Empowering linguistics students and teachers with accelerated HPC performance.

How **Jiangsu Normal University** used a high-performance computing platform from Lenovo and NVIDIA to accelerate cutting-edge research and enhance its teaching programs.

Lenovo Infrastructure Solutions for The Data-Centered

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Background

Founded in Xuzhou, China in 1952, Jiangsu Normal University (JSNU) is a regional high-level university in Jiangsu Province, supervised by the Ministry of Education and the Jiangsu Provincial Government. With four campuses across over 2,457 acres, the organization offers a wide range of degree programs to more than 18,800 undergraduate and 4,500 postgraduate students.

In the School of Linguistic Sciences and Arts, JSNU provides training in fields such as broadcasting, as well as cutting-edge work in disciplines including language engineering and theoretical linguistics. One of the School's most popular degree courses is neurolinguistics, where graduates use techniques such as magnetic resonance imaging and electroencephalograms to study the relationship between the human brain and language, and investigate how people use language to think.

"Language is the carrier of thought and plays an integral role in the realization of human intelligence; this is the basis of research into linguistic sciences and arts," says Feng Gefei, a teacher at the School.

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Challenge

Artificial intelligence (AI) is becoming an increasingly important tool in linguistics, as Feng Gefei explains: "We currently offer the only linguistics and AI major in China, and digital systems play an important role in our teaching and research work. In recent years, new and sophisticated methods for AI processing have emerged, including natural language processing and speech recognition—and many of our studies leverage these technologies."

To support its research efforts, JSNU uses a powerful natural language processing model. Analysing large amounts of natural language data requires substantial compute resources, and the organization previously used on-premises workstations with GPU acceleration to run the model.

"As we train and develop our model, the demands on our IT infrastructure are getting bigger and bigger," says Gefei. "As a result, running jobs on our previous server platform was taking a significant amount of time. We want to offer all our students and researchers the freedom to run their jobs in a timely manner, but that simply wasn't possible with our existing architecture."

"We targeted a GPU-accelerated high-performance computing [HPC] platform, delivered as a private cloud. One key goal was to accelerate large-scale computing workloads such as machine learning and AI, empowering our students and teachers to pursue their research."

Feng Gefei
Teacher, School of Linguistic Sciences and Arts, Jiangsu Normal University

Why Lenovo and NVIDIA? Unbeatable price/performance in a dense rack footprint.

After considering a range of HPC offerings, JSNU selected Lenovo and NVIDIA to deliver its new private cloud cluster. The new platform comprises three Lenovo ThinkSystem HG680X servers equipped with NVIDIA® A40 GPUs, powered by ultra-efficient NVIDIA Ampere Architecture CUDA® Cores. Combined with IBM Spectrum LSF Suite running on a Lenovo ThinkSystem SR650 server, the solution offers an intuitive workflow that makes it fast and simple for users to book time on the cluster.

"Each Lenovo ThinkSystem HG680X server supports eight NVIDIA GPUs, which means we can achieve an extremely dense compute footprint within just 4U of rack space," comments Gefei. "Of all the vendors we considered, none could match the price/performance ratio of the Lenovo and NVIDIA offering."

In parallel with the HPC project, JSNU decided to take the opportunity to provision new infrastructure to support broadcasting students in the School of Linguistic Sciences and Arts. The organization selected 50 Lenovo ThinkStation P348 workstations, which will act as a dedicated, high-performance platform for video-editing projects.

"We also run a degree program in broadcasting—and that entire industry is evolving rapidly. By deploying Lenovo workstations as a high-performance video-editing platform, we can now offer a wide range of innovative capabilities: from virtual broadcasting in the Metaverse to synthesized speech."

Feng Gefei
Teacher, School of Linguistic Sciences and Arts, Jiangsu Normal University

Smooth deployment.

Working with Lenovo Services, JSNU deployed the new HPC cluster and video-editing platform on-premises at its data center and campus. "The entire experience—from planning and sizing our new infrastructure environments to deploying, configuring, and testing—went very smoothly," says Gefei. "Whenever we encountered an issue or had a technical question, Lenovo connected us with the resources we needed very quickly. Our new solutions are now deployed and stable, and we're very pleased with the support that Lenovo has provided."

As a next step, JSNU will install the HPC software for its compute cluster and train students and faculty to use IBM Spectrum LSF Suite to submit jobs. Gefei confirms: "We're looking forward to the improved performance that the Lenovo and NVIDIA platform will bring. The build quality of the Lenovo servers is very good, which gives us peace of mind that the solution will be resilient and reliable."

"AI and natural language processing is a fast-changing research area, and new directions of study are emerging all the time. Lenovo ThinkSystem HG680X servers support PCIe, NVIDIA® NVLink™, and other interconnect technologies, which gives us the flexibility to expand the HPC platform to meet future requirements."

Feng Gefei
Teacher, School of Linguistic Sciences and Arts, Jiangsu Normal University

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Results

As it prepares to launch its new HPC cluster, JSNU is confident that it the increased performance will allow students and faculty to accelerate workloads such as natural language processing—boosting research and teaching in the School of Linguistic Sciences and Arts.

"Our new job-scheduler supports CUDA Multi Process Service [MPS], which allows kernel and memcpy operations from different processes to overlap on a single GPU, which promises higher utilization rates and shorter running times," says Gefei. "Access to a modern, enterprise-grade HPC system will also be very useful for our students. They will gain valuable experience in writing and submitting jobs, which will support them as they move into postdoctoral research or industry."

✓ **High price/performance ratio**

✓ **Dense rack footprint**

✓ **Seamless scalability**

"Thanks to our work with Lenovo, we have deployed a future-ready HPC platform that will allow us to drive cutting-edge study and research programs."

Feng Gefei
Teacher, School of Linguistic Sciences and Arts, Jiangsu Normal University

What will you do with
Lenovo HPC solutions?

The Data-Centered push the boundaries of linguistics research with Lenovo smarter infrastructure solutions, powered by NVIDIA®.

Explore Lenovo HPC Solutions