"Having our own Fujitsu PRIMEFLEX for HPC infrastructure means we don't need to rely on the cloud so there are no subscriptions and no waiting. We can publish more academic papers quickly and attract more grants."

Sudeep Narayan Banerjee
Systems Analyst/Scientist B
Indian Institute of Technology Gandhinagar

Indian Institute of Technology Gandhinagar deploys Fujitsu PRIMEFLEX for HPC infrastructure to enable fast completion of complex, academic projects, attracting students and funding.

At a glance
Country: India
Industry: Education
Founded: 2008
Website: iitgn.ac.in

Challenge
IITGN wanted to extend its HPC capacity to meet a growing demand and complete complex projects more quickly. It needed to find the right hardware partner at the right price.

Solution
The institute has added a new cluster with 12 compute nodes and two GPGPU compute nodes, based on FUJITSU Integrated System PRIMEFLEX for HPC and PRIMERGY RX servers. This supports applications relating to Gaussian modelling, fluid dynamics, biological engineering and so on for around 60 users.

Benefit
- Extra capacity means students no longer have to queue to complete projects
- Fujitsu quality and reliability ensures optimal uptime
- Fujitsu PRIMEFLEX for HPC enables IITGN to attract more students, researchers and funding

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Customer

The Indian Institute of Technology Gandhinagar (IITGN) was founded in 2008 and is sited in Gujarat on the banks of the Sabarmati river, near Ahmedabad, known for its rich cultural past as well as its state-of-the-art infrastructure and thriving industries. IITGN strives to offer the best undergraduate and graduate education in India with B.Tech., M.Tech. and PhD programs in Chemical, Civil, Electrical, Mechanical, Computer Science, Biological and Materials Science and Engineering as well as MASC and MSc programs in Mathematics, Physics, Chemistry and Cognitive Science etc.

Products and Services

- FUJITSU Integrated System PRIMEFLEX for HPC
- FUJITSU Server PRIMERGY RX2530 compute nodes
- FUJITSU Server PRIMERGY RX2540 GPGPU compute nodes

Building a reliable HPC capability

With its focus on STEM (Science, Technology, Engineering and Mathematics) subjects, IITGN has had a need for enhanced compute power since its foundation in 2008. Originally, it used three Fujitsu CELSIUS R970 workstations to produce the necessary processing power, however, the institute was fully conscious of the need for a dedicated high-performance computing (HPC) cluster.

"There was a pressing requirement for more computation power because we simply didn't have the capacity to meet demand, so jobs would spend days in the queue," explains Sudeep Narayan Banerjee, Systems Analyst/ Scientist B, IITGN. "As we grow as an educational hub and the problems we need to solve become increasingly complex, the need for HPC grows. That is why we issued a tender for HPC in 2014."

That initial tender was only the first phase in a longer-term vision for HPC and resulted in Fujitsu being selected based on its competitiveness in technical capabilities, price and performance. This first cluster consisted of ten compute nodes and two GPU nodes, housing 192 cores with usable 26TB of storage. However, it again became clear that this would not be enough long term. Another tender was issued and, after intense evaluation and benchmarking, Fujitsu was once again selected as an HPC partner through open tendering process.

"As an institute of national importance and dedicated to the nation, we must be very detailed and transparent during the tender process," adds Banerjee. "We therefore set the policies and benchmarking criteria more strictly, so we could quickly eliminate less suitable vendors and focus on the best offers. Again, Fujitsu came out on top based on cost, build quality and performance."

Adding extra compute power

The proposed Fujitsu solution adds a new cluster with 12 compute nodes and two GPGPU compute nodes, while leveraging the existing infrastructure for master node functionality and storage. The solution also includes running application benchmarks to optimize performance. It is based on FUJITSU Integrated System PRIMEFLEX for HPC and PRIMERGY RX systems, versatile rack-optimized servers that provide best-in-class performance and energy efficiency.

"Commissioning the new system took six months, with us carrying out the lion's share of the installation in-house over one month with the help of Fujitsu and a local systems integrator, Micropoint," continues Banerjee.

"It is now set to handle a wide range of critical software, such as GROMACS or NAMD, and other processor intensive applications that model complex systems."

Around 60 users now use PRIMEFLEX for HPC to perform fast calculations relating to Gaussian modelling, fluid dynamics, biological engineering and so on. A student studying molecular dynamics, for example, previously would only have been able to manipulate four atoms in any given simulation. The new PRIMEFLEX for HPC enables that number to rise to 50 – exponentially more complex.

"The additional cores mean we can deliver the best performance for our students and ensure the jobs are completed within a specified time and according to schedule," says Banerjee. "That allows them to get on with their study without getting stuck in a lengthy queue."

Optimal performance, minimal downtime

IITGN now has the capacity it needs to carry out intense research projects quickly and efficiently. In the hyper-competitive world of higher education, this capability makes it more attractive to students, researchers and government funding.

"Having our own PRIMEFLEX for HPC infrastructure means we don't need to rely on the cloud so there are no subscriptions and no waiting. We can publish more academic papers quickly and, as a result, attract more grants," comments Banerjee.

IITGN has also been impressed by the reliability of the Fujitsu hardware: in four years there have been only four major technical issues, none of which resulted in downtime for the entire HPC cluster. When incidents do arise, the institute is guaranteed a swift resolution from the local SI and Fujitsu itself. Such has been the success of the PRIMEFLEX for HPC project that IITGN is already moving on to the third phase which will see additional expansion of the cluster.

"Fujitsu has always proven competitive in terms of specifications, performance and price so we fully expect it to play a role in phase three as the open tender gets published," concludes Banerjee. "Fujitsu has a different problem-solving approach and has consistently engaged with us to build a healthy customer centric relationship. That adds more value to what is already an impressive solution."