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Enhancing Manufacturing Efficiency with Lenovo and Intel®

Introduction

Manufacturing companies face a myriad of obstacles that can impact their productivity and competitiveness. This use case explores how Autonomy Manufacturing, a producer of high-precision components, leveraged Lenovo ThinkEdge devices, powered by the latest Intel processors, to address key challenges in the manufacturing environment.

For Autonomy Manufacturing, supply chain management, rising operational costs, labor shortages, and quality control have been challenging, and the company is considering smart manufacturing technologies to streamline operations. By deploying the ThinkEdge SE30 client and the ThinkEdge SE360 V2 server, Autonomy Manufacturing achieved real-time data processing, backed by AI-driven analytics, for intelligent decision-making that led to increased automation, reduced costs, and more efficient supply chain operations.

The scalability, flexibility, and versatility of ThinkEdge allowed Autonomy to deploy edge devices across their environment, from the production floor to warehouse facilities, while also bridging the gap between Autonomy's IT (Information Technology) and OT (Operational Technology) systems for improved performance and faster response times in areas such as predictive maintenance and quality control.

This use case highlights how Lenovo edge computing solutions, powered by Intel technology, helped Autonomy harness the full potential of smart manufacturing.

About Autonomy Manufacturing

Autonomy Manufacturing specializes in producing high-precision components and assemblies for the aerospace and automotive industries.

- Autonomy was founded in 1985 by a group of aerospace engineers
- The company operates five locations in Detroit, Dallas, Charlotte, Seattle, and Toronto
- Autonomy ships extensively within the United States, Canada, and Mexico
- The company employs approximately 2,500 people across its facilities, including corporate personnel, engineers, machinists, quality control specialists, and support staff.

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The Challenges of Autonomy Manufacturing

Autonomy Manufacturing is a highly respected manufacturer valued for quality components, but the company continues to struggle with rising costs, decreased productivity, and quality control.



Supply Chain Disruptions

Global supply chain volatility has caused significant delays in obtaining raw materials and critical components. These disruptions have increased lead times and made it difficult for Autonomy to maintain consistent production schedules, impacting their ability to meet client deadlines.



Rising Operational Costs

Autonomy is experiencing rising costs across various areas, including raw materials and labor. These increased expenses have put pressure on their profit margins, forcing the company to seek cost-saving measures without compromising quality or production capacity.



Labor Shortages and Skill Gaps

Difficulty in recruiting and retaining qualified workers, especially those with expertise in advanced manufacturing techniques and technology, has strained Autonomy's ability to operate efficiently and maintain high production standards.



Quality Control and Compliance

In industries such as aerospace and automotive, quality control is paramount. Keeping up with ever-evolving regulations, certifications, and compliance requirements is a challenge for Autonomy, as even small errors are leading to costly rework, recalls, and loss of contracts.



Technological Advancements and Integration

Integrating new technologies into existing systems without disrupting ongoing operations is a continual challenge for Autonomy, and staying up to date with automation, IoT, and AI-driven manufacturing processes is requiring significant investment in both infrastructure and workforce training.

Powering Smart Manufacturing with Edge Computing

ThinkEdge enables real-time data processing and analytics with reduced latency, allowing for immediate insights into production efficiency, inferencing models for predictive maintenance, and quality control in manufacturing. Autonomy chose the ThinkEdge SE30 client for its ability to withstand noise, dust, and vibration for machine monitoring on the production floor, and its wide thermal operating temperature range from -20° to 60° C.

The SE30 also features standard dual ethernet ports and can be equipped with optional 4G LTE or 5G WWAN as well as WLAN and Bluetooth for both wired and wireless connectivity. An optional IOBOX with configurable serial interfaces, two POE ports, and DI/DO connectors provided Autonomy even greater connectivity for their manufacturing scenarios, including enabling DC power for ultimate flexibility.

Autonomy chose the ThinkEdge SE360 V2 as their primary server for larger-scale data processing from production floor robotics and digital twins, helping them modernize operations and maintain a competitive edge.

The rugged design of ThinkEdge devices ensure reliable performance in Autonomy's demanding environments, while their scalability and flexibility make them suitable for a wide range of manufacturing applications. Additionally, ThinkEdge's ability to seamlessly integrate with existing systems in the cloud and leverage AI accelerators makes it a future-proof, scalable solution that can evolve with Autonomy's technological advancements.

