Federated Learning-Based Inventory Management System (IMS)

The future of **Inventory Management Systems (IMS)** lies in **Federated Learning (FL)**, a **privacy-preserving machine learning technique** that allows multiple warehouses or retail chains to train a shared AI model **without exchanging sensitive data**.

Traditional IMS solutions rely on centralized data processing, which exposes businesses to cybersecurity threats and privacy breaches. FL enables multiple inventory centers to **train AI models locally**, learning from stock movement patterns, demand forecasts, and supplier delays while ensuring that private business data remains within each location.

AI-powered demand forecasting models analyze real-time data from **sales, seasonal trends, and supply chain disruptions** across different stores, **optimizing stock distribution** and reducing excess inventory.

Furthermore, **Blockchain integration enhances transparency** by ensuring that stock transactions across multiple locations are immutable and verifiable. The use of **Federated Learning, AI, and Blockchain** transforms IMS into an **intelligent, decentralized, and privacy-focused system**, reducing operational risks and improving supply chain efficiency.