intel®

Transformational Performance and Security, Purpose-Built for the Edge

Push more compute power to the edge using the Lenovo ThinkEdge SE450 Edge Server and Intel® Smart Edge Open 21.09. The optimized solution delivers the performance, security, and reliability needed to deploy demanding workloads at the edge with confidence, even in harsh, non-secure physical environments.

Multiple factors continue to drive the need for computing at the edge of the network, close to its point of origin. For example, performing data processing such as video analytics at the edge instead of backhauling potentially huge data sets to the cloud or network core helps avoid high bandwidth usage. Likewise, direct geographic proximity of compute resources avoids long-haul transport latency, which can be a critical factor for real-time workloads such as control and safety applications.

Realizing these benefits requires remote deployment of compute hardware to locations that may be unsecured and subject to dust, physical shock, and vibration, without any IT infrastructure or support. Computers built for such environments are typically small-footprint devices such as customer premises equipment or industrial PCs, neither of which has sufficient computing resources for server-scale advanced workloads. More powerful equipment such as general-purpose servers are built to operate in the controlled environment of server rooms, making them unsuitable for many edge deployments.

Edge deployment must simplify development, implementation, and management of applications and services at the edge. Cloud-native software architecture will support modern development practices such as DevOps, accelerating time to deployment for new capabilities and features, improving quality, and mitigating the technology risks built into innovation. It must also provide an orchestration and management layer to move workloads freely across any type of network, in data center, cloud, and edge locations.

To meet these challenges, Lenovo and Intel offer a solution composed of a hardware edge platform and software that jointly deliver business-critical performance, security, and reliability. The solution is based on the Lenovo ThinkEdge SE450 Server, powered by the 3rd Generation Intel® Xeon® Platinum processor, with edge software based on Intel® Smart Edge Open 21.09. Lenovo and Intel have extensively tested the operation of this solution, validating it for deployment by enterprises, communication service providers, and others, across verticals.

Figure 1. Lenovo ThinkEdge SE450 server.

Lenovo ThinkEdge SE450 Edge Server

Purpose-built for critical workloads outside the data center, the rugged and compact Lenovo ThinkEdge SE450 Server is built specifically for high-end computation in remote, challenging environments. This one-socket server is powered by the 3rd Generation Intel® Xeon® Scalable Processor and optional add-on accelerator cards to deliver the high computational throughput and low latency required by demanding edge workloads.

Each node has up to 10 memory slots, with support for a total of up to a terabyte of DDR4 memory per node, including up to two Intel® Optane™ Persistent Memory 200 Series modules. The system is expandable using up to four PCI Express 4.0 slots and one OCP 3.0 slot.

The SE450 is designed to be installed on any wall, shelf, or rack, in remote locations without typical IT infrastructure. Security at the edge is crucial, which is why the server includes TPM 2.0 technology and various secure technologies protecting the device and the data it contains. Configurations are available that accommodate extended temperature ranges, shock, vibration, and dust. The server incorporates reliability features such as wireless failover, redundant boot and data drives, and dual redundant power supplies.

Lenovo offers several tools for deployment and life cycle management of its systems. Lenovo xClarity Orchestrator centrally configures ThinkEdge SE450 systems deployed at multiple remote sites. Lenovo xClarity Controller, an enterprise-grade management engine, facilitates remote manageability over a secure out-of-band wired or wireless channel. Lenovo xClarity Administrator facilitates efficient maintenance of server, storage, and networking infrastructure and accelerates provisioning of services. Lenovo Open Cloud Automation (LOC-A) accelerates deployment and expansion of cloud infrastructure across central and edge sites.

Intel® Smart Edge Open

Accelerate time to benefit and increase the quality of edge solutions with Intel® Smart Edge Open. Royalty-free, modular building blocks that are highly optimized for Intel architecture deliver capabilities for critical workloads and applications at the edge, including networking, AI, media, and security workloads. Intel Smart Edge Open helps edge solutions meet deployment challenges and requirements, including resource constraints (compared to the cloud), high network performance, and exposure to security threats outside the data center.

