

Engineered for modern excellence

Lenovo Product Development Solution Guide

From design and engineering to product life cycle management, Lenovo devices powered by Intel® and Windows 11 Pro help you meet your every demand, without fail.

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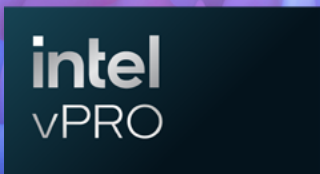
Smarter
technology
for all

Lenovo



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Breakthroughs in AI and product development technology is shaping the future of manufacturing.

Emerging trends indicate a future where product development merges traditional craftsmanship with advanced technologies like artificial intelligence (AI), AR/VR and digital twins, setting new standards for efficiency and innovation in manufacturing.

The manufacturing industry is seeing a shift in how products are being designed, developed, and built. From identifying bottlenecks to improving efficiency in operations, advancements in AI are drastically transforming collaboration and production workflows in factories. Other applications include predicting maintenance needs using machine learning algorithms, automating tasks with robotics, optimizing supply chain logistics by leveraging data analytics.

Use Windows 11 Pro for Workstations to blaze through workloads with lag-free multitasking across your most demanding applications. Running on the latest Intel® processors, Lenovo workstations are ISV tested and certified to power industry-leading software for product development.



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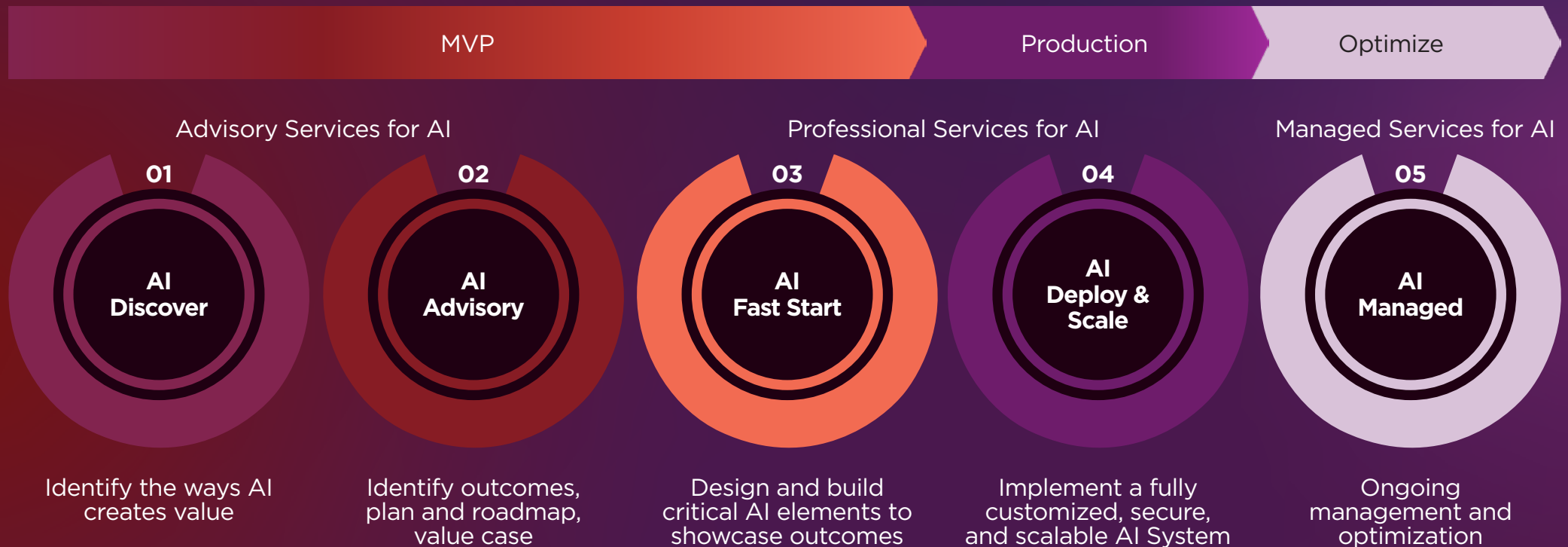
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It's easy to create an AI-powered smart factory with Lenovo

While the revolutionary opportunities of AI are now clear to businesses, to be able to leverage it companywide at a pace that works for your people and systems can be a long, complex journey. 94% of organizations are using AI – but only 14% are aiming to achieve it “enterprise-wide”

Expedite your AI vision with Lenovo Advisory and Professional Services for AI

What you get is a clear path to a production-ready, fully managed, customized AI system that can help improve your business outcomes. Our advisory services focus on strategies to elevate the employee experience, enhance software environments, and implement solutions that facilitate rapid digital transformation.



