

Gaining an edge in every industry

Edge AI solutions for smart spaces, retail, manufacturing, healthcare, utilities, and more

LENOVO + NVIDIA® SOLUTION BRIEF



Deliver value to all stakeholders with edge computing and AI — the fastest growing segment of enterprise technology

Centralized data is no longer efficient in today's distributed world

With the proliferation of technology, smart devices, and Internet of Things (IoT), the centralized data storage and computing resource model has become increasingly impractical for data-centered industries.

Latency, scalability, security, and environmental impacts concern retailers, restaurants, healthcare providers, manufacturers, energy and telecommunication network operators, and even smart spaces — all of which depend on quick access to accurate data to power exceptional customer experiences and drive operational excellence.

The inefficiencies of centralized data centers transmitting large amounts of data across networks, addressing requests from multiple concurrent users, can compromise end-user performance. The risks of server overload, outage, and security vulnerability provide a constant concern for distributed and global organizations.

As technology advances, and the pressures on networks and data centers increase, more organizations from all industries are turning to edge computing and AI for scalable solutions. This technological investment brings processing power right where it's needed: close to its source — empowering businesses with an unparalleled ability to drive operational efficiencies, offer groundbreaking experiences, and manage workloads at scale in real time.

Powering digital transformation with edge technology

\$274 billion will be spent on edge solutions in 2025.¹

150 billion IoT and edge devices will be generating 175 zettabytes of data by 2025.²

50% of all new enterprise IT infrastructure investment is now in edge technology.³

A study by Statista found edge disruptors can expect 5-10% ROI from their edge investments.⁴ These benefits are driving all sectors to the edge.

88% of retailers either have deployed edge computing or plan to within a year.⁵

75% of medical data will be generated at the edge by 2025.⁶

84% of utility companies are implementing or planning to implement edge AI automation.⁷

Organizations are also investing in edge computing to improve customer experience (CX).

61% of consumers will pay at least 5% more for good CX.⁸

75% of consumers expect companies to use new technologies to improve CX.⁹

84% of companies that work on improving their CX report an increase in revenue.¹⁰

¹ IDC, 2022, New IDC Spending Guide Forecasts Double-Digit Growth for Investments in Edge Computing

² Deloitte, 2022, Battle for the Enterprise Edge: Providers prepare to pounce on the emerging enterprise edge computing market

³ IDC, 2020, Edge Computing: Not All Edges are Created Equal

⁴ IBM, 2021, The edge computing advantage

⁵ IDC, 2021, Where Are Retailers Using Edge Computing Now and Within the Next Year?

⁶ MIT Technology Review, Transforming Health Care at the Edge

⁷ Forrester, TechHQ, 2020, Edge Computing is Fueling Energy's Smart Tech Revolution

⁸ Emplifi, 2022, 7 fascinating facts every customer service team must know today

⁹ Salesforce, 2019, State of the Connected Customer Report Outlines Changing Standards for Customer Engagement

¹⁰ Forbes, 2019, 50 Stats That Prove the Value of Customer Experience



An industry-leading edge AI infrastructure

Optimized performance:

Personalized end-to-end GPU-accelerated solutions from Lenovo and NVIDIA offer fast insights to drive customer experience, productivity, and performance improvements.

A trusted partnership:

Lenovo and NVIDIA combine core competencies to power the AI journey for world-leading enterprise organizations. Through a strategic partnership, Lenovo and NVIDIA collaborate on R&D initiatives, AI labs, and AI centers of excellence, helping customers at every stage of their technology adoption process.

Easy and secure edge deployment:

Lenovo and NVIDIA provide complete, pre-validated, edge-optimized infrastructure with record-setting performance and low total cost of ownership (TCO). The integrated solution enables the user-friendly and secure operation of AI applications with existing infrastructure management frameworks, and facilitates faster AI deployment and time to value.

Management and implementation:

Lenovo Local Cloud Automation (LOC-A) offers faster ROI and insights, saving time and money — and reducing carbon footprints — by automating all the manual tasks required to get an entire edge infrastructure network up and running. LOC-A operates at scale in hours, not days or weeks as previously required. The provisioning process is simplified by using a zero-touch secure utility running on a smartphone or laptop, which configures, validates, and then onboards the entire spectrum of Lenovo ThinkEdge clients and servers, with limited skillsets required and minimal travel needed.

