Driving green innovation with a cutting-edge HPC platform

Geely Auto R&D

To support the development of groundbreaking green and autonomous vehicles, Geely Auto R&D deployed a high-performance computing (HPC) platform based on Lenovo ThinkSystem SD650 V3 servers with Lenovo Neptune™ water cooling—boosting performance by 35% and creating headroom for continued R&D innovation.

Lenovo

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Who is
Geely Auto
R&D?

Part of Zhejiang Geely Holding Group, Ningbo Geely Automobile Research and Development Co., Ltd. (Geely Auto R&D) is developing a new generation of ultra-efficient, environmentally friendly vehicles. Geely Auto R&D supports the Group's portfolio of well-known international brands, including Geely Auto, Zeekr, LYNK & CO, Geometry, Volvo Car, Polestar, London Electric Vehicle Company (LEVC), PROTON, Lotus, and Terrafugia.

GEELY

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The
Challenge

Through its nine R&D centers across North America, Europe, China, and Southeast Asia, Geely Auto R&D strives to push the boundaries of sustainable transportation. As a leader in green, methanol-based fuel technologies as well as hybrid engines and electric motors, the organization plays a key role in the production of world-class vehicles and powertrains.

Computer-aided engineering (CAE) software such as Ansys LS-DYNA plays a key role in the R&D process. Geely Auto R&D leverages CAE solutions to put its new designs to the test—including everything from stress analysis on individual components to ensure passenger safety to fluid flow simulations to assess aerodynamic efficiency.

Hu Bo, Program Architecture Manager at Geely Auto R&D, says: "In the past, we leased high-performance computing [HPC] resources from a public cloud provider to run our CAE solutions. As we launched new vehicles, the scale and complexity of our HPC workloads grew—making the cloud approach prohibitively complex and costly."

"We believe green technology will be essential to fight climate change. To empower our engineers to develop new and better vehicles, we decided to replace our 37,000-core cloud HPC platform with a purpose-built on-premises solution."

Hu Bo
Program Architecture Manager, Geely Auto R&D

Boosting HPC performance

Geely Group selected Lenovo to build a brand-new HPC platform for Geely Auto R&D. Based on Lenovo ThinkSystem SD650 V2 compute servers, the solution is powered by 4th Gen Intel Xeon Scalable processors and includes Lenovo ThinkSystem SD650 V3 servers equipped with NVIDIA A40 Data Center GPUs.

To deliver high performance at a cost-effective price point, the solution includes both high-performance Lenovo DSS-G100 parallel storage and high-capacity Lenovo ThinkServer DN8848 V2 storage servers running the IBM Storage Scale file system.

Hardware

Lenovo Distributed Storage Solution for IBM Spectrum Scale (DSS-G100)
Lenovo ThinkServer DN8848 V2
Lenovo ThinkSystem SD650 V2
Lenovo ThinkSystem SD650 V3
Lenovo Neptune™
4th Gen Intel Xeon Scalable processors
NVIDIA A40 Data Center GPUs

Software

Lenovo XClarity Energy Manager
Ansys LS-DYNA

Services

Lenovo Deployment Services – HPC
Lenovo On-Site Support Services
Lenovo Warranty Services

High utilization, low temperatures

Working together with HPC experts from Lenovo, Geely Auto R&D deployed and configured the new solution. By utilizing Lenovo Neptune liquid cooling and Lenovo XClarity Energy Manager software, the company can drive high utilization of HPC resources while maintaining an average core temperature of just 45°C.

Bo comments: "Lenovo helped us create a highly stable, performant, and efficient HPC platform to support our demanding R&D workloads. Including GPU servers in the design of the cluster played an important role in this success, as it allows us to run each job on the optimal platform."

Lenovo offered a turnkey solution for Geely Auto R&D, including the deployment and stress testing of all software and hardware and the installation and tuning of CAE software. Geely Auto R&D selected two years of on-site support from Lenovo, and all the Lenovo solution components include a five-year original factory warranty.

"If I had to describe Lenovo's products and services in one word, I would say: trustworthy. Lenovo brought a highly experienced and professional project team that worked hard to deliver a HPC solution that will satisfy our R&D needs for years to come."

Hu Bo
Program Architecture Manager, Geely Auto R&D

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Results

Today, teams across Geely Auto R&D are leveraging the new HPC solution to drive innovation in a wide range of areas, including electric motors, hybrid engines, autonomous driving, and much more.

"We are running 30 CAE applications on the new cluster with an average cluster utilization rate of over 70%, and we aim to boost that to 90% utilization in the near future," says Bo. "Crucially, we have boosted our overall compute performance by 35% compared to the cloud platform—all while reducing power consumption by 1 million kWh/year compared to the previous cloud platform."

✓ 35% HPC performance boost

✓ 1 million kWh/year reduction in power usage

✓ Creates headroom for additional HPC workloads

"By partnering with Lenovo, we have created a finely tuned HPC platform that empowers us to develop cutting-edge technologies for a greener future. By running CAE simulations on our Lenovo platform, we are helping the Group to build vehicles that offer even greater efficiency, comfort, and safety."

Hu Bo
Program Architecture Manager, Geely Auto R&D

Why **Lenovo**?

Lenovo stood out as the clear choice for the project based on its excellent reputation and extensive experience in HPC deployments in China and around the world.

"In our view, Lenovo is the most mature producer and integrator of HPC solutions in the world," confirms Bo. "For the last nine years, Lenovo has had the largest share of HPC TOP500 finalists, and today one in three of all the world's HPC clusters run on Lenovo solutions. We also greatly appreciate Lenovo's innovation in water cooling technology, as this is far more energy and cost efficient than air cooling."

How can automotive manufacturers accelerate R&D?

Geely Auto R&D deployed a HPC platform from Lenovo, boosting performance by 35% and creating headroom for continued R&D innovation.

Explore Lenovo HPC Solutions

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