

Royal Dutch Meteorological Institute (KNMI)

Sun Success Story.



Dutch Weather Forecasting Institute Chooses Sun Fire™ 15K Server

Royal Dutch Meteorological Institute (KNMI), founded in 1854, is very familiar with the compute-intensive challenge that weather forecasting and research demands. Since 1995, KNMI has operated as an agency of the Ministry of Transport, Public Works and Water Management. It is the operational center responsible for the Netherlands weather forecasting, including observing weather, climate, and seismic activity. Additionally, KNMI is the national center for climate and weather research and seismology, focusing on climate monitoring, identifying weather patterns, studying meteorological data and seismology, and providing information to the public.

Like all other meteorological institutes in the world, KNMI is a member of the World Meteorological Organization (WMO). For more than a hundred years, these institutes have exchanged data on a daily basis using the Global Telecommunication System (GTS). The exchange of all different types of data between the various institutes occurs by an internationally standardized agreement specified by the WMO. In developing countries the original telex network often makes this exchange, while in industrialized countries, such as the Netherlands, this is done using modern network technology.

To provide all the target groups with the requested information, KNMI receives over five gigabytes of raw data daily that must be transformed into a weather forecast or a research report. Part of this data comes from KNMI's own nationwide network including data from 40 observation stations, 300 rain observation stations, and two radar stations. For research purposes, most data is received via the GTS network. On a daily basis, approximately one gigabyte of raw data is exchanged with other meteorological institutes in the Netherlands and abroad. In addition, more than four gigabytes arrive via the Internet every day. The computer model that analyzes all this data and calculates weather for the Netherlands every three hours is the High Resolution Limited Area Model, known as HIRLAM. The accuracy of the results provided by HIRLAM strongly depends on the size and speed of the computers running the computer models.

Company

Royal Dutch Meteorological Institute (KNMI)
www.KNMI.nl

Industry/Market

Weather forecasting (Government Agency)
 High Performance Computing

Products/Services

- Sun Fire™ 15K server
- Sun Enterprise™ 3000 servers
- Sun Enterprise 250 servers
- Solaris™ 8 Operating Environment
- Solaris Resource Manager™ software
- UltraSPARC® III Cu Processors

Key Business Benefits

- Sun Fire 15K server replaces two Silicon Graphics servers, providing 20 times more performance, thereby drastically improving accuracy of weather forecasts
- Solaris Resource Manager (SRM) software dynamically allocates resources to specific tasks eliminating down time and costly human intervention
- Dynamic System Domains (DSD) allow isolation of tasks, while applications run concurrently – significantly improving performance, workload, and uptime
- Sun Fire 15K server provides room to grow and meet the expected doubling of workload in the next year
- Investment protection allows new processors to be added for a smooth and simple future upgrade path

“We have increased our performance approximately twenty fold... The Sun Fire 15K server is helping us increase productivity now, and setting us up to meet our tremendous future growth, cost-effectively.”

“After an extensive analysis of possible vendors, we chose Sun Microsystems, Inc. and specifically the Sun Fire 15K server to replace the old computers... It was crucial to us to have a server run applications simultaneously even though we had a different set of performance goals for each of the applications.”

Dr. Rene van Lier
Coordinator of the Computer Center
Royal Netherlands Meteorological Institute

“After an extensive analysis of possible vendors, we chose Sun Microsystems, Inc. and specifically the Sun Fire 15K server to replace the old computers,” says Dr. Rene van Lier, Coordinator of the Computer Center at Royal Netherlands Meteorological Institute. “Most important to us was the Solaris Resource Manager™ (SRM) feature, which allocates the appropriate compute resources to running HIRLAM in a continuous, and more cost-effective manner. In addition, SRM provides more flexibility, because we can now simultaneously run our forecasting and weather and climate research much quicker and with less human intervention.”

Solaris Resource Manager Software Allocates System Resources Cost-Effectively

The practice of hosting one application per system for more predictable service levels has proven to be too expensive and unmanageable. As IT managers pressured to provide a predictable level of service under increased application workloads, while maintaining similar budgets, it's more important than ever to ensure that IT systems are running cost-effectively and efficiently.

Sun's Solaris Resource Manager (SRM) software helps control costs and ensure that the enterprise applications critical to a company's business are allocated their share of available system resources. One of the key features of SRM is its ability to consolidate multiple applications, on a single UNIX® platform server, and deliver predictable levels of service.

SRM allows the system administrator to set and enforce policies that control how resources are used, then SRM dynamically allocates unused CPU capacity to active users and applications, thereby increasing resource utilization. Consequently, multiple users, groups, and applications can be guaranteed predictable service levels on a single server. In other words, the company's enterprise makes the most of the resources it already has in place.

For KNMI, SRM helps the site run applications simultaneously for both weather forecasting and weather and climate research models in a way previously impossible. “It was crucial to us to have a server run applications simultaneously even though we had a different set of



performance goals for each of the applications,” says van Lier. “For instance, now our weather forecasting program is assigned a certain share of compute resources with top priority. But when that program is quiet, SRM reallocates idle resources to the weather and climate research programs.”

“In addition, online maintenance is so easy now, if a problem occurs, we fix it on-the-go. In the old situation, when a CPU failed we had to shut the system down which was very time consuming.” Other key benefits of SRM include reduced service level costs, increased flexibility in prioritizing applications and users, and increased efficiency and control in how compute resources are used.

KNMI Increases Performance Gains by Twenty Fold

Another huge benefit KNMI is reaping from its transition to the Sun Fire 15K server and SRM lies in the improved accuracy of its weather forecasts. In the old computer model, a geographic area was divided into sectors measuring 55x55 kilometers. On the Sun computer model, HIRLAM works with sector sizes of 22x22 km and a zoom option of 11x11 km. “This means we have enormously increased the amount of data received, which translates to significantly increased accuracy in the ability to predict small scale weather effects and weather forecasts,” says van Lier. “For example, now we can predict storms much better and advise boaters to keep out of the water, therefore possibly saving lives.”

Get the details.

Sun's Sun Fire 15K server helps KNMI increase its compute-resource utilization rates and performance, resulting in more accurate weather forecasts and climate research.

www.sun.com/servers/highend/SunFire15K/

Not only has the Sun Fire 15K server increased the amount of weather data gathered, it also has increased performance dramatically. “We have increased our performance approximately twenty fold,” exclaims van Lier. “The Sun Fire 15K server is helping us increase productivity now, and setting us up to meet our tremendous future growth, cost-effectively.” The Sun Fire 15K server is designed with performance and scalability in mind. With up to 106 high-performance UltraSPARC® III 900-MHz processors in a symmetric multiprocessing architecture, processors can be added as required by workloads. And the Solaris™ 8 Operating Environment can easily handle the huge data sets and enormously compute-intensive calculations that weather forecasting demands.

Increased performance, room to grow cost-effectively, and increased availability and flexibility are benefits any IT manager likes to gain.

Currently KNMI is using 48 CPUs but is expecting to experience tremendous growth in the future. “Since we have room to grow, we know we can easily add CPUs to meet our expected doubling in production and capacity in the next year,” explains van Lier. “Furthermore, our code is portable, so we can easily move to a new Sun product, seamlessly, if necessary.”

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