Intel vPro® with
Intel® Core™ i9 processor



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Design and engineering solutions

In the initial stages of product development, the focus is on conceptualizing the product's design. This phase involves a holistic consideration of various factors, including client needs, user experience, functionality, and physical characteristics. It's a critical time where designers and engineers leverage advanced tools to transform their innovative ideas into tangible plans.

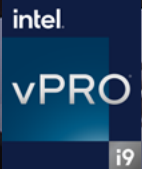
Visuals

The details matter for design and engineering, so you need the ultimate visual experience for your computer setup. Lenovo professional monitors are the ideal complement to our computing devices, offering a range of sizes, resolutions, and connectivity types, with ergonomic stands, protective eye care technology, and award-winning designs.

Augment creativity and enable enhanced details for your CAD requirements, and easily connect to peripherals for a holistic experience.

Spotlight on ThinkVision P32p

- Offers a crisp, near edge-less display with UHD resolution and factory-calibrated color accuracy.
- Up to 31.5-inch 4K ultra-wide screens with seamless multiscreen viewing.
- ThinkColor software allows you to efficiently manage and conveniently adjust the display settings.



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Design and engineering solutions

Workstations

Lenovo Workstations provide the power, performance, and reliability you need for design, engineering, simulation, and visualization. They are tested, optimized, and certified for all major ISVs, so your hardware won't get in the way of creativity and productivity.

Ideal for product architects, designers, and engineers, the Lenovo ThinkPad and ThinkStation P Series are designed for modeling, 3D imaging, and simulation. Powered by Intel® Core™ and Intel® Xeon® processors and NVIDIA RTX™ graphics, Lenovo provides the industry's most reliable workstation to run critical tasks.

Spotlight on ThinkStation P3 family



- The P3 Tower is the leader in entry-level workstations, featuring Intel vPro® with up to 13th Gen Intel® Core™ i9 processors.
- The P3 Tiny is the world's smallest workstation, with support for 6 displays.
- The P3 Ultra is designed for compact spaces, but still blazingly fast.

Spotlight on ThinkStation P2



- ISV-certified, entry-level workstation powered by up to Intel® Core™ i9 processors and 24 cores.
- Ultrafast memory and expandable storage for rapid data access and execution.
- Fortified protection with Lenovo ThinkShield, Trusted Platform Module (TPM) 2.0 chip and self-healing BIOS.

Spotlight on ThinkPad P16



- Portable powerhouse with up to 12th Gen Intel® Core™ HX-class processors.
- 16-inch display showcases your work in high-definition, making it ideal for designers and other visual workers.
- Tested against 12 military-grade requirements and 200+ quality checks for enduring quality.

Spotlight on ThinkPad P1



- Seamless performance powered by up to Intel vPro® with 13th Gen Intel® Core™ processors.
- Tackle heavy workloads on-the-go with ultra-fast memory, high performance storage and a large rapid-charging battery.
- 16:10 aspect ratio screen enables multitasking and larger workflows without sacrificing quality.



Intel vPro® with
Intel® Core™ i9 processor



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Simulation and CAE solutions

High-Performance Computing (HPC) has gone mainstream and forever changed the world of engineering and design. The adoption of HPC systems with Computer-Aided Engineering (CAE) software for modeling and simulation is on the rise. Lenovo empowers manufacturers to extract insights from their data using innovative HPC technologies.

