Academic Research

Lenovo

Building a future-ready HPC platform

Indian Institute of Technology Jodhpur

Lenovo ThinkSystem servers powered by AMD EPYC™ processors boost HPC compute performance by 100%—enabling users to drive demanding research in fields such as AI and machine learning.

Powered by

AMD

1

Who is the Indian Institute of Technology Jodhpur?

The Indian Institute of Technology Jodhpur (IITJ) is one of the country's premier technology institutes. With 11 departments and more than 3,000 learners—including 1,000 PhD students—the organization offers study programs in a wide range of disciplines, including bioscience and bioengineering, computer science, electrical engineering, mathematics, physics, and more.

IITJ is committed to a multidisciplinary approach of technology development. To support its students and researchers, the organization offers high-performance computing (HPC) resources for projects such as machine learning and AI (computer science), video processing and graphic design (electrical engineering), MATLAB (civil engineering), and molecular dynamics simulations (chemistry and physics).
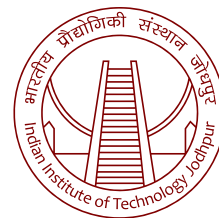
2

The
Challenge

HPC resources are one of the key enablers of research projects at IITJ, and hundreds of users rely on the institute's compute platform. With its existing HPC systems approaching end-of-life, the organization decided to look for a new solution that would meet its long-term requirements.

"**"Our existing cluster was around 10 years old. In that time, the volume and variety of our HPC workloads has grown significantly. As a result, we wanted to know that the successor environment had the performance to accommodate demanding HPC jobs."**

Suman Kundu
Assistant Professor of Computer Science & Engineering and Head of the Computer Center, Indian Institute of Technology Jodhpur

IITJ embarked on a thorough requirements-gathering exercise, spending 12 months defining its requirements for the new HPC platform. The organization determined that it would need more than 70 TFLOPS of CPU-based compute resources and 400 TB of storage (200 TB in a parallel file system [PFS] and 200 TB in a Network File System [NFS]) to future-proof the new solution, and looked for a vendor that could help it hit its benchmarks while keeping costs under control.

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"When we put out our tender, one of our key requirements was a vendor with experience in the HPC space. We didn't want a company to just sell us the hardware and software: we wanted a technology provider who would listen to our goals, and help us design a solution for our students and researchers."

Suman Kundu
Assistant Professor of Computer Science & Engineering and Head of the Computer Center, Indian Institute of Technology Jodhpur

Why Lenovo?

After carefully evaluating proposals from leading HPC vendors, IITJ selected an end-to-end solution from Lenovo and AMD: including compute, storage, networking, software, and professional services.

The new HPC platform is based on Lenovo ThinkSystem SR645 and SR665 servers powered by high-performance AMD EPYC™ 7402 and 7742 processors. Connected to Lenovo ThinkSystem DE6000H Hybrid Storage and networked via NVIDIA Mellanox QM8700 switches, the new solution is built on Red Hat Enterprise Linux with IBM Spectrum Scale (PFS and NFS environment).

Kundu notes: "The price/performance ratio of the AMD EPYC processors helps us to hit our benchmarks within budget. The new environment comprises seven virtualized nodes for non-HPC workloads such as our ERP applications, 20 HPC compute nodes, one storage node, two I/O nodes, one master node, and Lenovo Intelligent Computing Orchestration (LiCO) software—all networked with 100 GbE Infiniband connectivity, which is a rarity in India's public sector."

> " "We received bids from several OEMs, but Lenovo demonstrated the best understanding of our needs and created the optimal solution. Lenovo also offered us the whole package—infrastructure, software, and services—through a single contract, which greatly simplifies the support process."

Suman Kundu
Assistant Professor of Computer Science & Engineering and Head of the Computer Center, Indian Institute of Technology Jodhpur

Fast deployment, simple management

Working with experts from Lenovo Services and a local integration partner, IITJ deployed, configured, and tested the new HPC solution. Within just three months, the new cluster was up and running.

"The support we received from Lenovo and AMD was good," recalls Kundu. "Whenever we encountered an issue, Lenovo and AMD always found us the right person to help. Throughout the project, we had very productive discussions with Lenovo technicians, which helped us to solve any challenges we faced quickly and achieve the deployment timeline we set out at the start of the project."

Hardware
Lenovo ThinkSystem SR645 powered by AMD EPYC™ 7742 processors
Lenovo ThinkSystem SR665 powered by AMD EPYC™ 7402 processors
Lenovo ThinkSystem DE6000H Hybrid Storage Array
NVIDIA Mellanox QM8700 switches

Software
IBM Spectrum Scale (PFS and NFS)
Lenovo Intelligent Computing Orchestration (LiCO) – HPC and AI
Red Hat Enterprise Linux

Services
Lenovo Deployment Services – HPC
Lenovo Hardware Installation Services
Lenovo Preconfigured Support – Warranty Service Upgrades, Coverage hours
Lenovo Training Services

3

Results

By making the transition to Lenovo ThinkSystem servers powered by AMD EPYC processors, the institute has achieved its goal of building a future-ready HPC platform. With 70 TFLOPS of compute performance, students and researchers can pursue demanding projects and receive results quickly.

"Our previous cluster had 40 nodes but only delivered half the performance we get today," says Kundu. "Fields such as AI and machine learning are moving forward all the time, which means it's important to have the headroom to keep pace. Thanks to the new HPC solution from Lenovo and AMD, we achieved the compute requirements that will meet our needs in the future."

✓ 100% higher compute performance

✓ Simple to manage

✓ Single point of contact for support

"Although our journey with the Lenovo and AMD HPC solution is just beginning, we're very pleased with the results so far. We've found the Lenovo team to be helpful. We have many vendors in our data center—but I rate Lenovo Services among the top."

Suman Kundu
Assistant Professor of Computer Science & Engineering and Head of the Computer Center, Indian Institute of Technology Jodhpur

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