Ninth Dimension
Enabling Information

High-Performance Computing Infrastructure for a Premier Education Institute in India

Client Snapshot

Company
Premier educational institute

Size
4000 students
500 faculty

Industry
Higher Education

Location
Operations across 60+ countries

Institute required a scalable HPC infrastructure powering breakthrough research with GPU clusters

A leading public research university faced critical bottlenecks in its computational research capacity. Outdated CPU-only clusters were unable to support the surging demand from AI/ML workloads,large-scale simulations — stalling breakthrough research and limiting faculty competitiveness for grants.

Key challenges

Researchers queued for weeks to run jobs; time-sensitive deliverables at risk of missing deadlines. and simulations

Siloed storage and compute systems lacking unified management, causing data movement inefficiencies.

No standardized ROCm or CUDA-compatible environment, requiring researchers to maintain their own stacks.

No clear upgrade path to support anticipated 3× growth in research computing demand over 5 years.

Lack of fair and efficient GPU sharing across multiple users and departments

Legacy compute nodes unable to handle parallel workloads required by modern AI/ML frameworks and simulations.

Delivering Scalable, Cost-Efficient HPC for Academic Excellence

Ninth Dimension in partnership with Dell & AMD, deployed GPU cluster built on ROCm ecosystem that delivered significant value to the institute by accelerating research, improving resource efficiency, and enabling scalable innovation. It allows students and faculty to run compute-intensive workloads—from AI model training with frameworks like PyTorch to large-scale simulations—much faster than traditional CPU-based systems With centralized scheduling via SLURM, the cluster ensures fair access, high utilization, and streamlined job management across departments. This shared infrastructure reduces reliance on costly cloud resources while supporting hands-on learning at scale, giving students exposure to industry-relevant tools and workflows. Ultimately, it strengthens the institute's research capabilities, fosters collaboration, and positions it as a competitive hub for high-performance computing and AI-driven innovation

The implementation journey

Phase 1

Infrastructure Foundation

AMD Instinct MI300X GPU node deployment

High-speed InfiniBand HDR networking fabric

Value
Accelerated academic HPC

Phase 2

Software & ROCm Stack

ROCm platform deployment & validation

Slurm workload manager configuration

Containerized HPC environments

Value:
Software ecosystem for compute intensive workloads

Phase 3

Security & Access Control

Role-based research group access policies

Role-based research group access policies

Value:
Secure access

Phase 4

Operations & Monitoring

Unified HPC portal for job submission

Real-time GPU utilization dashboards

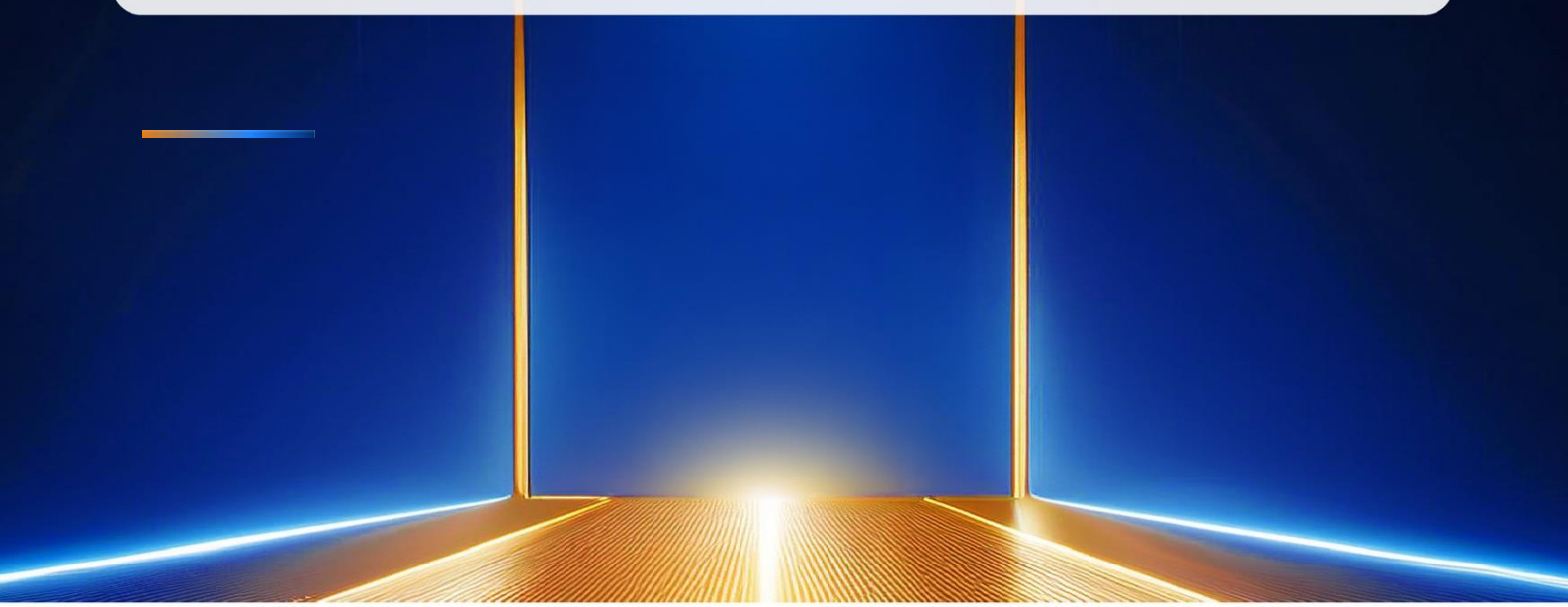
AI-driven predictive maintenance alerts

Value:
Ease of use
Ease of management

Results

1. Faster processing of jobs
2. Reduced job queue times
3. Significant improvement in researcher productivity
4. Reduced operational overheads due to automation
5. Furture ready architecture

> ""The GPU cluster transformed the institute from compute-constrained to innovation-driven—accelerating discovery, expanding access, and turning ambitious ideas into measurable outcomes."
>
> — *Professor owning the research project*



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