Intel Smart Edge Open provides experience kits (EKs) to simplify deployment with customized collections of cloud-native technologies to satisfy edge use cases on-premises, at the access edge, or at the network near edge. The experience kits are built on top of Kubernetes, extending the control plane and edge node with microservices, third-party applications, and optimizations on Intel architecture. Edge solution builders and developers can use either an entire experience kit or just the building blocks they need for a specific solution. Individual building blocks provide functionality such as hardware and software telemetry and resource management, zero-trust architecture, offload support for hardware accelerators, container network interfaces, and AI workload optimization.

Lenovo and Intel Edge Solution Benefits

The pre-validated combination of Intel Smart Edge Open and the Lenovo ThinkEdge SE450 server provides a rich hardware and software solution for applications and services at the edge. The two companies have collaborated on the development of this solution to give edge solution builders confidence with a comprehensive set of integrated capabilities and benefits for performance and security.

Performance

The ThinkEdge SE450 draws on Intel technologies including processors and hardware accelerators to process huge amounts of data at the edge, close to the point where it is generated. Solutions draw on these robust computing resources to transform data into insights with high performance for demanding edge workloads such as deep learning, private 5G networks, and video streaming and analytics.

The 3rd Generation Intel Xeon Platinum processor offers high per-core performance and up to 36 cores per Lenovo ThinkEdge SE450 node. It incorporates a range of hardware technologies that edge solution builders and developers can take advantage of to accelerate edge workloads, including Intel® Deep Learning Boost, which accelerates AI functions by eliminating unneeded precision in calculations. The platform also helps overcome the performance impacts of pervasive encryption with technologies that include Intel AES New Instructions to accelerate resource-intensive parts of the AES algorithm as well as Intel® QuickAssist Technology, which accelerates both encryption and compression routines.

Accelerate Time to Market
Reduce risks associated with developing cloud-native networking platforms

Simplify Complex Network Architectures
Deploy reference architectures for common use cases and edge locations

Ready for 5G Networking
Run compute-intensive workloads at the edge at 5G speeds

Figure 2. Benefits of Intel® Smart Edge Open experience kits.

Security

Capabilities and features built into the ThinkEdge SE450 help protect solution data as well as the device itself, which is particularly important when edge solutions are installed in non-secure locations. For example, it provides a secure BIOS as well as optional tamper protection using elements of the Lenovo ThinkShield portfolio. The server also includes Trusted Platform Module (TPM) 2.0 technology, a tamper-resistant dedicated crypto processor that operates outside the reach of software to harden the creation and use of crypto keys as well as to conduct system integrity measurements to establish and maintain a trusted computing environment.

Cutting-edge security features are built into the Intel Xeon Platinum processor. The platform can cryptographically protect memory against hardware attacks using keys generated using a hardened random number generator embedded in the silicon. Software does not need to be modified to take advantage of this capability. In addition, Intel® Software Guard Extensions (Intel® SGX) provides private, isolated segments of system memory called enclaves. Application code running in an Intel SGX enclave can operate on unencrypted sensitive data beyond the reach of other software or users, regardless of their privilege level.

Conclusion

Solutions no longer need to compromise their performance, security, and reliability of compute resources at the edge. The Lenovo ThinkEdge SE450 Server, powered by the 3rd Generation Intel Xeon Scalable Processor, is purpose-built to deliver on all these requirements, even in demanding rugged environments. Intel Smart Edge Open provides components and services for development, deployment, and management of edge-oriented containerized software. By validating Intel Smart Edge Open on the ThinkEdge SE450, Lenovo and Intel give solution builders an accelerated path to driving business value from data at the edge.

More Information

Lenovo ThinkEdge SE450
lenovo.com/us/en/data-center/edge-ai

Intel® Smart Edge Open
intel.com/content/www/us/en/developer/tools/smart-edge-open/overview.html

5G in a Box: The Game-Changer for Telco Industry Leaders
lenovopress.com/lp1483-5g-in-a-box-the-game-changer-for-telco-industry-leaders

Intel® Network Builders
networkbuilders.intel.com

Intel® Xeon® Scalable Processors
intel.com/xeon/scalable

Solution provided by:

intel. + **Lenovo**