Desktop Workstations

CAE engineers running computationally intensive multiphysics workflows, designers working with high-quality graphics, and AI data scientists sandboxing research concepts or processing massive datasets can all benefit from the power and performance of a ThinkStation P series workstation. Featuring Intel vPro® with 13th Gen Intel® Core™ processors and up to dual 4th Gen Intel® Xeon® Scalable processors and Windows 11 Pro, the Lenovo ThinkStation portfolio offers rich configurations enabling you to fine tune performance for any engineering workload.

The ThinkStation P Series combines reliability with efficiency. It features ECC memory for data integrity and advanced cooling for sustained performance. Supporting multiple monitors and diverse connectivity, these workstations are energy-efficient, making them ideal for intensive CAE tasks.



Spotlight on ThinkStation P7

- Powered by Intel® Xeon® W-Series processor and ISV-certified.
- Offers data center-like performance on the desktop, with multi-core CPU and GPU configuration flexibility.
- Support for up to 3 NVIDIA RTX™ 6000 Ada graphics cards.
- Front drive access and tool-less serviceability for easy upgrades.

Servers

High-performing servers are utilized for stimulating stresses on a product, analyzing how interconnected components behave, and to simulate manufacturing to optimize output and reduce scrap and waste. Lenovo solutions enable engineers to use real-time data to drive actionable insights. Our high-performance ThinkSystem servers powered by Intel® Xeon® processors are reliable and scalable, helping to significantly accelerate CAE workloads, improving accuracy and providing faster deployment. With data stored closer to the processor, applications can access data faster, driving swifter response times for real-time analytics.

ThinkSystem servers also feature Lenovo's Neptune hybrid cooling module, which quickly dissipates heat in a closed-loop liquid-to-air (L2A) heat exchanger, delivering the benefits of liquid cooling without additional infrastructure.



Spotlight on ThinkSystem SR630 V3

- Powered by up to two 5th Gen Intel® Xeon® Scalable processors.
- Industry-leading x86 server technology and reliability.
- Provides end-to-end peace of mind with Lenovo ThinkShield, XClarity, and Services.
- Significantly lower data latency and higher capacities.



Intel® Xeon® Platinum processor



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Visualization solutions

Modern digital workflow transformations—including the move to more augmented (AR) and virtual reality (VR) project processes—can drive down costs and save time. Lenovo provides cutting-edge AR and VR solutions, enabling businesses to enhance collaboration, improve design accuracy, and bring immersive experiences to their digital transformation journey.

AR/VR

From real-time visualization to spatial computing workflows, the immersive experiences that product designers and engineers now strive to create place extraordinary demands on hardware. Lenovo ThinkStation and Intel vPro®-based ThinkPad devices powered by Windows 11 Pro are purpose-built to exceed the rigorous performance requirements for professional visualization solutions, enabling your organization's workflows to provide the ultimate virtual reality experience. Make your design reviews faster and smoother with photorealistic immersive virtual and mixed reality experiences enabled by Lenovo ThinkReality A3 glasses and ThinkReality VRX. Visualize and explore product designs in beautiful human-eye resolution. Plus, bring your visual sketches to life and see your changes in real time, with a true 1:1 scale.

Spotlight on ThinkStation P5

- Powered by Intel® Xeon® W-2400 processor and ISV-certified.
- Support for up to two NVIDIA RTX™ A6000 graphics cards.
- Front drive and tool-less access for easy maintenance and upgrading.
- High-capacity DDR5 memory and extensive storage for seamless AR/VR performance.



Spotlight on ThinkReality VRX

- All-in-one headset delivering six degrees of freedom (6DoF) immersive experiences.
- Slim, comfortable, lightweight design for extended wear.
- Ideal for soft skills training and simulation.
- Comes with end-to-end suite of VR training kit to help businesses realize ROI faster.



Intel Xeon® W7 processor



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AI and data science solutions

Generative AI is a common use case when applying AI in product design and development. Across our solutions, Lenovo is helping manufacturers harness the value of their data, deploying purpose-built AI solutions to transform their business with more predictable outcomes.

Desktop to data center

The use of AI and machine learning in product development is increasing, allowing engineers to gain real-time insights for design, advance time-consuming simulation tasks, improve data management, and use data to train machine learning models to identify key design parameters. Digital twin technology is also being adopted in product development. With AI and digital twins, companies can better predict and optimize operational performance, resulting in improved processes, faster development times, and enhanced overall efficiency.

