Lenovo Hybrid AI Advantage™ with NVIDIA:

Spatial intelligence for Retail with AiFi

Transform physical stores into intelligent, data-rich environments. Leverage advanced computer vision to digitize inventory, gain e-commerce-level shopper insights, and combat shrinkage from entry to exit, all in real time.

The Lenovo Hybrid AI Advantage™ with NVIDIA Spatial Intelligence for Retail solution, built with AiFi, combines AiFi's proprietary computer vision and deep learning software with Lenovo ThinkEdge SE455 V3 and ThinkSystem servers accelerated by NVIDIA® L4 and L40S GPUs to deliver real-time analytics at the edge.

The solution uses a scalable, camera-only architecture with privacy-first keypoint tracking— no facial recognition required. Deploy from pilot to global scale to reduce shrinkage, automate inventory tasks, and unlock shopper insights while maintaining full GDPR/CCPA compliance.

Why build a spatial intelligence retail solution?

Retailers face a perfect storm: crisis-level shrinkage (up 93% since 2019), rising labor costs, and higher customer expectations for convenience.

Challenges:

- **Shrinkage and revenue loss:** Combat rising shoplifting and fraud with proactive, AI-powered detection.

- **Inefficient Inventory:** Automate labor-intensive stock checks to prevent out-of-stocks and revenue loss.

- **Data privacy:** Ensure GDPR/CCPA compliance with on-premises handling and no facial recognition.

- **Lack of insights:** Gain the granular conversion funnels and journey tracking previously only available in e-commerce.

Powered by AiFi Spatial Intelligence: Uses overhead cameras to create a real-time 3D store view, tracking anonymous keypoints to deliver insights on inventory, behavior, and operations without compromising privacy.

+50M Products processed globally across the largest spatial intelligence network.

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AiFi

Achieving tangible improvements for retail

By applying edge-deployed computer-vision AI, retailers can detect fraud the moment it happens and optimize store performance based on real-world data.

✓ **Combat shrinkage with AI-powered fraud detection:** Real-time detection of suspicious activity. In-store and self-checkout fraud with timestamped, labeled video evidence for investigation.

✓ **Optimize inventory & operations:** Automate stock checks, detect out-of-stocks in real-time, and ensure planogram compliance. Early adopters see up to 0.5% waste reduction and significant uplifts in basket fill by ensuring products are always available.

✓ **Gain e-commerce-level insights:** Track the complete customer journey to create measurable conversion funnels. Understand which promotions drive sales, optimize store layouts based on heatmaps, and measure the impact of retail media.

✓ **Comprehensive intelligence:** Delivers Product, Shopper, Operations, and Fraud Intelligence from a single camera infrastructure, one deployment for multiple high-value use cases.

Key takeaways

Delivering tangible business value—protecting revenue, optimizing operations, and unlocking customer insights.
Key advantages include:

High-performance Edge AI
Supports NVIDIA L4 and L40S GPUs to process high-definition camera streams with low latency for real-time inference and analytics.

Global enterprise scale
AiFi operates one of the largest network of computer vision-powered spatial intelligence solutions globally, with 300+ active deployments and over 50 million products processed.

Enhanced security and compliance
Camera-only, privacy-first architecture uses keypoint tracking with no facial recognition. On-premises processing ensures full GDPR and CCPA compliance.

By unifying AI-driven spatial intelligence with Lenovo ThinkEdge and ThinkSystem infrastructure and NVIDIA acceleration, AiFi helps retailers **cut shrinkage, improve margins, and deliver a superior shopper experience.**

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1 PwC research and AiFi customer data

Solution Architecture

The Spatial Intelligence solution with Lenovo, NVIDIA and AiFi is a AI-powered retail solution, running on Lenovo ThinkEdge and ThinkSystem servers with AiFi's Spatial Intelligence platform. It enables comprehensive spatial intelligence including shopper journey tracking, automated inventory management, and real-time fraud detection, inventory management, and shopper analytics, accelerating deployment and helping retailers reduce risk and improve profitability.

Lenovo ThinkSystem SR630 V4
1U rack server for larger deployments or centralized processing, supporting Intel Xeon® 6 processors and NVIDIA acceleration.

Lenovo ThinkEdge SE455 V3
Purpose-built 2U short-depth edge server for space-constrained retail back-rooms; supports up to 6x NVIDIA L4 GPUs for robust in-store analytics.

	Platform	GPU	CPU	Use case
Small	Lenovo ThinkSystem SR630 V4	1 x NVIDIA L4	Intel Xeon 6	Centralized processing or large stores
Medium	Lenovo ThinkEdge SE455 V3	Up to 6x NVIDIA L4 or 2x L40S	AMD EPYC	Space-constrained retail back-rooms
Large	Lenovo ThinkSystem SR650 V4	Multi-GPU Configs	Intel Xeon 6	Compute and analytics

Why Lenovo

Lenovo's portfolio brings server-class compute to retail environments, with rugged, secure servers pre-validated for AI-powered spatial intelligence workloads.

- **Powering the intelligent store:** The ThinkEdge SE455 V3 is designed to handle the massive throughput of dozens of overhead cameras simultaneously, delivering the high-performance inference needed for 3D spatial reconstruction.
- **Lenovo lifecycle management tools:** Lenovo XClarity One and Lenovo Open Cloud Automation simplify deployment, provisioning, and ongoing management of distributed retail infrastructure.
- **Full-stack approach:** Bringing together Lenovo AI library, services, and Lenovo hybrid AI infrastructure with partner, platform options to deliver productivity, agility and trusted innovation.

Why NVIDIA

NVIDIA GPUs deliver real-time acceleration, processing multiple high-resolution camera streams for ultra-low-latency retail analytics.

- **Data center power at the Edge:** NVIDIA L4 and L40S GPUs provide the deep learning power required to track thousands of anonymous 'keypoints' (shoppers and products) simultaneously with ultra-low latency.
- **Future-proof scaling:** The design supports the latest NVIDIA architectures, ensuring the solution can grow with increasing store complexity and camera counts.
- **Full-stack AI portfolio:** Supports a vast ecosystem of vision AI applications, enabling retailers to add new capabilities without replacing hardware.

Learn more

Visit Lenovo Hybrid AI Advantage with NVIDIA