SE30



Intel® Celeron® or Intel® Core™

Powerful and reliable edge client for smart manufacturing

SE360 V2



Intel® Xeon® D Intel® Data Center GPU Flex Series

Compact and secure edge server with rugged reliability

Transform Your Business with AI at the Edge.
Discover How at [Lenovo.com/IntelEdgeAI](https://lenovo.com/intelEdgeAI)

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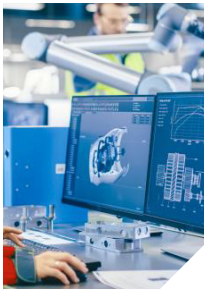
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Transforming Autonomy Manufacturing with Lenovo ThinkEdge and Intel



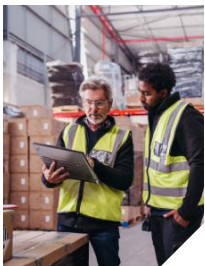
Supply Chain Efficiencies

By deploying the ThinkEdge SE30 in their warehouses, data from barcode scanners, RFID tags, and IoT sensors installed on robotics and forklifts are processed locally at the warehouse's edge, enabling instant updates to Autonomy's Warehouse Management Systems (WMS). This allowed for early detection of disruptions, automated inventory management, optimized logistics, and reduced lead times, keeping production on schedule and minimizing delays.



Cost Reduction

The ThinkEdge SE30 reduced Autonomy's operational costs by optimizing resources through real-time monitoring of energy use and machine performance. Predictive maintenance prevented costly downtime, while local data processing cut cloud communication costs and minimized latency for smoother, more cost-efficient operations. The SE30 was also used to identify variations in size, shape, and quality of the components, decreasing costly errors and ensuring uniformity in the production runs.



Efficient Usage of Labor

Autonomy leveraged the ThinkEdge SE360 V2's AI capabilities to upgrade its manufacturing line with robotics, which automated production floor tasks powered by data from sensors and cameras, including assembly, quality inspection, and material handling. This reduced the need for manual labor on the production line, allowing the existing workforce to focus on higher-level tasks while also decreasing Autonomy's need to recruit new personnel.



Improved Quality and Efficiency

ThinkEdge processes data from Autonomy's Supervisory Control and Data Acquisition (SCADA) systems locally, enabling real-time analytics and allowing SCADA to detect issues like equipment malfunctions, abnormal conditions, or system inefficiencies instantly, and take corrective actions in real-time. Using AI-driven analytics powered by the latest Intel® processors, Autonomy can detect early signs of potential equipment failure before they happen.



Seamless Integration of IT and OT Needs

The scalability and flexibility of the ThinkEdge SE360 V2 bridged the gap between Autonomy's IT (Information Technology) and OT (Operational Technology) systems. In IT, the SE360 V2 enabled Autonomy to offload AI workloads to ThinkEdge high-powered GPUs, improving central system performance, while enabling faster responses and improved operational control in OT. This seamless blending of the two systems also allowed ThinkEdge to ensure Autonomy's digital twin manufacturing process is updated in real-time, reflecting the current state of the physical systems.



Simplified Deployment and Provisioning with Lenovo and Intel's Global AI Innovation

Autonomy strategically leveraged Lenovo and Intel's suite of software and services to streamline the deployment and management of the SE30 and SE360 V2, while maximizing AI capabilities.

Lenovo's Open Cloud Automation (LOC-A) enabled Autonomy to standardize configurations for edge deployments, ensuring consistency across their manufacturing and distribution sites. This automation accelerated the rollout of devices and reduced errors during setup, leading to faster time-to-value and minimizing operational disruptions.

Once deployed, Autonomy utilized **Lenovo XClarity** to manage their ThinkEdge infrastructure efficiently with a centralized platform for monitoring and maintaining the health of all edge devices, offering real-time insights into system performance, predictive maintenance alerts, and automated firmware updates.

Autonomy leveraged the **Intel® Tiber™ Edge Platform** to implement digital twin technology, allowing them to create virtual replicas of their physical processes and equipment. Autonomy continuously feeds real-time data from their machines and sensors into the models, allowing them to monitor performance, predict potential failures, and test scenarios without interrupting actual production.

Through the **Lenovo AI Innovators Program**, Autonomy gained access to Lenovo and Intel's AI expertise and pre-validated solutions. Autonomy used Intel's AI-optimized processors and software frameworks to maximize the performance of AI models at the edge. Intel's **OpenVINO™** was particularly valuable in accelerating deep learning inference, allowing Autonomy to process vast amounts of real-time sensor data more efficiently.



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Smarter technology for all 