To apply generative AI and machine learning in manufacturing, you need powerful and reliable solutions that can increase speed and proficiency at every stage of your AI workflow. Lenovo has the industry's most comprehensive AI portfolio from desktop to data center. Lenovo AI Workstations for Data Science powered by the latest Intel® Xeon® processors and Windows 11 Pro have been engineered from the ground up to deliver the best performance, even with demanding generative AI workloads. Use Windows 11 Pro for Workstations to blaze through workloads with lag-free multitasking across your most demanding applications.

In the data center, Lenovo ThinkSystem servers provide the most versatile accelerated computing platform on the market and are purpose-built for AI, ready to perform large scale training and execution with large language models.

Spotlight on ThinkStation PX



- The fastest and most powerful workstation for data science workloads.
- Powered by two 4th Gen Intel® Xeon® Platinum Scalable processors.
- The PX provides a modular build, enhanced thermal architecture, rack-optimization flexibility, and an extensive list of ISV-certified applications.
- Pair with ThinkVision Creator Extreme for 27" 4K UHD Monitor that delivers accurate visuals so you can design every frame with extreme precision.

Spotlight on ThinkSystem SR650 V3



- Features 5th Gen Intel® Xeon® Scalable processors and support for PCIe Gen 5.
- Increased I/O lanes for optimized data transfer rates.
- Industry leading backplane technology with Lenovo AnyBay™ SSD/HDD drive support.



Intel® Xeon® Platinum processor



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Edge computing solutions

With the increased demand for IoT solutions, mobile devices, and real-time applications, there is a need for faster processing, lower latency, and reduced bandwidth usage. Lenovo's ThinkEdge portfolio is designed to be networked on-premises or embedded in solutions to give manufacturers the advantage in performance, security, and scalability.

Edge devices

As the volume of data we produce continues to increase, so does the demand on data storage. Even with the adoption of 5G, network bandwidth is often not sufficient to process data to and from the cloud. Powerful edge devices are needed to process and inference data locally. Lenovo ThinkEdge solutions are designed for versatile applications that require analytics and data processing at the edge, such as onsite CAM simulations and fabrication print programs. With innovative fanless designs that guarantee efficient heat dissipation, ThinkEdge products support a wide thermal operating temperature range from -20°C to 60°C.

Lenovo Edge Servers deliver purpose-built and secure platforms suitable for compute-intensive and latency-sensitive applications deployed outside traditional data centers. By leveraging edge computing in product development and manufacturing, you can gain real-time insights, optimize operational efficiency, reduce downtime, and improve overall productivity. This enables quicker response times and more autonomous decision-making at the local level.



Spotlight on ThinkEdge SE30

- Powered by the latest Intel® Core™ processors for industrial computing.
- Delivers expandability features optimized for industrial environments that operate a wide variety of devices.
- MIL-SPEC tested to withstand extreme temperatures and harsh conditions.



Spotlight on ThinkEdge SE350 V2

- Featuring Intel® Xeon® D-2700 processor, up to 16 cores.
- ThinkShield security with key encrypted storage.
- Virtualize traditional IT and OT applications.
- This rugged Edge server can handle temperatures from 0-55°C and is tolerant to locations with high-dust and vibration.



Intel® Xeon® processor



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Production planning solutions

Thorough production planning is essential when manufacturing complex products. Supply chain management, production scheduling and lead time, material requirements, and capacity planning all require software and hardware that can optimize data-heavy workloads.

Desktops

The Lenovo ThinkStation family of desktops, powered by Intel vPro® with Intel® Core™ processors and Windows 11 Pro, are designed to help users increase their productivity and cope with heavy workloads. Smarter technology and built-in intelligence gives you more flexibility in the way you work, so you can optimize your production planning to ensure you can make and deliver products to customers on time and on budget.

Today's desktops retain their expansibility, which allows them to be upgraded according to the changing requirements of your business, helping to future proof your investments.



