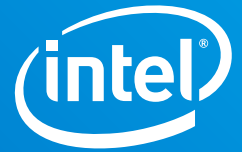


## CASE STUDY

High Performance Computing (HPC)  
Intel® Xeon® Scalable Processor  
Intel® Omni-Path Architecture

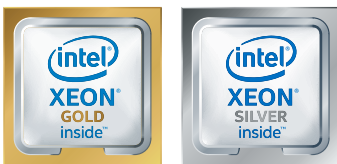


# Peking University Researchers Advance Insight into Multiple Scientific Fields

**New Intel® Xeon® Scalable processor-based cluster delivers computational and visualization performance for breakthrough research**

## Peking University Weiming Life Science #1 Cluster Highlights:

- Intel® Xeon® Gold and Intel® Xeon® Silver processors
- Comprises Lenovo ThinkSystem SD530, XS1500, SR650, SR630, and Lenovo System x3650 M5 server nodes
- Intel® Omni-Path Architecture fabric
- 587.8 teraFLOPS peak performance



**Lenovo**

## Executive Summary

As a leading education and research institution in China, [Peking University](#) embraces many branches of learning in applied and pure sciences, social sciences, humanities, health and medicine, business, and education. Important to its research support is the university's [High Performance Computing \(HPC\) facility](#). Peking University's HPC resources help scientists make new discoveries in materials, physics, chemistry, weather and climate, and many other disciplines. Its latest additions to the HPC facility include two clusters for teaching and student research based on Intel Xeon Scalable processors and Intel Omni-Path Architecture (Intel® OPA) fabric.

## Challenge

HPC facilities are an important component to academic research. To maintain its reputation as a leading research institution in China, Peking University needed greater computing capability in its HPC facilities to support ongoing research in chemistry, image processing, artificial intelligence (AI), cryo-electron microscopy (cryo-EM), and other sciences.

## Solution

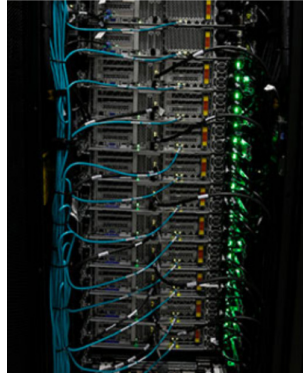
In 2018, Peking University turned to supercomputing vendors for new supercomputing clusters. In May, the university put into production a four-node teaching cluster for education. This system was built with Inspur NF5280M5 servers using Intel Xeon Gold 6132 processors with 14 cores each. The total cluster provides 112 cores, which are used to create many virtual machines across the system.

Later that year in October, a much larger research cluster called Weiming Life Science #1 was put into production with 150 total nodes. 129 compute nodes of Lenovo SD530 servers each house two Intel Xeon Gold 6142 processors with 16 cores, and seven Lenovo XS1500 GPU nodes each include two Intel Xeon E5-2690 v4 processors and four graphics cards. An additional 14 nodes of Lenovo SR650, SR630, and Lenovo System X3650 M5 servers provide login, management, and storage services. The compute and GPU nodes are interconnected by 100 Gbps Intel Omni-Path Architecture.

The research cluster delivers a total of over one-half petaFLOPS of peak performance (587.8 teraFLOPS).

## Results

"The new clusters provide the high-performance scientific and engineering computing services needed across the entire university," commented Mr. Chun Fan, Senior Engineer, Chief of the System Management Section in Computing Center Peking University and Chief Engineer in HPC platform of Peking University.



Peking University's HPC resources help scientists make new discoveries in materials, physics, chemistry, weather and climate, and more.

"These systems meet the needs of large-scale data processing and scientific computing required by research in cryo-EM, deep learning, biomedical, physics, and other sciences."

Many projects have already taken advantage of the computing capabilities of Weiming Life Science #1, such as the following:

- Computational support and visualization of cryo-EM research on Eukaryotic cell structure and interaction with human proteasome. ([Cryo-EM structures and dynamics of substrate-engaged human 26S proteasome](#))
- Creation of an objective method of Surveillance Video Quality Assessment (SVQA) of images from surveillance data. ([How to Assess the Quality of Compressed Surveillance Videos using Face Recognition](#))
- STEM and Ab initio simulation of methylammonium lead iodide perovskite research for next-generation solar cell development. (Atomic scale insights into structure instability and decomposition pathway of methylammonium lead iodide perovskite)

These and many other reports are available on the [Peking University HPC's web site](#).

## Solution Summary

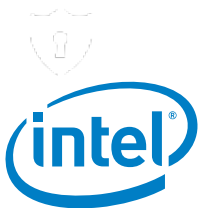
- Intel Xeon Gold and Intel Xeon Silver processors
- 150-node Weiming Life Science Cluster #1 built by Lenovo
- Intel Omni-Path Architecture fabric
- 587.8 teraFLOPS peak performance

## Where to Get More Information

Learn more about [Intel Xeon Scalable Processors](#).

Learn more about [Intel Omni-Path Architecture](#).

Learn more about [Peking University](#) and their [HPC resources](#).



Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit [www.intel.com/benchmarks](http://www.intel.com/benchmarks).

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available security updates. See backup for configuration details. No product or component can be absolutely secure.

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