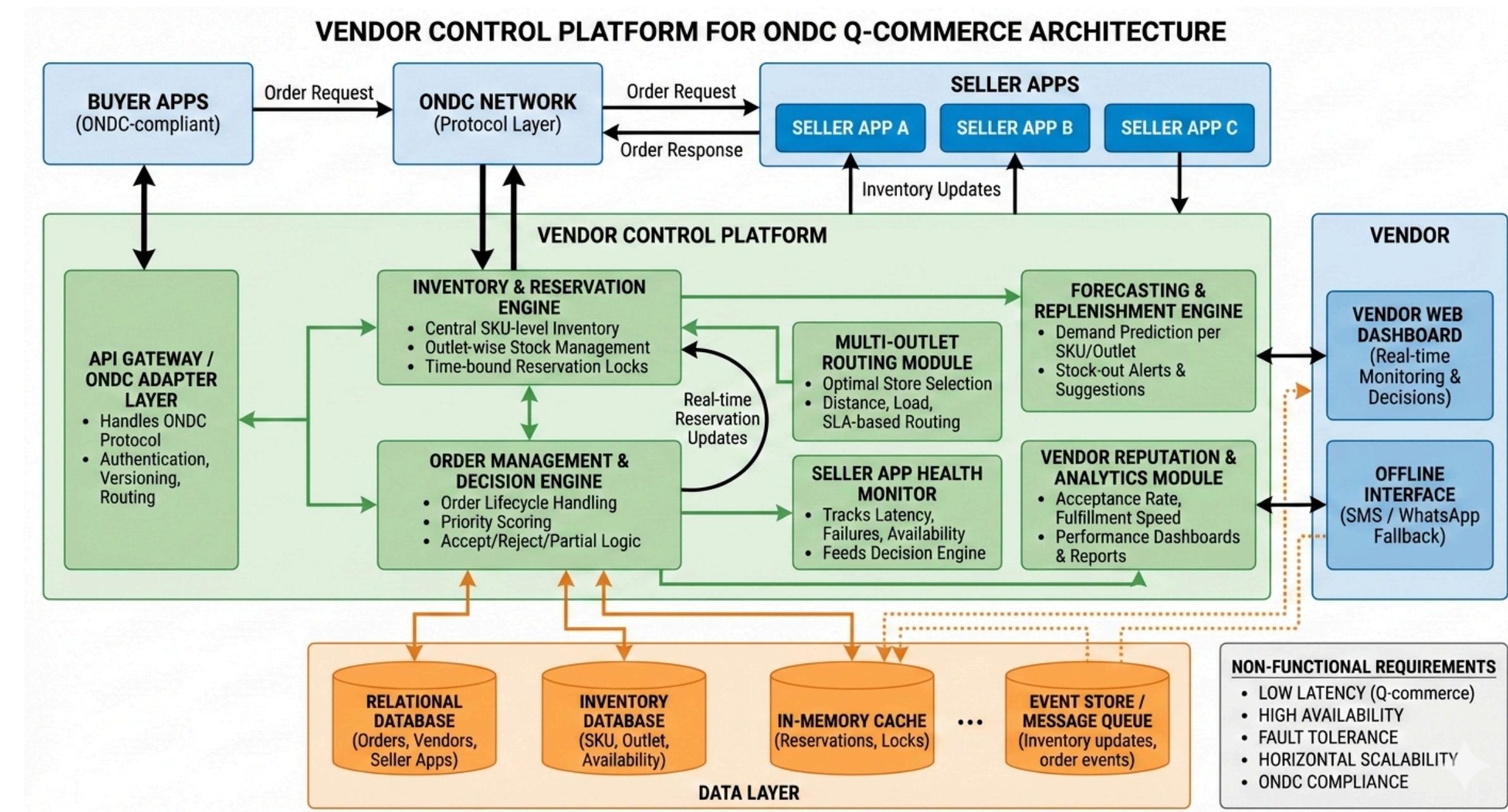
- Real-time vendor web dashboard
- Offline fallback via SMS/WhatsApp

Design Principles

- Low latency for q-commerce
- ONDC protocol compliance
- Scalable, fault-tolerant architecture

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Architecture





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Sustainable Development Goals Achieved

SDG 8 – Decent Work & Economic Growth

- Improves vendor productivity through automation
- Reduces operational losses due to overselling and cancellations
- Enables small vendors to compete with large platforms

SDG 12 – Responsible Consumption & Production

- Minimizes inventory wastage and stock expiry
- Enables demand-driven replenishment
- Reduces unnecessary order cancellations and returns

SDG 9 – Industry, Innovation & Infrastructure

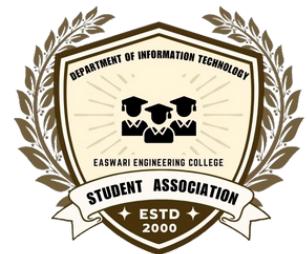
- Builds digital infrastructure for ONDC vendor ecosystem
- Introduces intelligent middleware for decentralized commerce
- Strengthens resilience of q-commerce supply chains

How SDGs Are Achieved:

- Centralized inventory control
- Smart order decision-making
- Predictive demand forecasting



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Challenges and Learnings

Challenges

- Handling real-time inventory synchronization across multiple seller apps
- Preventing race conditions during simultaneous order requests
- Designing ONDC-compliant partial fulfillment flows
- Ensuring low latency decision-making in q-commerce scenarios
- Supporting vendors with limited digital literacy and connectivity

Learnings

- Vendor-level inventory must be the single source of truth
- Reservation-based systems are critical for concurrency control
- Decision engines add more value than raw data dashboards
- Offline support is essential for real-world adoption
- Simplicity in UI is key for vendor acceptance



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Future Scope

Technical Enhancements

- AI-based dynamic pricing and margin optimization
- Advanced fraud and return prediction models
- Plug-and-play onboarding for new seller apps

Ecosystem Expansion

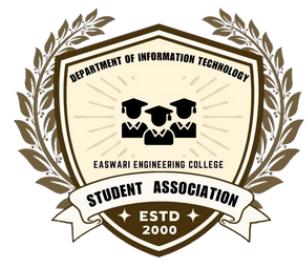
- Vendor-to-vendor inventory sharing
- Integration with logistics and hyperlocal delivery partners
- Cross-city and inter-state vendor networks

Long-Term Vision

- To become the default Vendor Operating System powering scalable, fair, and efficient digital commerce on ONDC.



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THANK YOU