



Advancing AI Infrastructure with Arm and Lenovo: Introducing the Lenovo HR650a V3 Server

Article

Advancing AI Infrastructure

AI infrastructure is entering a new phase focused on efficiency, system balance, and scale. As AI workloads become more distributed and agentic, organizations are prioritizing platforms optimized for orchestration, power efficiency, and operational flexibility. Lenovo continues to evolve its infrastructure portfolio to meet these changing enterprise and cloud requirements.

At Computex 2026, Lenovo showcased the Arm® AGI CPU-based Lenovo HR650a V3 Server – a server designed for CSP customers – illustrating how next generation CPU architectures can support cloud scale, AI oriented infrastructure. The platform highlights design principles optimized for AI orchestration, data movement, and modern cloud native workloads. Learn more about Arm AGI CPU portfolio here: <https://www.arm.com/products/cloud-datacenter/arm-agi-cpu>.

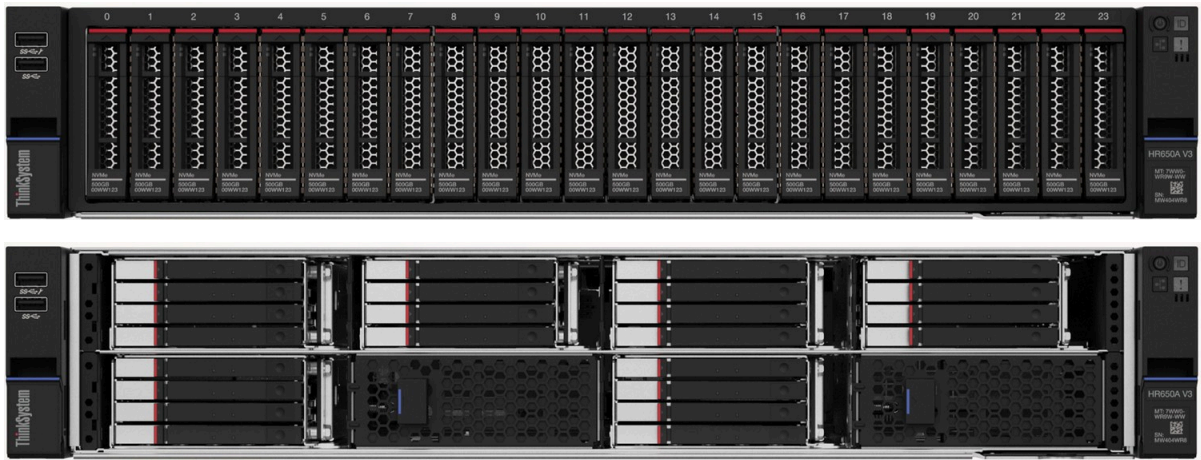


Figure 1. Front view of the HR650a V3 with U.2 (top) and E3.S (bottom) drive bays

Lenovo works across a broad partner ecosystem to help customers evaluate emerging technologies and expand infrastructure choice. This platform reflects Lenovo’s continued commitment to future-ready architectures aligned with evolving workload demands and market needs.

Bringing Systems to Market: Arm + Lenovo Collaboration

Lenovo applies its deep experience in cloud-native and hyperscale system design to develop high-performance server platforms that translate advanced CPU innovation into scalable infrastructure solutions for enterprise and cloud environments.

The Lenovo HR650a V3 server illustrates how next-generation CPU technologies can be integrated into a flexible, dual-socket platform designed to support customer evaluation and architectural validation for emerging AI and cloud use cases.

As customers explore new approaches to improve performance per watt, scalability, and operational efficiency, Lenovo is actively engaging with partners and customers to assess where these architectures can deliver measurable business value.



Figure 2. Arm AGI CPU processor

System Overview: Lenovo Arm-Based Platform

The Lenovo HR650a V3 is a high-performance 2U rack server featuring the latest-generation Arm AGI CPU processors in a dual processor (2P) configuration. The platform is engineered to support modern cloud and AI infrastructure requirements while providing high core density and advanced I/O capabilities.

Key platform highlights include:

- 2x Arm AGI CPU processors with up to 136 cores per CPU
- Support for up to 24x DDR5-8000 DIMMs
- Up to 6x PCIe Gen6 x16 slots
- 2x OCP 3.0 Gen6 slots
- Flexible support for U.2 NVMe SSD and E3.S NVMe SSD storage configurations
- Redundant cooling and power architecture designed for data center deployment



Figure 3. Rear view of the HR650a V3 with 6x PCIe slots and 2x OCP slots

The platform has been designed to address the operational requirements of modern AI and cloud-native environments where efficient orchestration, high-throughput data movement, and infrastructure scalability are increasingly important. The architecture is intended to support infrastructure evaluation for workloads including cloud services, AI orchestration layers, distributed compute environments, and data-intensive applications.