Spotlight on ThinkCenter M90t Tower

- Features Intel vPro® Enterprise with up to Intel® Core™ i9 processors.
- Offers versatile connectivity with improved ports and Smart Cable for device collaboration.
- ThinkShield protection and Intel vPro® platform for advanced security.
- Boasts green certifications and uses recycled materials, emphasizing sustainability.



Spotlight on ThinkCenter M90q Tiny

- Features Intel vPro® Enterprise with up to Intel® Core™ i9 processors.
- Up to two DDR5 SODIMM (up to 5600MHz) memory support.
- Built-in security features, such as self-healing BIOS, TPM 2.0 chip, and Smart USB Protection.
- Flexible mounting options including under desks and on walls.



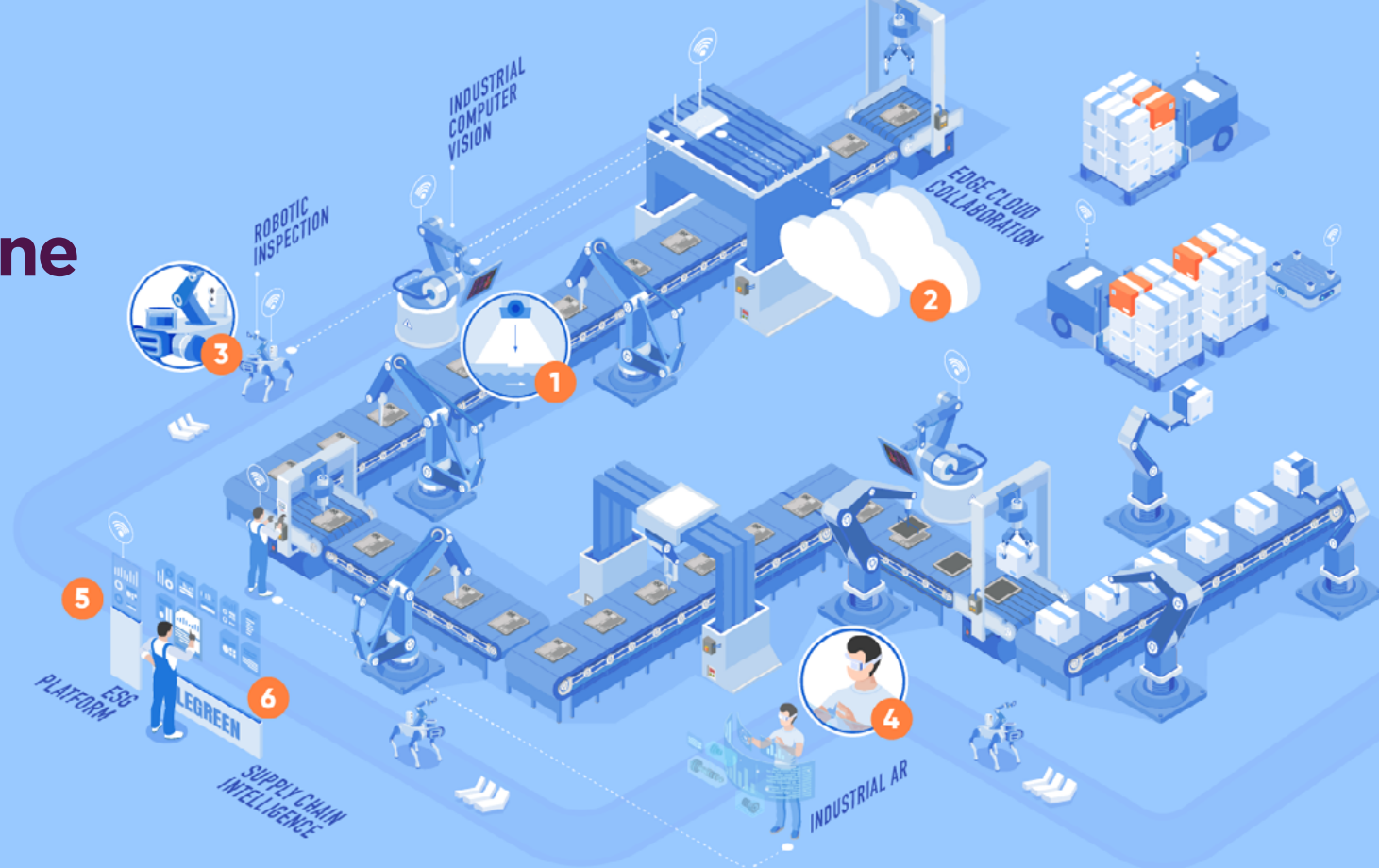
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Production Line



