Lenovo Hybrid AI Advantage™ with NVIDIA:

Driving operational excellence in manufacturing

An AI-driven quality inspection solution developed in collaboration with Trifork for enhanced consistency and reduced downtime.

Leveraging Hybrid AI, our collaborative solution delivers advanced, AI-driven quality inspections, predictive maintenance, and reduced downtime for manufacturing environments. Developed in partnership with Trifork and powered by Lenovo ThinkEdge servers with NVIDIA® accelerated computing, this solution helps manufacturers achieve consistency at scale and faster ROI.

Challenges:

Manufacturers are under constant pressure to produce consistent, high-quality products while managing tight margins and labor shortages. Manual inspections often miss small but critical defects, creating inefficiencies that quickly escalate costs and erode customer satisfaction.

Key challenges include:

- **Inconsistent quality control:** Human-led inspections are error-prone, especially in fast-paced production.
- **Costly defects & returns:** Rework, scrap, and returns significantly cut into profit margins.
- **Scaling complex operations:** As production lines expand, traditional processes struggle to keep pace.
- **Limited real-time visibility:** Delayed data prevents quick responses to emerging quality issues.

Edge-Optimized Solution Architecture

Our solution employs an edge-optimized architecture that integrates high-speed imaging with real-time analytics to automate quality checks and optimize production. Developed by Trifork and powered by Lenovo ThinkEdge servers and accelerated by NVIDIA AI, this integrated system leverages the Lenovo Validated Design, ensuring rapid deployment and proven reliability in demanding industrial environments.

Solutions:

- **Automated defect detection:** Rapidly identify and classify flaws to enhance quality and throughput.
- **On-site edge computing:** Lenovo ThinkEdge servers minimize latency and eliminate cloud dependency for real-time processing.
- **High-speed inferencing:** NVIDIA's AI accelerated GPUs deliver scalable performance across diverse production lines.
- **Actionable insights:** Real-time data dashboards, let teams quickly adapt processes and address issues before they escalate.

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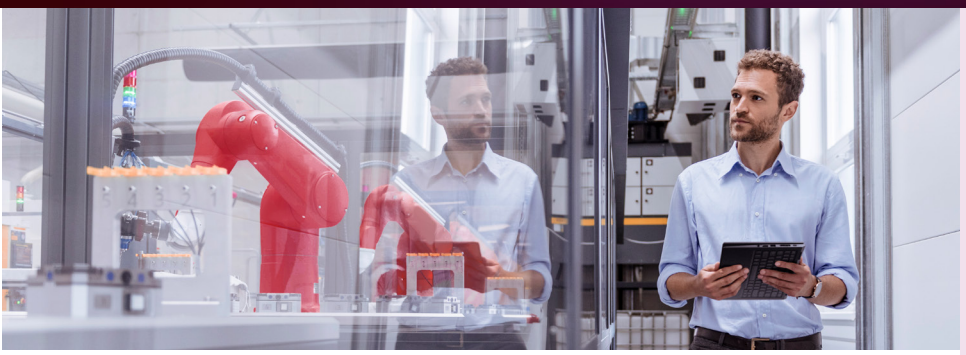

High-impact outcomes with Trifork Vision AI

Trifork Vision AI, validated on Lenovo ThinkEdge servers and accelerated by NVIDIA GPUs, delivers measurable improvements for manufacturers seeking agile quality management, reduced operational costs, and faster ROI. By automating defect detection at the edge, manufacturers gain real-time insights that minimize downtime, improve product consistency, and support compliance with industry standards.

- **Enhanced quality & consistency:** AI-driven inspections instantly identify defects, reducing rework and improving customer satisfaction.
- **Accelerated productivity:** On-site processing with Lenovo ThinkEdge servers shortens response times and eases manual workloads.
- **Optimized cost & ROI:** Automated workflows minimize labor and material waste, while analytics guide continuous improvement
- **Streamlined compliance & security:** Consistent digital records and Lenovo's integrated security features simplify audits and reduce risk, while edge-based processing safeguards sensitive data by limiting unnecessary transfers.

Key takeaways

Trifork Vision AI, backed by Lenovo Validated Designs and powered by NVIDIA AI, provides a fully integrated edge solution that streamlines the inspection process and elevates production quality. The following points highlight how manufacturers benefit from this robust framework:

Real-time adaptability
Scales instantly to shifting demands, ensuring reliable performance.

Industrial-grade performance
Robust Lenovo ThinkEdge systems provide consistent AI efficiency in harsh environments.

Data-driven insights
Dynamic dashboards, drive continuous process improvements.

Edge-to-cloud efficiency
On-site inferencing reduces latency and bandwidth use, with optional cloud integration for multi-site coordination.

By unifying advanced computer vision with Lenovo's Mil-Spec hardware and NVIDIA acceleration, Trifork Vision AI helps manufacturers capture, analyze, and act on critical production data—ultimately driving **agile, high-quality output and sustainable, profitable growth.**

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Solutions for manufacturers

Lenovo Validated Design Architecture

Trifork Vision AI is built on a rigorously validated architecture that combines Trifork's Vision AI platform with Lenovo ThinkEdge servers and NVIDIA GPUs. Tested together under real manufacturing conditions, the stack delivers predictable deployment, industrial-grade reliability, and instant confidence in real-time inferencing, on-device retraining, and centralized analytics. **It is deployed in two phases:**

Phase 1: Edge-based inferencing

Runs on Lenovo ThinkEdge SE360 V2, using NVIDIA A2 or L4 GPUs to handle basic or advanced AI models directly at the production line.

Phase 2: Enhanced training & analytics

Expands to Lenovo ThinkEdge SE455 V3 for on-device model retraining, broader data aggregation, and multi-site integrations.

Lenovo ThinkEdge SE360 V2
Optimized for edge inferencing with built-in validation for different GPU/ CPU configurations.

Lenovo ThinkEdge SE455 V3
Provides scalable training, data storage, and advanced analytics for extended deployments.

Each tier below reflects specific GPU and CPU configurations validated in Phase 1 for three inference scales, each supporting 1080p at 5 FPS. More advanced AI models can be accommodated by adjusting camera counts or other performance parameters.

	ThinkEdge Platform	GPU	CPU	RAM	Cameras
Small	SE360 V2	1x NVIDIA A2	8 cores	16GB	140 Basic, 2 Advanced
Medium	SE360 V2	1 x NVIDIA L4	16 cores	32GB	192 Basic, 4 Advanced
Large	SE360 V2	2x NVIDIA L4	16 cores	32GB	260 Basic, 6 Advanced

Why Lenovo

Lenovo's ThinkEdge portfolio is purpose-built for industrial environments, ensuring reliable AI performance in dusty, hot, or vibration-prone conditions. With pre-validated configurations, manufacturers can:

- Deploy quickly with minimal disruption
- Scale seamlessly, from pilot lines to global facilities
- Centrally manage systems using Lenovo XClarity and Open Cloud Automation (LOC-A) for near-zero touch provisioning.

Why NVIDIA

Industrial leaders worldwide leverage NVIDIA-accelerated computing to deploy large-scale AI, harnessing sensor and operational data to optimize operations through:

- GPU-accelerated for real-time inferencing and rapid training
- NVIDIA Metropolis for streamlined deployment of computer vision at the edge
- Containerized workflows utilizing NVIDIA Triton Inference Server and NVIDIA TensorRT for scalable AI

Download technical guide

Lenovo Validated Design: AI-Powered Quality Inspection in Manufacturing

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