Lenovo designed the HR650a V3 platform with multiple deployment configurations to support varying infrastructure requirements:

- Storage-focused configuration supporting up to 24 NVMe drives
- E3.S optimized storage configuration for next-generation storage density and efficiency
- IO-rich configuration supporting up to 6 PCIe Gen6 expansion slots for accelerator and networking flexibility

This modular approach enables customers to evaluate infrastructure configurations aligned to their operational and workload priorities.

Value Proposition

As AI workloads continue to scale, data center operators are increasingly focused on infrastructure efficiency and total cost of ownership. The Lenovo HR650a V3 server is designed to explore how high-core-density CPU platforms can help optimize performance per watt, improve infrastructure utilization, and support more balanced system designs.

In modern AI environments, CPUs continue to play a key role in orchestration, scheduling, data movement, networking, and overall system management. The Lenovo HR650a V3 platform is designed to efficiently support these infrastructure-layer functions in large-scale cloud and AI deployments.

Today's AI infrastructure increasingly combines CPUs, accelerators, networking, and storage into highly optimized heterogeneous environments. The Lenovo HR650a V3 platform is designed to integrate seamlessly into these architectures while supporting Lenovo's broader strategy of delivering workload-appropriate infrastructure solutions across diverse customer requirements.

Customer Engagement and Momentum

Organizations across hyperscale, cloud, and enterprise segments continue to evaluate next-generation infrastructure technologies that can help address increasing demands for efficiency, scalability, and operational flexibility in AI-enabled environments.

Lenovo is seeing early interest and active evaluation discussions around this server, particularly from customers exploring:

- Cloud-native infrastructure
- Large-scale AI orchestration
- Energy-efficient data center designs

These engagements are helping validate real-world requirements and will inform next steps toward potential production readiness

The Lenovo HR650a V3 server is being positioned for evaluation across a range of workload types, including:

- Cloud-native applications & microservices
- AI orchestration & scheduling (control plane for AI)
- CDN & edge delivery systems
- Data movement & storage infrastructure
- Networking & infrastructure services (SDN/NFV)
- DevOps, CI/CD & build systems
- Distributed AI inference coordination

At Computex 2026, the Lenovo HR650a V3 server was showcased within the Arm ecosystem showcase, highlighting collaborative innovation in next generation AI and cloud infrastructure. Lenovo participated in Computex to support the Arm ecosystem and contribute system design expertise.

The HR650a V3 server reflects growing interest in efficient, scalable, and flexible infrastructure designs, supporting the evolution of AI-ready data centers.

Availability

Initial platform samples are expected to be available during the second half of 2026 for ecosystem engagement, technical collaboration, and evaluation activities.

Customers and partners interested in learning more about the Lenovo HR650a V3 server can reach out through their Lenovo representatives, explore [lenovo.com](https://www.lenovo.com), or engage with Lenovo at upcoming industry events and initiatives.

The system reflects Lenovo's broader infrastructure innovation strategy, with ongoing evaluation of future development and production readiness guided by customer interest, market requirements, and ecosystem demand.

Summary

The Lenovo HR650a V3 server demonstrates Lenovo's ability to translate emerging compute technologies into practical, scalable system designs, supporting the evolving needs of AI-enabled and cloud-native infrastructure environments.

By combining Lenovo's system engineering expertise with next-generation CPU innovation, the platform enables customer and ecosystem evaluation of new approaches to efficient, balanced, and scalable infrastructure architectures.

Initial platform samples are planned for the second half of 2026, supporting ecosystem collaboration and technical validation activities.

To learn more about Lenovo's infrastructure innovation initiatives and the HR650a V3 server, connect with your Lenovo representative, visit [lenovo.com](https://www.lenovo.com), or engage with Lenovo teams at upcoming industry events. To explore Lenovo's broader Cloud Service Provider program and how the HR650a V3 fits within it, visit the Lenovo CSP solutions page, <https://www.lenovo.com/us/en/servers-storage/solutions/cloud-service-provider/>.

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Related product families

Product families related to this document are the following:

- [Lenovo Servers for Cloud Service Providers](#)

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This document, LP2449, was created or updated on June 4, 2026.

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