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- 1. Lenovo Industrial Computer Vision:** Boasts a range of AI capabilities and employs computer vision to identify, measure, position and detect the condition and quality of equipment, processes and environment.
- 2. Edge Cloud Collaboration:** Manage your data more efficiently with real-time machine data collection according to different industrial protocols with ThinkEdge. Easily add context and timestamps to the collected data on the cloud for further AI analysis.
- 3. Robotic Inspection:** Take drudgery out of defect detection with AI and automation. Enables round-the-clock, automated monitoring of assets such as substations and pipelines by integrating intelligent sensors and technologies like computer vision and edge computing.

- 4. Industrial AR:** Break through geographical constraints using ThinkReality AR wearable devices and computer vision technology. Build photorealistic and immersive virtual experiences to enhance collaboration efficiency in design and remote support.
- 5. Lenovo ESG Navigator:** Break down organizational barriers and achieve ESG data-driven decision-making using AI and digital solutions. Process closed-loop management and effectively empower your enterprise in low-carbon transformation and sustainable development.
- 6. Supply Chain Intelligence (SCI):** One centralized hub to provide immediate visibility and management across the entire supply chain ecosystem by aggregating data from various sources. Helps customers to make better, faster business decisions with the support of comprehensive real-time data and anticipation of market demand.

Warehouse

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- 1. Asset Tracking:** Incorporates real-time locating system to automatically track and record the location of movement and objects with typical sub-meter positioning accuracy.
- 2. Smart Packing:** Generates step by step loading plans for various containers with 3D visualization. Helps to improve transportation efficiency and reduce operating cost.
- 3. Pick Assist Autonomous Mobile Robot (AMR):** Utilizes the most advanced “order to person” human-robot collaborative mode to help eliminate the need for manual route planning, warehouse design or human intervention.

4. Automatic Storage and Retrieval System (AS/RS):

Offers high density, flexibility and scalability in stereo warehouse and combines different kinds of robotics with AI algorithms to unleash the potential of precise and agile pallet movement.

- 5. Warehouse Execution System (WES):** Focus on real-time coordination and optimization of material handling tasks. Easy to integrate automation resources from different brands into one unique platform.

- 6. Automatic Guided Forklift (AGF):** Designed to revolutionize your intralogistics operations, this innovative forklift leverages advanced technologies to empower the entire pallet handling process from unloading to high-level put away.

Lenovo services

Lenovo offers a modular, scalable, end-to-end lifecycle management of services, and flexible pay-as-you-go models. With a focus on sustainability in manufacturing, Lenovo can help reduce your carbon footprint by reusing heat and energy from compute-intensive equipment, allowing organizations to save up to 40% more energy.

As every manufacturer has unique requirements, working with Lenovo can help achieve solutions that are tailored to your evolving workloads and workforce needs.



Lenovo TruScale™

From pocket to device to cloud, Lenovo TruScale is optimized for today's product development workloads and for the future of manufacturing. TruScale Infrastructure-as-a-Service offers all the power and strategic advantages of the latest data center hardware through a pay-as-you-go business model.

With this new model, customers pay only when their workloads are actively running as part of their operating expenses, with no minimum capacity commitment.

Capacity can be scaled up or down to accommodate business needs, ensuring IT infrastructure is always the right size. Lenovo's unique metering solution provides the advantages of cloud-like economics with the security of on-premises hardware. TruScale's end-to-end service includes initial consultation, analysis, and configuring the right environment. It extends through ongoing cooling assessment and maintenance services, remote monitoring and system health, to billing and administration. Pricing structures are simple and include all associated services in one monthly bill.

Lenovo TruScale helps manufacturers maximize their return on investment in product development and accelerate time to value to drive innovation.