And with XClarity edge device management application, edge customers get an easy, one-stop management platform across the entirety of Lenovo edge devices. They no longer have to work in separate applications and screens to ensure their edge servers are online, up to date, operating at maximum efficiency, and delivering the data needed to make important, fast business decisions.

Whether on-premises or in-cloud, customers get device management capabilities with minimal footprint and scalable architecture.

Edge AI is disrupting every industry



Smart spaces and security



Retail, restaurants, and QSRs



Manufacturing



Healthcare



Energy and telcos

A Lenovo + NVIDIA solution to enable faster insights and smarter decisions

In partnership with NVIDIA, Lenovo edge AI solutions are empowering data-centric organizations from all industries, enhancing customer experience, and optimizing internal operations. With computing power at the edge, AI can run locally, automating and improving processes while benefiting from low latency and central control through connections to cloud-based nodes. It's powerful computing when and where it is needed.

Lenovo's AI-ready ThinkEdge portfolio comprises purpose-built devices designed to be deployed on-premises. The NVIDIA AI Enterprise suite runs on Lenovo's infrastructure, accelerating the speed at which developers can build and deploy AI applications. The fully integrated AI solution delivers best-in-class availability, security, and scalability with enterprise-level manageability and high-performance data analytics. These innovative solutions deliver business value for smart spaces, retailers and restaurants, manufacturers, healthcare providers, energy and telecommunication network operators, and more, enabling the development of custom applications that support immersive, connected customer experiences and efficient, optimized internal processes.

Most analysts predict edge computing to be the fastest-growing technology segment in enterprise technology. IDC forecasts 50% of new enterprise IT infrastructure will be at the edge in 2023 and a compound annual growth rate of 15% between 2023 and 2025 (IDC 4).¹ With distributed technology, free from the shackles of standalone data centers, Lenovo edge AI solutions provide the complete platform to help start or accelerate an edge AI journey.

¹ IDC, 2022, IDC FutureScape: Top 10 Predictions for the Future of Digital Infrastructure



Every industry is harnessing the power of edge technology

Discovering the use cases and applications in smart spaces and security, retail and restaurants, manufacturing, healthcare, energy, and telecommunication

Improving customer experience

Personalized messaging:

Analyze customer data to provide more accurate buyer insights to improve communication.

Faster check-ins and checkouts:

Utilize intelligent video to monitor queue length and wait times, and identify and resolve bottlenecks.

Enhanced navigation and mobility:

Provide autonomous navigation around stores, buildings, cities, healthcare locations, and travel terminals.

Personalized products and services:

Make live recommendations, for example in retail, restaurant or healthcare settings, and support conversations in real time with AI.

Cost optimization:

Optimize supply chains and processes for all industries, for example enabling manufacturers, energy providers, and telcos to quickly identify patterns and adjust operations.

Improved service experience:

Empower customer service representatives and use machine learning (ML) to identify issues before they become a pain point.

Accurate diagnoses and treatment planning:

Enable quicker AI-driven diagnoses, personalized treatment plans, and more accurate predictions to improve outcomes.

More targeted safety:

Analyze events, identify suspicious or unsafe behavior in real time, and perform automated safety actions using ML.

Focused resourcing:

Automatically adjust resources based on customer flow, needs, and requirements for improved efficiency.

Increased product availability:

Predict consumer demands ahead of time and make product delays a thing of the past with AI analysis and forecasting.

Improved product quality:

Prevent defects in components, assembly, packing, and shipment using computer vision and deep learning.



Improving operational efficiency

Sophisticated traffic management:

Improve business and traveler experience by autonomously analyzing and predictively optimizing transportation routes for improved efficiency.

Efficient energy management:

Monitor energy consumption, predict and identify abnormal patterns, or adjust operations to reduce costs.

Effective infrastructure management:

Proactively monitor and fix infrastructure, performing maintenance before breakpoints to reduce management costs and service availability.

Improved healthcare delivery:

Analyze patient data, videos, and images to identify trends or detect disease early for improved care and outcomes.

Advanced inventory management:

Identify shortages and enable proactive replenishment of inventory and supplies for effective cost management.

Enhanced customer service:

Personalize customer experiences and automate customer service conversations, support, and the sharing of help information.

