

The University of Oslo shapes the future of high-performance computing with an HP Integrity Superdome based on Intel® Itanium® 2 processors



Founded in 1811, the University of Oslo is Norway's largest and oldest institution of higher education. It is also one of the country's most important research centers. Like many other universities, however, it faces increasing competition for the best students and researchers.

University of Oslo



### **More power**

To respond to these pressures, it is important to offer the best possible research facilities. This philosophy was behind the university's decision in 2000 to deploy Norway's first HP 9000 Superdome, and recently, to upgrade from this system to an Itanium 2–based HP Integrity Superdome running HP-UX 11i.

“Scientists need access to increasingly powerful computers to run their applications in order to run their calculations. If we can't offer them an outstanding high-performance computing environment, the quality of our research will suffer,” explained Lars Oftedal, assistant IT director at the university's Center for Information Technology.

About 100 end users tap into the HP Integrity Superdome on a regular basis, employing a variety of applications in areas such as chemistry, astrophysics, economics, physics, geophysics, and biology. Researchers can now tackle problems that were previously beyond their reach.

### **Meeting demands**

The first HP 9000 Superdome provided a sixfold increase in performance over the university's previous IBM SP2 machine. With the move to the HP Integrity Superdome based on the Intel Itanium 2 processor, performance is three to four times faster than the speed of the initial HP Superdome system.

“Research applications that used to take days to run now run in a few hours,” says Oftedal. “It's fair to say our users are very satisfied with the performance of the HP Integrity Superdome system.”

As with the HP 9000 Superdome, HP offered exceptional price/performance and a strong commitment to high-performance technical computing in Norway. There was plenty of technical help available, with substantial management involvement and the potential for bringing in resources from outside. HP also offered ideas for cooperative projects.

### **Smooth transition**

The move to the HP Integrity Superdome running HP-UX 11i went smoothly. Porting code from the previous PA-RISC–based system to the Itanium 2–based system was, according to Oftedal, exceptionally fast and easy. HP assisted by lending the university an HP Integrity rx2600 Server with Intel Itanium 2 processors for code compilation and testing, as well as providing upgrade planning and implementation support.

“HP's service and support teams were responsive and helpful during our transition to the HP Integrity Superdome server,” says Oftedal. “When there were minor issues with compilers or other glitches, we received exceptional assistance from HP in solving them.”

As with any major change, Oftedal says his users were initially concerned with the move to the HP Integrity Superdome—and specifically with application speed and stability, one of the hallmarks of the HP 9000 Superdome. Their fears proved unfounded.

Not only does the new HP Integrity Superdome system provide double the theoretical peak speed of the previous HP Superdome, but it also delivers three to four times the input/output speed needed for compute-intensive tasks. “The transition was seamless, and the new server and HP-UX 11i are exceptionally fast and stable,” said Oftedal.

Scientists at the university store terabytes of data each year, making secure data archival one of the university's prime requirements. In addition to the new server, an HP StorageWorks Enterprise Virtual Array 3000 is an important component of the solution.

“The HP StorageWorks Enterprise Virtual Array 3000 allows us to pool our storage and allocate storage capacity where needed, providing important flexibility for our researchers,” says Oftedal. “We can utilize our total storage capacity and manage it more efficiently than we ever could in the past, even increasing storage capacity without bringing down the system.”

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**Shaping the future**

With far faster disk access to files and extended storage capacity, the University of Oslo is helping to shape the future of high-performance computing. The university’s Itanium 2–based HP Integrity Superdome is among the fastest single-CPU systems and among the most powerful resources to NOTUR, the government-funded Norwegian High-Performance Computing Consortium.

NOTUR was formed to create scientific and technological innovations in Norway, including establishing a national infrastructure for high-performance computing, with leading-edge computer systems at several Norwegian universities. The HP Integrity Superdome system at the University of Oslo is a key asset in advancing NOTUR’s mission.

The new system is also advancing the university’s aim of attracting and retaining the best students and researchers. “We have several exciting new projects in physics, chemistry, economics, and biotechnology. Without the HP Integrity Superdome system, the people working on these projects might go to universities outside Norway to complete their studies. HP is helping us meet one of our key business challenges—to retain the best people,” said Oftedal.

## At a glance

- Industry sector: Education
- Name: University of Oslo
- Headquarters: Oslo, Norway
- Founded: 1811
- Telephone: +47 22 85 50 50
- Number of employees: 4,500
- Number of students: 33,000
- URL: [www.uio.no](http://www.uio.no)  
[www.hpc.uio.no](http://www.hpc.uio.no)

## Technology highlights

- Itanium 2-based HP Integrity Superdome with 64 processors and 128 GB of memory
- HP-UX 11i Operating System
- HP storage area network (SAN) with two Fibre Channel switches
- HP StorageWorks Enterprise Virtual Array 3000, fully populated (60 drives x 73 GB, 15K rpm, total of 4.4 TB)
- HP Surestore Disk Array FC60 with 49 x 73 GB disks

- HP Event Management System
- HP MeasureWare
- HP Process Resource Manager (PRM)
- HP Workload Manager (WLM)
- HP Developer Toolkit
- HP GlancePlus
- TotalView
- Caliper
- HP Message Passing Interface (MPI)
- HP MLIB
- HP-UX CIFS

## Why HP

- Best price/performance
- Commitment to Norwegian business
- Positive attitude to joint project work
- Exceptional service and support

### Challenge

- Attract and retain the best people
- Meet researchers' needs for high-performance computing
- Provide secure data archival
- Contribute ultra-fast machine to NOTUR

### Solution

- Replace HP Superdome system with HP Integrity Superdome
- HP StorageWorks Enterprise Virtual Array
- Service, support, and training from HP

### Results

- Threefold increase in average performance
- Easy transition with minimal porting effort
- Support for the powerful applications used in research
- Success in attracting new research groups
- Ability to contribute fastest single-CPU computer to NOTUR

To learn more, visit [www.hp.com](http://www.hp.com)

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