Intel vPro® with
Intel® Core™ i9 processor



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Managed services

- **Data center services:** End-to-end solution, implementation, and support services, from simple to complex, to help you achieve your business goals while maximizing return on investment.
- **Asset management and recovery:** An efficient, safe, environmentally sound, and compliant solution to simplify your asset recovery and end-of-life disposal while mitigating security risks and maximizing the value potential of the assets.
- **Premium care:** Advanced front-of-the-queue customer support service from expert technicians for everyday situations—by phone, chat, or email.

Premier Support Plus

Premier Support Plus provides faster issue resolution, protects your investment, and prevents IT issues before they become problems. Protect your investment on devices like the ThinkPad P1 powered by Intel vPro® with up to 13th Gen Intel® Core™ i9 H-Series processors as well as Windows 11 Pro, to get direct access to advanced technicians who provide better, faster solutions that work every time.

- Advanced technical support available 24x7x365
- Break/fix support for broken machines
- Single point of contact for simplified end-to-end case management
- AI insights, powered by Lenovo Device Intelligence deliver proactive and predictive alerts
- VIP coverage for both IT staff and end users
- Reduce downtime to maximize end user productivity

Lenovo sustainability

Maximize circularity in manufacturing with secure Asset Recovery.

Lenovo Asset Recovery Services (ARS) is an end-to-end service that helps mitigate the environmental impact and data security risks associated with end-of-life IT asset disposal.

- **Environmental and data security focus:**

Lenovo ARS promotes the reuse, refurbishment, and recycling of IT hardware while maintaining data security. It adheres to NIST SP 800-88 standards for data sanitization.

- **Maximizing reuse potential:**

The ARS team, in partnership with global ITAD leaders, follows a reuse-first-then-recycle approach. It offers potential financial returns from decommissioned equipment, aiding technology refreshes.

- **Comprehensive coverage:**

Services cover all technology brands and hardware types, including servers, storage, networking, PCs, and mobile devices.

- **Flexible service options:**

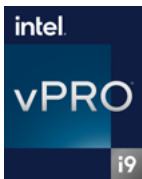
- » **Standard Services:** Include secure transport, testing and preparation for resale, recycling, NIST-compliant data sanitization, and detailed reporting.
- » **Additional Services:** On-request services include asset valuation, dismantling, data migration support, and on-site data destruction.
- » **Other Options:** Include refurbishment, remarketing, component recycling, and donation options.

- **Efficiency and compliance:**

Lenovo ensures efficient, environmentally conscious, and legally compliant IT hardware recycling and data disposal including servers, storage, networking, PCs, cell phones, and more.

- **Intel sustainability:**

We are proud to partner with Intel, the industry leader in sustainable semiconductor manufacturing.



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ThinkShield Security

ThinkShield Security by Lenovo offers a comprehensive, customizable IT security solution. It ensures robust protection for your data, business processes, and workforce, regardless of location.

Key features include:

- Secure-by-design hardware and software
- Global security services
- Built-in platform security
- Real-time endpoint security
- Endpoint tracking with secure wiping
- Antivirus and encryption management
- Privilege and license management
- Identity management
- Intel Transparent Supply Chain

Lenovo ThinkShield-protected devices, like the ThinkStation P2 Tower desktop powered by up to Intel® Core™ i9 processors and Windows 11 Pro, provide security for next-gen data and business protection.

Contact your Lenovo Account Representative
or visit www.lenovo.com/manufacturing

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About Lenovo: Lenovo is a US\$62 billion revenue global technology powerhouse, ranked #217 in the Fortune Global 500, employing 77,000 people around the world, and serving millions of customers every day in 180 markets. Focused on a bold vision to deliver Smarter Technology for All, Lenovo has built on its success as the world's largest PC company by further expanding into growth areas that fuel the advancement of 'New IT' technologies (client, edge, cloud, network, and intelligence) including server, storage, mobile, software, solutions, and services. This transformation together with Lenovo's world-changing innovation is building a more inclusive, trustworthy, and smarter future for everyone, everywhere. Lenovo is listed on the Hong Kong stock exchange under Lenovo Group Limited (HKSE: 992)(ADR: LNVGY). To find out more visit <https://www.lenovo.com>, and read about the latest news via our StoryHub.



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