Improved loss prevention and fraud detection:

Analyze customer behavior and transaction information to detect suspicious activity and protect customers from potential issues.

Advanced robotics and automation:

Assist customers to improve service quality and efficiency or automate mundane tasks, like picking and packing items in warehouses.

Enhanced security:

Set up AI-driven surveillance systems and access control solutions to ensure safety and security in public spaces and businesses.

Optimization for energy and telco networks:

Monitor and manage electricity, water, gas, or telecom networks leveraging predictive analytics to anticipate issues and reduce manual intervention.

Improved sustainability:

Centralized data centers consume large amounts of energy, produce carbon emissions, and generate electronic waste. Many data centers are switching to green energy to offset this, but edge computing offers a superior solution. Locally processing and storing data reduces cloud traffic and energy consumption and is a step toward a more sustainable future.



Lenovo and NVIDIA edge AI: world-changing technologies driving innovations across all industries

Computing:

Lenovo offers a breadth of purpose-built and edge computing solutions to power industry-leading performance, security, and manageability.

Servers and storage:

Lenovo ThinkEdge and ThinkSystem clients, servers and storage provide a full range of ruggedized, industry-leading solutions, delivering performance, security, and scalability at the core, near edge, and far edge, backed by enterprise-grade support. Lenovo's easy-to-manage storage offers compact flexibility and manageability, explicitly designed for edge environments.

Kubernetes:

Lenovo and NVIDIA offer a leading purpose-built solution for deploying, managing, and monitoring applications at the edge. The NVIDIA GPU Operator and NVIDIA Network Operator standardize and automate the deployment of all components for provisioning Kubernetes clusters.

NGC software catalog:

The NVIDIA NGC software catalog is the hub for performance-optimized deep learning and machine learning applications. NGC simplifies building, sharing, and deploying software, allowing organizations to gather insights faster and deliver value sooner.

NVIDIA AI Enterprise:

NVIDIA AI Enterprise is an end-to-end, cloud-native suite of AI and data analytics software, optimized for every organization to excel at AI, certified to deploy on Lenovo NVIDIA-Certified Systems, and includes global enterprise support so AI projects stay on track, allowing organizations to focus on harnessing the business value of AI.

EDGE AI SOLUTIONS FOR EVERY INDUSTRY

AI SOLUTIONS FROM ISVs & TECHNOLOGY PARTNERS

Customer Experience Examples



Operational Performance Examples



AI LIBRARIES, TOOLKITS, AND CONTAINERS

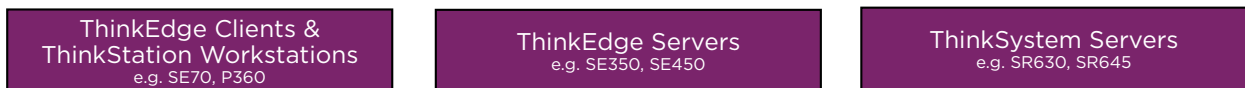
NVIDIA Software Catalog (NGC)

EDGE AI-READY TECHNOLOGY AND INFRASTRUCTURE

Virtualization Technology and Management



Lenovo Server & Edge Technology



Lenovo ThinkEdge and ThinkSystem solutions enabling edge AI:

Lenovo delivers NVIDIA-certified high-performance AI servers, digital twin-ready infrastructure, and ruggedized edge servers as the foundation to edge AI solutions for every industry application.



ThinkEdge Clients (such as the SE70 shown) combine rugged utility and versatility for remote use at the far edge in locations like QSRs, offices, warehouses, and factories.



Right-sized, robust ThinkEdge servers (such as the SE450 shown) provide rich AI server capabilities designed for the near edge.



Lenovo ThinkSystem Servers (such as the SR630 V3 shown), supporting a variety of NVIDIA GPUs, ideal for handling data-hungry AI and analytics, as well as supporting hybrid cloud, HCI, video surveillance, and high performance computing.

Why Lenovo and NVIDIA

Working in partnership with NVIDIA, Lenovo is developing world-changing technologies to create a more efficient, connected, and digital society. By designing, engineering, and building the world's most complete portfolio of innovative, AI-ready devices and infrastructure, Lenovo and NVIDIA are leading an Intelligent Transformation — to create better experiences and opportunities for millions of customers worldwide.

To find out more, visit <http://www.lenovo.com/nvidia-infrastructure>.