

ICAMS Research Institute Case Study

ICAMS at Ruhr-University Bochum Switches to SDS with Nexenta to Keep in Line with Budgets

Bochum, Germany
www.icams.de
Education



Summary

Challenge: ICAMS required a predictably priced solution with better performance to handle growing student demand for IT systems

Solution: NexentaStor

Platform: Supermicro, Hitachi

Use Case: High performance file storage

Benefits:

- Exceptional support
- High performance
- Simple deployment
- Cost effective

Business Overview

The Interdisciplinary Centre for Advanced Materials Simulation (ICAMS) is a research institute at Ruhr-University Bochum, Germany, dedicated to the development and application of a new generation of simulation tools for multi-scale modeling, with the aim of reducing development cost and time of new materials. Founded in 2008, ICAMS brings engineers, material scientists, physicists and chemists together around a number of disciplines from quantum mechanics to dislocation dynamics and continuum methods. The centre's research on new materials via this interdisciplinary approach makes ICAMS globally unique. The institute hosts three department chairs and a group for High Performance Computing (HPC).

ICAMS' large capacity computer from MEGWARE is one of the the researchers' most important tools. It calculates extensive simulations for material characteristics and virtual material design that would take months on a regular PC. ICAMS' MEGWARE Cluster contains more than 4,500 cores, over 25TB of RAM and covers ten water-cooled racks. With its own small data center, ICAMS is mostly self-sufficient from the university's data center.

To support research with HPC performance and education with state of the art IT services, ICAMS runs two separate networks. An HPC cluster network calculates the simulations for research and another network supports the students' education.

“
We like that with Nexenta we were able to calculate the cost for the entire life span of the system right from day one. With other vendors it is extremely difficult to plan budgets after the initial three years. Our experience was that cost for support quickly gets out of hand with legacy vendors. Since we are in the public sector we cannot plan for expensive services three years ahead.”

Mr. Caesar

IT Administrator at ICAMS
Ruhr University

The HPC network leverages Panasas storage, a special storage system for high performance parallel storage for technical applications and Big Data workloads. Panasas storage was designed and installed by MEGWARE. To store Big Data simulations for several weeks would be very expensive on the Panasas System, so ICAMS stores the simulations on a smaller mid-tier storage system that helps ICAMS to separate data creation and post-processing workloads. This second, non-high performance network is for the students' storage pool.

Challenges

After it was founded, ICAMS had a single central storage system for workstations and deployed NetApp storage to support it. In 2013, the network for students was ramped up from 30 to 50 workstations and the IT team decided to deploy a new system to give the pool more performance. After some research, the team decided to use a system based on ZFS that could also manage NFS. It also required a partner that could guarantee support for the system and the search quickly narrowed down to Nexenta. To test if a system based on Software-Defined Storage would fit ICAMS' environment, they used an existing system to install the NexentaStor Community Edition.

The ICAMS team wanted a partner they could rely on, and therefore support was a critical requirement. The experience with the Nexenta solution was positive

Impact on Education and Research

Nexenta's storage performance is key to efficient post-processing of the huge data files created by researchers' simulations. Nexenta's compression helps ICAMS manage valuable capacity, and its advanced caching capabilities ensure that the system can provide all participants rapid access to big files during an event.

throughout and as a result, the ICAMS team decided to go with Nexenta again to replace an existing standard RAID system from EonStore.

"There are quite a few Linux distributions on the market, but we required full support which quickly separated the wheat from the chaff and made Nexenta the obvious choice," says Mr. Caesar, IT Administrator at ICAMS. "We like that with Nexenta we were able to calculate the cost for the entire lifespan of the system right from day one. With other vendors it is extremely difficult to plan budgets after the initial three years. Our experience was that cost for support quickly gets out of hand with legacy vendors. Since we are in the public sector we cannot plan for expensive services three years ahead."

Solution and Benefits

Solution

MEGWARE, ICAMS' long-standing partner for HPC storage, answered the call, delivered, and designed a system based on standard Supermicro hardware. MEGWARE conducted a detailed data and application analysis that enabled the optimal ZFS configuration. Deployment and data migration went without problems and the system was fit for service in a single day.

The new Nexenta system, which has 60TB of storage and 256GB RAM, stores the results from the HPC cluster and provides them to researchers and students. Since some of the simulation results are huge single files and others are spread out over many single files, the storage performance has a strong influence on the time spent for post-processing.

"The only reason why we wanted to have a bit more juice than before is that the students are working live on the storage at certain events," Caesar explains. "At the beginning of the event they need to download files from the central location to be part of the session. In the past, 20 to 50 downloads in a short time slowed down the storage a lot and delayed the entire event.

System Configuration

- 64TB Capacity
- NexentaStor
- Supermicro SC846BE26-R920B
- 256GB System Memory
- 22x 3TB SAS Hitachi

The new Nexenta storage system has solved that problem with its Hybrid Storage Pooling capabilities that use flash and DRAM for caching."

Data reduction and snapshots are also features that make the system valuable for the team. Caesar says: "Some of our researchers create extremely big files and compression helps a lot to manage valuable capacity. We are very happy with the two Nexenta systems and can't recommend them enough. Our requirements for the HPC cluster are very special, which is why we use the specialized Panasas system with NFS. For all other purposes, we would not hesitate to go with Nexenta again."

Visit us online at nexenta.com

Lutz Daume, key account storage manager for MEGWARE added: “We have been ICAMS’ partner for more than 12 years, mainly because we can tailor our solutions individually. Our system offers exactly the performance ICAMS required for its model calculations.”

Benefits

NexentaStor can be used with standard hardware, providing a very favorable price/performance ratio for purchase and maintenance over the entire system lifecycle.

The full flexibility of Software-Defined Storage enables ICAMS to be free from vendor lock-in. ICAMS can use standard hardware to run NexentaStor systems to meet its different goals. ZFS combines with industry-standard support for hardware and software to provide tremendous flexibility, scalability, and potential for cost savings.

About MEGWARE

For 25 years MEGWARE Computer Vertrieb und Service GmbH has carved out its position as one of Europe’s leading supercomputing specialists.

The company from Chemnitz has gathered extensive experience in the development and installation of High Performance Computing (HPC) systems and Linux Clusters. MEGWARE has delivered and installed approximately a thousand HPC systems to research institutes, universities and enterprises.

A lot of implemented projects are among the most powerful systems worldwide and achieve excellent positions in the TOP500 global list of the most efficient HPC systems. Innovation is the essence of the MEGWARE strategy. Every year, the company invests in research and development, working closely together with the technology leaders.